

# **Measuring taxable capacity in Libya**

*By: MOHAMED ABDALAZIZ*

*PhD in Economics*

*A Thesis submitted to the University of Gloucestershire for the Degree of Doctor of  
Philosophy in Economics.*

*July 2012*

## DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No element of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Signed.....Date.....

## **Dedication**

This work is dedicated to the memory of my father. I am greatly indebted to my beloved mother who has always prayed for me and sacrificed a lot for my success; also to my brothers who have never failed to support me each step of the way. As to my wife, a word of thank you is not enough to describe her persistent encouragement and contribution in the success of this research. Her patience and sacrifice in looking after the children are greatly appreciated. Lastly, I send my thanks to my children Nada and Younis for their love.

## **Abstract**

This thesis measures the tax effort and taxable capacity in Libya and examines an important research question: "Has the tax burden reached the level of full tax capacity in Libya?". The main motivation of the study is the need to diversify the sources of the Libyan economy. To this end the thesis presents a conceptual framework for tax burden, excess of tax burden, theory of optimal taxation, concept of taxable capacity, concept of tax effort. The framework is used to review the developments of the Libyan economy and the impact on tax effort. The thesis has explored several aspects of tax performance in Libya. First, it analyses the trends of public revenues, public revenues, public spending in final stances of the government. Second, it studies the tax structure and the relative importance of tax sources through the analysis of marginal propensity to tax and the income elasticity of taxes. Third, it examines the evolution of Libya's tax system particularly the income tax system. Finally, various econometrics models such as OLS regression, Ordinary ridge regression, and Unbiased ridge regression are used to measure the tax performance such as tax burden, tax effort and tax capacity using time series data covering 1970 to 2000, and panel data covering 2001 to 2007. A fixed and random effect model are used to compare if the determinants of Libya's tax efforts differ from that of a range of selected oil producing countries. These countries are: Algeria, Argentina, Bahrain, Bangladesh, Bolivia, Botswana, Brazil, Cameroon, Chad, Chile, Colombia, Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Ecuador, Egypt, Emirates, Ethiopia, Ghana, Guatemala, Guyana, Indonesia, Iran, Kenya, Kuwait, Lesotho, Libya, Mauritania, Nigeria, Oman, Peru, Saudi, Trinidad and Tobago, Tunisia, Venezuela, Yemen, Zambia, Zimbabwe.

This research consists of seven chapters: Chapter One provides a background; Chapter Two provides the literature review; Chapter Three

gives a brief overview of the development of the Libyan economy, while in Chapter Four there is a description of the public finances in Libya; this is followed in Chapter Five by a review of the tax system in Libya; Chapter Six presents the study's analyses and findings; Chapter Seven provides the conclusions and recommendations.

The main findings of this research are: First, in Libya, tax burden per capita is high; Second, the tax bases in Libya were narrow reflecting the government's heavy reliance on oil revenue; Third, the level of taxable capacity in Libya is also low compared to the selected oil producing countries for a variety of reasons, including: narrow tax bases, failure to diversify the tax sources, and the public sector being subject to tax. The argument is presented that the Libyan economy has reached the full utilization of its taxable capacity.

In addition, the study found that the following factors have a major positive impact on Libya's taxable capacity and tax effort: the national product of the service sector, money supply, level of business freedom, level of economic freedom, currency in circulation and tax penalties. In contrast, two factors are found to be negatively affecting the taxable capacity and tax effort in Libya: non-oil exports, oil revenues.

The contributions of this study to the literature are twofold: first, this is the first of its kind to provide comprehensive analyses of Libya's tax performance; Second, it has added some new variables such as oil revenues, non-oil exports, currency in circulation, money supply(M1), and tax penalties in testing the determinants of tax effort into the model built by previous researchers. Finally, the research results shed lights on how Libya government may diversify the Libyan economy and encourage growth in the non-oil private sector through proper taxation mechanisms.

## Contents

Declaration	1
Dedication	2
Abstract	3
Contents	5
List of Tables	12
List of Figures	14
Acknowledgements	15
Chapter One : Introduction	16
1.1 Background	16
1.2 Problem of the research	17
1.3 Research Questions	20
1.4 The aims of the Study	21
1.5 Methodology of the research	22
1.6 Importance of the study and its contribution	23
Chapter Two: Literature Review	26
2.1. Introduction	26
2.1.1. Meaning of tax and its classification	27
2.2. Tax burden and its measurement	28
2.2. 1. Tax burden and equity.	30
2.2.2. Excess of tax burden	34
2.2.2.1. What does excess tax burden mean?	34
2.2.2.2. Private sector and excess tax burden	36
2.2.2.3. Estimating excess tax burden	39
2.2.2.4. Distribution of tax burden	41
2.2.2.5. What is the relationship between excess tax burden, tax rate and tax revenues ?	42
2.3. Theory of optimal taxation	43
2.3.1. The optimal tax on commodities	44
2. 4. The concept of taxable capacity for the national economy and its measurements	48
2. 4.1. The concept of taxable capacity	48
2.4.1.1. Laffer curve and the absolute taxable capacity	51
2.4.1.2. Tax effort and the relative taxable capacity	58
2.4.1.3. The measurement of taxable capacity	60

a) Regression Analysis Approach	63
a. i ) Stochastic Model	64
a. ii) Panel data	64
b) Representative Tax System Approach	66
2.5. The concept of tax effort	68
2. 5.1. The importance of measuring the tax effort	69
2. 5.2. Factors affecting tax effort and taxable capacity	71
a) The size of foreign trade	73
b) Structure of the national economy	76
c) The income level and economic development	78
2. 6. Previous studies on tax effort	83
2.7 Conclusion	109
Chapter Three: The Development of the Libyan Economy.	111
The development of Libyan Economy during the period 1970 -2005	111
3.1 - Libya's economic structure and sectoral contribution to GDP	111
3.1.1- The development of value added of the agricultural sector	111
3.1.2- The development of value added of manufacturing industries	112
3.1.3- The development of value added of other non-oil sectors	113
3.1.4- The development of value added of the non-oil sector	114
3.1.5- The development of value added of the oil sector	115
3.2- Development of the gross domestic product	116
3.3- The main characteristics of the Libyan Economy	117
3.4- Income and product analysis in the Libyan economy	118
3.4.1-The economic development in Libya and its impacts on tax effort/burden in subsequent periods	118
Firstly, during the period 1970 - 1979	119
Secondly: the period 1980 - 1989	121
Thirdly, the period 1990 - 2005	126

3.4.2- The development in the individual's money and real income from 1970-2005	129
Chapter four: Development of the public finances in Libya.	132
4.1 The development in public revenue during the period 1970-2005	132
4.2 Development of public expenditure in the period 1970- 2005	133
4.3 The status of the public budget during the period 1970- 2005	135
Chapter Five: The Tax System in Libya.	138
5.1 Introduction	138
5.2 Libyan Tax Structure	138
5.2.1 The rate of direct taxes	139
5.2.1.a The Libyan Income Tax System, 1968 – 1973	140
5.2.1.b The Libyan Income Tax System, 1973-2004	141
5.2.1.c The Libyan Income Tax System, 2004 – 2005	145
5.2.1.d The main features of the new Income Law	146
5.2.1.e Social security deductions	155
5.2.1.f Exemption from the Specific Income Taxes	162
5.2.2 Indirect taxes	165
5.2.2.1 Customs taxes	165
5.2.2.1 .a Import tax	166
5.2.2.1 .a .1 Specific taxes	167
5.2.2.1 .a.2 Advalorem taxes	167
5.2.2.1 .a.3 Preferential duties	167
5.2.2.1 .a.4 Customs surcharges and indirect taxes	167
5.2.2.1 .a.5 Customs tax exemptions	170
5.2.2.1 .b Export tax	171
5.2.2.1 .c Charitable Tax	171
5.2.2.1 .d Municipality Tax	171
5.2.2.1 .e Tax of the Man-Made river project	171
5.2.2.1 .f Stamp tax for customs purposes	171
5.2.2.1 .g Quayages (Quay returns)	171

5.2.2.2	Production & Consumption Tax	172
5.2.2.3	General Stamp tax	172
5.2.2.3.1	Stamp Tax on Documents/Writs	173
5.2.2.3.2	Stamp tax on disposition/transaction	173
5.2.2.3.3	Stamp Tax Law No. 12 of 2004	173
5.2.2.4	Tax of Entertainment	176
5.2.2.5	Tax for the Blind	176
5.3	Tax revenue in Libya during the period 1970-2005	177
5.3.1	Revenue from direct taxes during the period 1970-2005	177
5.3.2	Revenues from indirect taxes during the period 1970-2005	190
5.4	The relative importance of direct and indirect tax revenue during the period of 1970-2005	194
5.5	Marginal propensity to tax in the Libyan economy	197
5.6	Income elasticity of tax in Libya for the period 1970-2005	198
5.7	Evaluation of Libyan Income Tax system	211
5.7.1.	Introduction.	211
5.7.1.1	Role of Tax Policy in Economics.	212
5.7.1.2	General conditions for any good tax system.	214
5.7.2	Aims of the Libyan Tax System.	216
5.7.2.1	Libyan Tax Law Structure.	218
5.7.2.2	Principles and Canons of Evaluation of Taxes on Income System.	219
5.7.2.3	Tax System and Accomplishment of Objectives.	220
5.7.2.3.1	Justice of Distribution of Financial Burdens.	220
5.7.2.3.1.1	Actual Tax Rates.	221
5.7.2.3.1.2	Tax Exemptions.	225
5.7.2.3.2	Tax System and Objective of Income Re-distribution.	226
5.7.2.3.3	Tax System and Financing Objective (Financial).	228
5.7.2.4	Extent to which the Tax system is Subject to General Principles and Rules of Tax Imposition.	231
5.7.2.4.1	Tax Generality.	231
5.7.2.4.2	Double Taxation.	233
5.7.2.4.3	Tax System and the Inflation Problem.	234
5.7.2.4.3.1	Tax Rates.	234
5.7.2.4.3.2	Tax Base.	235
a)	Effect on Limits of Tax Exemption.	235
b)	Effect on Amortization Instalments.	235

c) Effect on Real Assets.	236
d) Effect on Indebtedness.	236
5.7.2.2.4 Tax System and Tax Incentives.	236
a) Investment Incentives.	236
b) Saving Incentives.	237
c) Production Incentives.	238
5.7.3 Conclusion.	238
5.7.4 Resources for Financing the Public Budget.	241
5.7.4.1 Revenues of Natural Resources Owned by Society.	241
5.7.4.2 Return on Capital Invested in Society	241
5.7.4.3 Tax Revenues	242
5.7.5 Economic Policy.	242
5.7.5.1 Openness of Libyan Economy	245
5.7.5.2 Structure of the Tax System.	246
5.7.5.2.1 Tax System and Economic System.	248
5.7.5.2.2 Tax system and the Economic situation.	253
5.7.5.2.3 Tax system and Financing Objectives.	254
5.7.6 Problems and difficulties the tax system faces.	256
Firstly: Problems of Tax Policy (Tax Legislation).	256
Secondly: Difficulties and problems of Tax Administration.	257
5.7.6.1 Problems of legislative provisions.	258
5.7.6.2 Problems resulting from the application environment.	260
5.7.6.3 The problems resulting from tax administration (Tax Authority).	263
5.7.7 Conclusion.	263
5.7.8 Tax Reform.	264
5.7.8.1 Economic Effectiveness of Tax System.	269
5.7.8.2 Reform Required for the Tax System.	270
5.7.8.3 Areas of tax reform.	270
5.7.8.3.1 Expansion of tax base.	271
5.7.8.3.2 Adjustment of tax rate.	272
5.7.8.3.3 Consistency between fiscal tools.	272
5.7.8.3.4 Improvement of the performance of the tax administration.	272
5.7.8.4 Conclusion.	272
 Chapter Six: Measuring the tax burden and tax effort for the national economy in Libya.	 275
6.1 Introduction.	275
6.2 Measuring the individual tax burden in Libya, 1970-2005.	275

6.2.1 Direct taxes per capita.	276
6.2.2 Indirect taxes per capita.	277
6.2.3 Total taxes per capita.	277
6.3 The model description	280
6.3.1 Measuring the Libyan tax effort, 1970-2000.	280
6.3.2 Identification of multicollinearity problem.	280
6.3.3 Regression methods and treatment of the multicollinearity problem.	282
6.3.3.1 OLS Regression Model	285
6.3.3.2 Ordinary Ridge Regression Model (ORR).	286
6.3.3.3 Unbiased Ridge Regression Model (URR).	286
6.4 Estimating Libya's tax effort.	288
6.4.1 Data description.	288
6.4.2 Detecting multicollinearity for the variables used in this study.	290
6.4.3 Regression results.	292
6.5 Comparing the Libyan tax capacity and tax effort with selected oil producing countries over the period 2001-2007.	300
6.5 .1. Introduction.	300
6.5.2. The methodology.	303
6.5.2.1 Analysis objectives.	303
6.5.2.2 Statistical Methods and Analyses.	308
6.5.2.2.1 Panel Regression Model and its different types.	310
6.5. 3. Data and Variables used in the study.	313
6.5 .4. Analysis and Results.	317
6.5.4.1 Cross Sectional Analysis.	317
6.5.4.2 Panel Data Analysis.	322
6.5. 5. Summary of the empirical results.	327
Chapter Seven: Conclusions and recommendations of the study.	328
7. 1 Summary of this study.	328
7.2 Empirical results of the study.	328
7.2.1. The main empirical results.	328
7.2.2. Regression results.	331
7.2.2.1. The ORR: Determinants of Libya's Tax Capacity between 1970 and 2000.	331
7.2.2.2. Cross-sectional Regression: Determinants of Libya's Tax Capacity between 2001 and 2007, and Comparison with that of Selected Oil-Producing Countries.	332

7.2.2.3. Panel data regression: Determinants of Libya's Tax Capacity between 2001 and 2007 and Comparison with that of Selected Oil-Producing Countries.	333
7.3 Implications and recommendations of the study.	335
7.4. Contribution of this study.	337
7.5. Limitation of this study and a proposal for future studies.	340
7.6. Policy Implications.	342
Appendices	345
Bibliography	433
Glossary	454

## List of Tables

Table( 1 ):The Gross Domestic Product at current factors cost - by economic Sectors ( LYD million)	345
Table ( 2 ) The structure of GDP at current factors cost -Economic Sectors ( %)	346
Table ( 3 ) Exports and Imports of Goods and Services in Libya* ( LYD/million )	347
Table ( 4 ) Rate of change in GDP in Libya	349
Table ( 5 ) The evolution of per capita nominal/real income in Libya	350
Table ( 6 ) Average monthly/annual income of employees in the Libyan public sector, (LYD/million)	351
Table ( 7 ) The public revenues in Libya LYD/million	352
Table ( 8 ) Structure of the public revenues in Libya, percentages (%)	354
Table ( 9 ) The nominal and real world prices for crude oil	355
Table ( 10 ) Non- Oil Revenues , percentages (%)	356
Table ( 11 ) Proportion of the actual public revenues to the GDP in Libya ( the values in LYD/million )	357
Table ( 12 ) The actual and estimated public expenditures in Libya, LYD/million	358
Table ( 13 ) The relative importance of public expenditures in Libya, (%)	360
Table ( 14 ) Comparison between the public expenditures and the public revenues in Libya	361
Table ( 15 ) The public expenditures in Libya (Annual increasing rate, %)	362
Table ( 16 ) Allocations of the Administrative budget in Libya during different years	363
Table ( 17 ) Evolution of the public expenditures, revenues & deficit / surplus in the public budget and income elasticity / marginal propensity to public expenditure.	364
Table ( 18 ) Evolution of investment expenditure; oil revenues and deficit/surplus in the development budget & the marginal propensity and income elasticity of the investment expenditures in Libya .	365
Table ( 19 ) Evolution of the current (administrative) expenditure; non-oil revenues and deficit/surplus in the administrative budget & the marginal propensity and income elasticity of the administrative expenditures in Libya .	366
Table ( 20 ) Proportion of the public revenues , surplus/deficit to the GDP in Libya	367
Table ( 21 ) Assets & Liabilities of Central Bank of Libya , LYD/Million	368
Table ( 22 ) Money Supply and its factors affecting (LYD/million)	369
Table ( 23 ) The relative importance of taxes to operating surplus in the non-oil sectors in Libya, (LYD/million)	370
Table ( 24 ) Tax on the real estate incomes & Tax on Business incomes, LYD/million	371
Table ( 25 ) Tax on individuals incomes , (LYD/ million)	372
Table ( 26 ) total of incomes tax, (LYD/ million)	373
Table ( 27 ) The total deposits collected by tax authority for benefit of other parties. (LYD/Million)	374
Table ( 28 ) Total of fines & seizures and miscellaneous accruals, (LYD /millions)	375
Table ( 29 ) Indirect taxes revenues in Libya , (LYD/million)	376
Table ( 30 ) Total stamp tax, (LYD / million)	377

Table( 31 ) The evolution of tax revenue in Libya during the period of 1970-2005 , ( Values in current prices )	378
Table ( 32 ) Population of Libya, ( millions )	379
Table ( 33 ) Evolution of employees numbers in Libyan Economy, ( Thousands employees )	380
Table ( 34 ) The average daily exchange rate announced by the Central bank of Libya	381
Table ( 35 ) The developing of a general cost of living index in Tripoli City	382
Table ( 36 ) Annual growth rate of individual money/real income in Libya	383
Table ( 37 ) Compensation of employees in the public sector in Libya, ( LYD million )	384
Table ( 38 ) GDP at current and constant prices in Libya ( LYD / million )	385
Table ( 39 ) Tax on Agricultural income, ownership of livestock and other items ( LYD/million )	386
Table ( 40 ) Total of tax payments to the municipalities ( LYD/million )	387
Table ( 41 ) Direct taxes revenues in Libya , ( LYD/ million )	388
Table ( 42 ) The difference between the actual and estimated public revenues in Libya , ( LYD/million )	389
Table ( 43 ) The proportion of actual public revenues to the estimated public revenues in Libya.	390
Table ( 44 ) The difference between estimated and actual expenditures in Libya.	391
Table ( 45 ) The ratio between public expenditure and the public revenues in Libya. (%)	392
Table ( 46 ) Libyan Non-oil Exports, LYD/million .	393
Table ( 47 ) Gross fixed capital formation in Libyan economy at current prices (million LYD).	394
Table ( 48 ) Individual tax burden in Libya during 1970-2005 , US\$ / year	395
Table ( 49 ) Country wise actual tax burden (%) for the period 2001 to 2007	396
Table ( 50 ) Country wise estimated Taxable Capacity for the period 2001 - 2007	397
Table ( 51 ) Country wise estimated Tax effort for the period 2001 - 2002	398
Table ( 52 ) Country wise comparison with the overall average actual tax burden (%) for the period 2001 to 2007	399
Table ( 53 ) Country wise comparison with the overall average estimated taxable capacity (%) for the period 2001 to 2007	400
Table ( 54 ) The variables used in OLS , ORR , URR analysis for the period 1970-2000 in Libya	401
Table ( 55 ) Selected variables for Libya during 2001-2007	402

## List of Figures

Figure 2.1 Lorenz curve	403
Figure 2.2 Effects of selective tax and Lump-sum Tax on consumer behaviour	403
Figure 2.3 The analysis of excess burden	404
Figure 2.4 Total Efficiency Loss of Economy	404
Figure 2.5 Tax effects in the product market and the role of price elasticity in burden distribution	405
Figure 2.6 Effects of tax rates on total revenue and excess burden	405
Figure 2.7 Growth direction of tax revenue and excess burden	406
Figure 2.8 Rent seeking cost	406
Figure 2.9 Laffer curve	407

## ACKNOWLEDGEMENTS

This research project would not have been possible without the support of many people. I am heartily thankful to my supervisors whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of my subject in the PhD program. Their wisdom and critical analysis were invaluable.

Thanks are also due to Prof. Barry Davies, for his encouragement and assistance in facing the particular challenges of my research.

I would also like to acknowledge the contributions of Dr Philippa Ward, Dr Yi Zhu and Prof. Tony Gear, and the staff of the Cheltenham International Language Centre who supported me. I received invaluable support from the library staff of the University of Gloucestershire, which institution provided me with an appropriate environment for completing my study. I offer my regards and blessings to all of those who supported me in any respect during the completion of the thesis.

Lastly, my heartfelt thanks go to my family, without whose support I would not have been able to complete this study; in particular to my Mother, my Brothers , my Wife, my daughter Nada and my son Younis.

## **Chapter One**

### **Introduction**

This chapter outlines the background to the study, the research problem, the research questions, the study objectives, and the importance of the study.

#### **1.1 Background**

An increase in interest in the topic of taxes has accompanied the development of countries all around the world, not only because of the resources they represent, but for the use they can be put to as a tool for social and economic policy, to achieve the objectives of countries. Taxes affect all areas of economic and social life; the importance of these effects has increased with the widening role of the state and its increased intervention in economic affairs, and the evolution of the concept of public finances. Therefore, countries are trying to reform their taxation through the design of more efficient systems, which include taxes that are more politically and socially acceptable and applicable, and are able to achieve sufficient income, provided there are no economic distortions as a result of these taxes.

However, the fiscal policy in Libya has not hitherto depended in general on the use of taxes as a financing tool, for several reasons, such as the abundance of oil resources, which meant that increases in the size of public spending were financed through monetary issuance. In the meantime, because the Libyan general budget mainly depended on one resource, which was oil revenue, this led to instability in the Libyan economy, and poor distribution of income and wealth among the members of the society. With this in mind, the Libyan government's effort to diversify its revenue sources since the mid-1980s had as its aim the development of taxes.

Due to the instability of oil revenues (and customs revenues), whereby Government funding was particularly affected when the oil price fell to \$13.5 a barrel in the mid-1980s, Libya has been trying to alleviate its dependence on oil revenues and move towards a transition to a free-market economy. Thus, it became necessary to use tax as an important tool to finance the expenses of the state, and the development of a tax system to suit the requirements of a free market and economic globalisation. Therefore, the optimal control of the tax system is necessary, which is an essential tool that the industrialised countries depend on to achieve and guide their development programmes. When tax is considered a successful tool, the state can use it for many purposes, such as controlling some of the economic phenomena of a state, encouraging certain economic activities, or limiting some other undesired economic activities. So Libya is considering how best to utilise its tax system in the search for alternative (non-oil) resources, which it can use to cover expenses and to achieve more sustainable economic development. Moreover, the Libyan government is fuelling the development of economic activity outside the oil sector by encouraging foreign and local investment in the non-oil sector in order to achieve tax revenues.

As a result, measuring the tax burden is of great importance, as it gives a clear picture of the nature of the prevailing tax system and its weaknesses. The measurement of the taxable capacity of a state also provides information on the financial capacity of the national economy and demonstrates the maximum tax that can be paid by the society in order to finance public services without harming economic development.

## **1.2 Problem of the research**

The Libyan economy has several salient features, such as its status as a mono-economy dependent predominantly on one resource, the difficulties it faces in its transition to a free economy, and the decline in foreign investment it is

facing for a variety of reasons both within and beyond its control. This research attempts to examine the factors most influential on tax effort and taxable capacity, which prevent the realisation of the optimal level of tax burden in the Libyan Economy.

The main reason for this study to be conducted is the occurrence of certain economic developments that require a re-examination of the tax effort index. Among these developments are the need for economic diversification, the shifting of the Libyan economy to a free market, and low levels of foreign investment. These problems are clarified as follows:

### **1. The need to diversify sources of national income:**

In the 1970s, the oil wealth of Libya led to some improvement in living standards, attracting investment and infrastructure development. However, it is also true that the economy has been so far been characterised by the features of an oil economy, which can be summarised in three elements:

First: Mono-economy (or rentier economy, see glossary), characterised as an economy in which the oil business is the main factor contributing to economic growth. As a result, fluctuations in world oil prices often lead to fluctuations in economic growth.

Second: Due to the mono-economic structure, oil revenues are the main drivers stimulating the Libyan economy. The abundance of oil leads to an increase in income, whether through direct shifts or by increasing the levels of wages and the expansion of jobs, all of which leads to increased purchasing power in society: this means transferring surplus oil revenues abroad. This in turn leads to a deficit in the balance of payments, because the wealth of the economy leaks abroad in the form of increasing imports. Tax policy has the potential to modify the balance of payments.

Third: There is unbalanced development at the district level linked geographically to the natural distribution of oil wealth, a pattern that is not easy to change or modify in terms of its social and economic effects. Tax policy at the district level can help a lot to change this pattern.

Although the non-oil sector in Libya has seen remarkable growth over previous years, the Libyan economy has not been completely free from the problem of a high dependence on oil; and since the beginning of the 1970s, until 2005, there was a notable instability of growth rates of GDP, so the economy was exposed to relative decline in the rates of economic growth in some years.

The national economy is still mainly dependent on the oil sector, resulting in the following:

- Dependency of the national economy on world oil market price fluctuations.
- Intensity of global competition and entry of new and strong competitors.
- High population growth.
- Focus of foreign investment in the oil business in Libya.
- Libya's obligations in terms of bilateral economic agreements.
- Increased staffing requirements (job creation) and the inability of the public sector to provide a sufficient number of jobs.

The Libyan economy depends primarily on oil, but oil prices are unstable, and oil revenues witnessed a marked deterioration in the mid-1980s. As a direct result of the low oil price, falling from \$26.5 per barrel in 1985 to \$13.5 in 1986, this situation led to the need to increase non-oil revenues to cover the shortfall in oil revenues.

## **2. Transition to a free market economy (privatisation):**

Libya, as a developing country, seeks to raise the rate of economic growth through a transition from a socialist system to a free market economy. Some steps have been taken to achieve this change, such as economic reforms in accordance with international standards, maintenance of economic resources and wealth, and creation of new sources of finance (i.e. resources that are not derived from oil).

## **3. Decline in foreign investments:**

A favourable tax policy can significantly contribute to attracting foreign capital by providing an attractive climate for investment. This is because the stability of the tax system stimulates the inflow of foreign direct investment, and also stimulates the investment of domestic capital locally, and prevents its leakage abroad. Therefore, the Libyan government needs to design an appropriate tax system to attract foreign capital.

## **4. Inadequacy of the tax system:**

The tax system prevailing in Libya during the study period was a system that was wholly inappropriate for all these political, economic and new social developments. It has not been revised since 2004.

### **1.3 Research Questions:**

1- What was the tax revenue performance during the period of the study?

2- What were the key determinant factors affecting the tax effort in Libya?

What social and economic factors and proxies affect the tax effort and show a positive and significant relation to the tax ratio; for example: tax penalties, money supply, non-oil exports, and oil revenues?

3- Has the Libyan tax effort not reached its optimal level because of:

- a) Low tax burden,
- b) Low taxable capacity,

or for some other reason?

4- What policies might be suggested to improve taxable capacity in Libya?

The variables mentioned in question two are expected to be important factors because the payment of tax is a monetary phenomenon and these factors have a strong influence on the tax structure and the Libyan economy.

#### **1.4 The aims of the Study**

The main purpose of this research is to estimate the optimal standard of the taxable capacity in the Libyan economy and make recommendations for improving Libyan tax effort. This study aims to:

- ( 1 ) Examine current tax revenue performance, and investigate the possibility of improvement.
- ( 2 ) Investigate the key determinants affecting tax effort.
- ( 3 ) Identify the nature and characteristics of the tax basis, establishing the tax basis field and range, and assessing the economic advantage or usefulness of the expansion and diversity of the tax base.
- ( 4 ) Explore whether the tax burden has reached its optimal level .
- ( 5 ) Provide recommendations for policy makers to improve tax effort.

( 6 ) Measure the Libyan tax effort compared with other selected oil producing countries .

### **1.5 Methodology of the research**

In order to measure the tax effort inside Libya during 1970 - 2000, this study used three regression models: ordinary least squares (OLS), ordinary ridge regression (ORR), and unbiased ridge regression (URR) .

The OLS method examines the relationship between the dependent variable and the independent variables. Under the Gauss-Markov assumptions, the OLS estimator is the best, linear, unbiased estimator of the true parameters  $\beta_i$ , conditional on the sample values of the explanatory variables. The goal of OLS is to closely ‘fit’ a function with the data. It does so by minimizing the sum of squared errors from the data.

ORR is obtained from Ordinary Least Squares (OLS) by adding a small constant to the diagonal elements of the matrix  $X'X$ , which improves the estimation to get a smaller mean squared error than ordinary least squares.

The URR method is based on realistic empirical prior information that can be measured by taking the average of the regression coefficients of OLS. URR regression achieves a smaller mean squared error than ORR and is more stable than the OLS. Meanwhile, the URR method leads to smaller mean square error (MSE) than the ORR procedure, and substantially smaller than OLS.

The dependent variable is the contribution of tax revenue to gross domestic product ( $T_y$ ); this is the variable representing the process the study is trying to predict and understand. After estimation  $\hat{T}_y$  became as indicator of the taxable capacity. The four explanatory variables are: non-oil exports (nox); tax penalties (vp); oil revenues (oilR); and money supply (Msp): these are the variables used to model or to predict the dependent variable values, where  $T_y$  is a function of

nox, vp, oilR, and Msp. The number of observations is 31 for the period of 1970-2000 .

The regression coefficients ( $\beta$ ) are computed by the regression models. They are values, one for each explanatory variable, that represent the strength and type of relationship the explanatory variable has to the dependent variable.

For the period 2001-2007, cross-sectional analysis and panel data analysis were used for measuring the comparative tax effort, by measuring the indices of tax effort for Libya and comparing them with some other oil producing countries. Using cross-sectional analysis, the sample is 34 countries and independent variables are: Service, value added as share of GDP; Index of fiscal freedom; Index of business freedom; Currency in circulation % of GDP; Index of trade freedom; Agriculture, value added as share of GDP. Meanwhile, the sample in the panel data analysis is 38 countries , and the independent variables are: Agriculture, value added as share of GDP; International trade as share of GDP; Annual rates of inflation % growth; Index of economic freedom; Corruption perception index; Shadow economy index.

The index of tax effort is constructed as the ratio of actual tax share to the predicted tax share.

### **1.6 Importance of the study, and its contribution**

This study attempts to examine the tax policy performance of the Libyan economy, during the period 1970-2000, then to make a comparison with selected oil producing countries during the period 2001-2007, identifying if and how objectives of the tax policy were realised. Therefore it is necessary to make a regular estimate of the most important factors which affected the taxable capacity, and to make an appraisal of potential effects of the different components of tax structure. This will assist in determining the tax capacity of Libyan society, as well as helping to ensure the expansion possibility of the tax

base, and the forecasting of taxable capacity's limits, which can be used in the planning and projection of fiscal policy. The theoretical contribution of this study is represented in studying the impact of some new variables on tax effort, and these variables are: oil revenues; non-oil exports; tax penalties; currency in circulation, money supply ( M1).

As for its empirical contribution, this research has examined the tax system in Libya during a 31 year period from 1970 to 2000. It has also made a comparison of the tax effort between Libya and some selected oil-producing countries. This study has also applied the two methods of ORR and URR in measuring the tax effort.

This research consists of seven chapters. Chapter one contains the research problem, the research questions, the study objectives, the research method and data sources, and describes the study's importance and its contribution.

Chapter two deals with the literature review of the research, including an introduction, the notion of tax burden, the excess of tax burden, the theory of optimal taxation, the concept of taxable capacity, the concept of tax effort and the previous studies on tax effort

Chapter three explains the developments of the Libyan economy during the study period through analysis of the GDP structure and its components, analyzing the product of non-oil sector and the oil sector. This chapter points out that the development plans aimed at reducing dependence on oil due to its price fluctuations in world markets. In this chapter, the most important characteristics of the Libyan economy are also reviewed. Chapter Three also touches on the economic developments in Libya and their impact on tax effort and tax burden during different periods with different conditions.

Chapter four sheds light on the public finance in Libya; it shows trends of public revenues, public spending and the position of the public budget (deficit /

surplus) during the study period. Chapter four also explains that indirect taxes are mainly dependent on the customs taxes, especially import tax and production tax.

Chapter five sheds light on the tax system, tax base and rates in accordance with the Libyan tax legislation, and shows the most important developments and trends in tax revenues, and then analyses the tax structure and the relative importance of the tax types to determine the marginal propensity to tax and the income elasticity of taxes in the Libyan economy. This chapter explains that the tax system in Libya applies two methods of tax deduction, which are the direct method (direct taxes) and the indirect method (indirect taxes). The chapter finally evaluates the Libyan income tax system.

Chapter six deals with measuring the tax burden and the tax effort for the national economy in Libya, including: measuring the individual tax burden in Libya during 1970-2000, and measuring the Libyan tax effort over the same period, using OLS, ORR and URR. This chapter also measures the Libyan tax effort during 2001-2007 compared with selected oil producing countries, applying cross-sectional analysis and panel data analysis.

Chapter seven gives a summary of conclusions, based on the empirical results of the study, together with the implications and recommendations of the study, its contribution, limitations and a proposal for future studies.

## **Chapter Two**

### **Literature Review**

#### **2.1. Introduction**

To fulfill the objectives of the current study to examine the Libyan tax system and tax performance, some importance concepts such as tax burden, taxable capacity, tax effort, and their measurement needed to be clarified. In addition, the previous research in this area will be discussed so that key issues relating to tax performance in developing countries can be identified, in order to lay the foundation for the current study.

Tax burden represents the wider indicator of the role of taxation in a country's economy, which mirrors the entire tax burden born by households and firms, (De Santis et al., 2001, p. 9).

Taxable capacity is considered together with tax effort as the most essential tools in the area of tax policy. Both concepts put stability between positive and negative influences as a priority. However tax, which is an important source of revenue, may also be compared against other economic elements. Although fiscal policy's influence is not restricted to demand, to supply, consumption and employment elements, it expands to have an effect on money supply through the way that is selected to fund expenditure (Mankiw, 2003). Some studies indicate, in this case, that financing budget deficit from external borrowing, especially in developing countries, may result in money market instability (Aaron & Pechman, 1981; Bird & Oldham, 1990).

The level of prices will, therefore, be increased by aggregate demand. Developing countries are counseled to organise and manage their public expenditure and improve their internal receipts to avoid such negative effects. Although taxation acts as a lead source of internal incomes, there are many restrictions upon using it. Government cannot always go on raising the tax burden due to its confliction with other economic elements such as economic development, wages and well-being. In most cases, increases in tax rates can impact not only on receipts, but also other tax bases and eventually their tax receipts.

The purpose of this chapter is to review the meaning of taxable capacity and tax effort in addition to their methods and determinants.

### **2.1.1. Meaning of tax and its classification**

The distinction between oil revenues and tax revenues is important in the economies of oil-producing countries, and for this purpose tax can be defined as chargeable money imposed on persons, income or property by public government (Allan, 1971; Black, 1997; James & Nobes, 1996; Lymer & Hancock, 2002). To differentiate between tax revenues and revenues from natural resources such as oil and gas, such a definition is very helpful.

Although oil and gas revenues are categorised by the financial and budget systems with different method to tax revenues, in a rentier state such as Libya, and other petroleum based economics, it is practical to assume that the oil industry could allow for a broad tax basis while oil rents are obtainable, which may suggest a lack of necessity for other types of taxation.

Having faced a deficit in its budget since the 1980s, the Libyan government is trying to obtain extra financial revenue sources to fill the gap between revenue

and expenditure. This study will differentiate between oil revenues, such as income obtained from natural resources, and tax revenues. Governments resort to taxation for many purposes, such as funding their expenditure, redistributing income, improving economic growth, and protecting particular industries. Moreover, it can be used to encourage or discourage consumption of particular goods (Allan, 1971, Farhoud, 1998).

Tax is classified into direct and indirect tax according to the administrative arrangements for collection. Direct tax can be defined as money directly paid by individuals to a tax authority; while indirect tax is defined as tax borne by someone different from the one paying it, such as value added tax (VAT) which acts as a form of consumption tax.

It is also split in accordance with the relationship of tax amount to tax basis size (Allan, 1971; James & Nobes, 1996). Lymer and Hancock (2002) mentioned that exact or unit tax takes into account the weight or size of the basis, while “ad valorem” tax relies on the value of the tax basis. Tax rate is likely to be split into three kinds: progressive, proportional, and regressive, according to rate diversity. Progressive rate refers to a tax that occupies an increasing share of the tax basis as the tax base rises. Proportional indicates a tax that occupies an unchangeable share of tax basis regardless of increases or decreases. The final rate, regressive, indicates that the tax rate declines as the tax basis increases.

## **2.2. Tax burden and its measurement.**

Interest in the concept of the tax burden in tax studies has increased since the middle of the last century. Overall, most studies have agreed that tax burden is the actual amount of tax suffered by individuals and organisations, which can be measured by finding (counting) the ratio of Government tax revenues to Gross

Domestic Product (Baer and Galvao, 2005, p.5), or to Gross National Product (Malik, 2001, p.10 ).

Musgrave (1959) saw the tax burden as representing the changes in the distribution of national income resulting from the tax deduction. Musgrave differentiated between the specific tax burden and what he called the differential tax burden (cited in Howard, 2001). Assuming stability of expenditure, the specific tax burden means the change in pattern of income distribution because of taxation. On the other hand, the differential tax burden means the change in the distribution of income resulting from the replacement of another tax system, under the assumption that the real tax revenue in both systems is equal, and the real public expenditure has not been affected by this replacement.

Hicks (1959), an English economist, made a distinction between the traditional burden of tax and the tax effects. Hicks viewed the traditional tax burden as the statistical expression of the distribution method of the actual tax burden among the citizens during a certain period, while the effects of tax represent the changes in the behavior of taxpayers as a result of the imposition of tax. Other economists such as Daxon and Enevoldsen (1998) have pointed out that the tax burden is part of the resources that are absorbed by the public sector in a certain period of time, which can be considered as an indicator of the degree of state intervention.

Stiglitz, a Nobel Prize winner for economics, believes that "tax burden is the difference between the individual's real income before and after the tax has been imposed, taking full account of how wages and prices may have adjusted", (1999, p. 483)

Entin (2004) considered the tax burden as the economic impacts caused by taxation, which reflect the reactions of taxpayers because of this tax deduction. In other words, tax becomes a burden because it reduces people's income.

Most scholars who have conducted research on this subject agree that the tax burden can be measured quantitatively as a share of GDP, (Baer and Galvao, 2005, p.5 ).

Daxon and Enevoldsen (1998) suggested a measure of the tax burden per capita, which can be measured in two ways:

First, per capita taxes expressed in money terms. However, this indicator may lead to misleading results for not taking into account the differences in income levels, especially when the comparison is between several asymmetrical communities.

Second, it is possible to calculate the taxpayer's share of taxes divided by his share of national income.

### **2.2. 1. Tax burden and equity.**

The measures of tax burden are indicators of how well tax policy meets one of its primary goals; that of equitably raising the revenues needed to run government. There has been ongoing debate on how to find the optimal tax system, both socially and economically, in such a way that both efficiency and fairness are generated, because taxpayers should have an ability to bear the tax burden (Maroun, 2010, p. 32).

Equity has two aspects. The first, vertical equity, concerns the way taxes are distributed among taxpayers with different abilities to pay. The second, horizontal equity, concerns the way taxes are distributed among taxpayers with the same ability to pay. Tax burden thus measures broad economic and social questions about the effect of tax policy on the distribution of income and wealth (Atrostic & Nunns, 1991). To examine the fairness of tax equity, several

indices have been constructed. These include the Suits Index, the Gini Index, the Hoover Index and the Theil Index.

The Gini coefficient is a measure of income inequality: the Gini coefficient can be calculated as the ratio of the area between the Lorenz curve and the absolute equality line, divided over the total area under the 45° line. Its value ranges from 0 to 1, with 0 being the value of perfect equality and 1 of maximum inequality (Charles-coll, 2011).

The Hoover index is equal to that portion of the total income that would have to be redistributed for there to be perfect equality (Harney, 2007). The idea behind this measure is quite simple; it is the proportion of income that would need to be redistributed from the upper half in the income distribution to the lower one, in order to achieve maximum distributional equality. As in the Theil index, the value of the index ranges from 0 to 1, being 0 the value of perfect equality - where no redistribution is necessary- and 1 of maximum income inequality - where all income would be redistributed (Charles-Coll, 2011).

The Theil index provides a measure of discrepancies between the distribution of income and the distribution of population between groups (Rohde, 2007), and like the Theil index goes from 0 to 1. However, in this case a value of 1 reflects total equality and a value of 0 represents maximum inequality (Charles-Coll, 2011).

Musgrave (1959) had recourse to use the Lorenz Curve when measuring per capita tax burden, which represents the pattern of income distribution in society. As illustrated by figure 2.1 (see the figures appendix), the Lorenz curve can be used to compare distributions of pre-tax or post-tax income over different years; different countries, for other purposes; or of pre-tax income with post-tax income (James & Nobes, 2004).

A Lorenz curve is the cumulative portion of the total income held below a certain income percentile, and the straight line of slope +1 (MacDonald, 2007, p. 60).

From figure 2.1, the axis AB measures the percentage of income earned, AD axis is cumulative percentage of population, AEC is 45 degree line (line of perfect equality) which reflects the optimum distribution of income, and the curve AGC represents the pattern of income distribution prior to the imposition of a new tax, and curve AFC refers to the pattern of income distribution after the imposition of a new tax (the new distribution of income). Mathematically, tax equity can be explained by the 'Gini Index' which is the difference between the 45 degree line and the Lorenz curve. The index varies between 0 and 1, with 1 being the maximum inequality. Also using the Lorenz curve, the Suits Index can be constructed. In figure 2.1, if the rate of change between the area AFCB and area AGCB is greater than one, this means that the tax burden is progressive and that income (after tax) is distributed in a more equitable way. Vice versa, if the rate of change between the two areas mentioned is less than one, this means that the tax burden is regressive. Therefore, the distribution of income after taxation is less equitable than before. In other words, if the AFC curve is closer to the line AEC compared to the AGC curve, this means that the tax burden is more equitable in this case. The Suits Index is positive for a progressive tax whilst it is negative if there is a regressive tax.

There are many other indices of income redistribution through tax burden. The most commonly used are the Hoover and Theil indices. The Hoover index is the easiest to calculate from all measures of inequality, namely: the proportion of all income which would have to be redistributed to achieve a state of perfect equality (taken from the richer half of the population and offered to the poorest half). Hoover index varies between 0 and 1 (0% and 100%), where 0 (zero) indicates perfect equality and 1 (100%) indicates maximum inequality

(Constantin et al., 2010). Theil's measure is part of a special class of inequality measures known as Generalised Entropy, or GE measures, (Rohde, 2007, p. 2). Entropy can be understood as a property of a group of income earners who are unable to be distinguished from each other by their resources. In other words, higher entropy means higher equality in income distribution. The Theil index goes from 0 to 1. A value of 1 reflects total equality (maximum entropy) and a value of 0 represents maximum inequality (Charles-Coll, 2011, p. 23).

From this we understand that if a Hoover index is close to zero this means that the tax burden is low, and if a Theil index is close to zero this means that the tax burden is high.

There have been some criticisms about the aforementioned measurement for tax burden. For example, when the percentage of actual deducted tax to national income is used to measure the tax burden, there may be a difficulty in defining the scope, substance and items of national income. In addition, there is also a difficulty in using the measurement to compare the tax burden across different countries, because this measure does not take into account the differences between these countries in terms of their tax structure; level of economic growth; structure of the economy, population structure and also the methods of determining prices.

Despite all the shortcomings of this measure of the tax burden, it has been used widely by many modern tax studies when they have distinguished between different tax burdens, and this was because of the ease of its use and the lack of other alternative standards that are more accurate.

In terms of using the ratio of actual deducted tax to total public revenues as the measurement of tax burden, this method also faces some difficulties in measuring some non-tax revenues.

Based on all the above definitions, during the period between 1970 and 1972, the International Monetary Fund (IMF) conducted a study to measure the tax burden for 72 countries using the following three criteria:

- (1) the tax burden = total tax revenues ÷ gross national product
- (2) the tax burden = total tax revenues ÷ per capita income
- (3) the tax burden = total tax revenues ÷ size of the foreign trade.

( Marar and El-hindi , 1980, p.90 ) :

### **2.2.2. Excess of tax burden**

To be familiar with the cost of introducing and/or changing taxes is one of the major orientations of taxation. Tax collected by the state on the basis of the exact amount which is used to estimate the taxation cost may surpass the revenue raised. The following study will discuss the impact of excess tax on the welfare and the production.

#### **2.2.2.1. What does excess tax burden mean?**

Tax burden is defined by Black, (1997) as the burden to which an entire society is subjected in terms of tax cost, while Auerbach (1985) defines excess burden as allocative inefficiency, styling it the sum of all losses in productivity caused by excessive taxation in a society. As all conceptual definitions broaden the excess burden further than revenues a government collects, graphical and mathematical representation will be relied upon in its analysis.

A formula can be developed that assumes that an indirect tax is offered to allow the government to obtain “R” revenue, then:

$$R = R ( \acute{P}, E ( \acute{P}, \acute{U} ) ) \dots\dots\dots (1)$$

This function indicates that revenue will be expressed as a price function “P” and required expenditure amount “E” encountering utility “U” at price “P”.

Therefore revenue will be the following function in the case that tax rate “ $t_i$ ” is imposed on good “ $X$ ” and period “ $i$ ”

$$R = (P, E(P, U_i)) = \sum (t_k/1 + t_k) P_k X_k (P, E(P, U)) \dots \dots \dots (2)$$

Marshallian demand function is represented in the last equation section,  $X_k(p', E(P', U'))$ .

The excess burden based on equivalent (extortionary) variation “EBe” or the excess burden based on compensating variation “EBc” is the act of debating about conceptual definition of excess burden; based on equivalent variation “EV” this means consumers change their behaviour in order to reduce the amount of tax they must pay. Meanwhile, having the government repay the amount of additional money to the individual to reach the initial utility (before the tax collection) is the definition of excess burden based on compensated variation “CV”. Therefore (according to Auerbach, 1985; Creedy, 2000 & 2004):

$$EBe = EV - R(P^1, E(P^1, U^1)) \dots \dots \dots (3)$$

and:

$$EBc = CV - R(P^1, E(P^1, U^0)) \dots \dots \dots (4)$$

Where:

$$EV = E(P^1, U^1) - E(P^0, U^1) \dots \dots \dots (5)$$

$E(p^1, U^1)$  reflects the sum of expenditure after a modification in price due to taxes.

$P^0$  and  $U^0$  reflect initial price and utility respectively

$p^1$  and  $U^1$  refer to new price and utility levels after a modification in tax.

$$CV = E(P^1, U^0) - E(P^0, U^0) \dots \dots \dots (6)$$

$E(p^0, U^0)$  stands for total expenditure before a change price.

The following section uses graphical analysis to clarify excess burden in order to discuss the welfare cost of taxation and tax incidence, and to specify from whom taxation is collected.

#### **2.2.2.2. Private sector and excess tax burden**

The majority of situations vary in the impact they have; and a similar situation applies to people in evaluating different values. That means that people assess their benefits differently (Alwaily, 2006). Thus, people may withhold paying an imposed tax; however, they will face a burden of tax which limits the consumer's choice either by discouraging them from a bargain, or by imposing cheaper goods on them. To analyse excess burden (dead-weight) of taxation, indifference curves and budget line technique will be useful. Black (1997) and Pindyck and Rubinfeld, (1997) provide a definition for the Indifference curve as a graph showing different bundles of goods between which a consumer is indifferent: the consumer has no preference. The budget line refers to all probable choices or goods a consumer can afford, restricted by earnings level and goods prices.

Tax imposed before and after consumer behavior is represented in figure 2.2. All probable combinations of the consumer designate consumption between goods "X" and "Y" are included. In the case of devoting his whole earnings to one of the quantities "OA" of "Y", or "OB" of "X", the consumer can consume them. Although the comparative price of "X" and "Y"  $P_x/P_y$  is referred to by the gradient of the budget line, a reasonable consumer will select the combination of these two goods that enable him to maximise his utility.

When the budget line “AB” touches (tangent) the highest indifference curve, “ $I_1$ ”, it acts as the perfect combination. The indifference tangent curve slope referring to marginal substitution rate “ $MU_x / MU_y$ ” between “X” and “Y” is as equal as the gradient of the budget line and reflects the comparative price “ $P_x/P_y$ ”. This finding gratifies utility maximisation.

As a rule,  $(MU_1/P_1 = MU_2/P_2 = \dots = MU_n/P_n)$  must be equaled to maximise consumer utility, which means that the same marginal utility is provided by all money spent on goods "1, 2,....., n". In the case that the government imposes a tax on commodity “X”, the budget line will adapt to “AC”, which gives the consumer, in particular, the chance to buy “OC” units of commodity “X” after the imposed tax, while the commodity quantity “Y” does not change.

The comparative price, the incline of the budget line, obviously changes to " $P_x(1+t)/P_y$ ". The consumer will broaden, one more time, his utility at “Q2” where the highest possible indifference curve “ $I_2$ ” is touched by budget line “AC”. “Q2” achieves a state of balance for the consumer.

" $MU_x/MU_y = P_x(1+t)/P_y$ ", which will help in demonstrating the consumer's worst condition due to the initiation of such a duty of excise special tax. To get the same receipts (as equal as duty of excise special tax), the government is able to use other kinds of taxes and leave the consumer more satisfied than a duty of excise special tax. Forcing a lump-sum tax, for instance, on both commodities “X” and “Y” at an equal rate by a consumption tax, will move the budget constraint backward to “A'B'”, analogous with “AB” and joint point “Q2” (to get as equal receipt as a selective tax).

Thus the consumer can purchase equal amounts, as with the selective tax approach. A higher indifference curve “ $I_3$ ”, however, can be achieved under utility maximisation conditions. The falsification of price structure is the major difference between these scenarios.

The selective tax that may lead to having an effect on fruitful price elements has obviously modified the comparative price, the incline of the budget line,  $P_x/P_y$ , so there will be an effective loss. The comparative price has not been affected in the second scenario (the slope of "A' B' " is as equal as "AB")

Musgrave and Musgrave, (1989) indicate that income tax only has an income effect when leading to purchase decreases from both commodities "X" and "Y", while duty of excise special tax has an additional alternative effect leading to "X" by "Y" substitution. There is a significant result indicating that constricted tax basis is likely to impose a more significant excess burden than a wide tax basis (Cullis & Jones, 1992; James & Nobes, 1996; Musgrave & Musgrave, 1989). Imposing wide based taxes without any exceptions is not easy to collect and less complies with costs. A low rate of tax will encourage the public to accept the tax and decrease the motivation to avoid it. This in turn leads to contradict the demand to present complicated non-avoidable plans (Eland, 1995). But a question of low income groups and geographic distribution may arise from Eland's viewpoint (Alwaily, 2006).

Some elements that may have an effect on excess burden size is also important, as indicated by (Alwaily, 2006 ):

1. How efficiently pertinent parts of the economy are working.
2. The value of elasticity of demand and supply timetables (see following section).
3. Elasticity of production elements and how they could be assembled.
4. Great tax basis (as mentioned before. a wide tax basis is likely to produce less excess burden in comparison with a narrow tax base).

### 2.2.2.3. Estimating excess tax burden.

Considering income compensated and uncompensated demand curves (the latter also known as the Marshallian demand curve), excess burden can be evaluated through measuring well-being costs.

Figure 2.3 is extracted from figure 2.2 where the curve “Dm” acts for the Marshallian demand curve and “Dc” shows the income compensated demand curve, which involves income impacts and is less elastic, for normal commodities, than the Marshallian curve (Black, 1997). The excess burden (Welfare cost “W”) is determined by Triangle 123. The triangle area Mathematically calculates as  $1/2(\text{Base} * \text{Height})$ . The basis equals “q2-q1” or “ $\partial Q$ ” and the high equals the variation between “P1” and “P2” which also points out for tax per unit “T” ( T equivalent to  $t_p$ ) concerning figure 2.3. “P2” reflects the price level after tax, where:

$$P2 = P1 (1+t) \dots\dots\dots(7)$$

Where ( t ) is tax rate representing the variation between P1 and P2.

Evaluation of the excess burden needed to calculate triangle (123) area, thus:

$$W = 1/2 (q2 - q1) (P2 - P1) \dots\dots\dots(8)$$

Or

$$W = 1/2 (q2 - q1) (P1 (1+t) - P1) \dots\dots\dots(9)$$

$$W = 1/2 \partial Q.T \dots\dots\dots(10)$$

The modification on “Q” relies on price elasticity of demand (ed) which can be calculated as the following equation:

$$ed = \left( \frac{\partial Q}{\partial P} \right) \cdot \left( \frac{P}{Q} \right) \dots\dots\dots(11)$$

Leads to :

$$\partial Q = \left( \frac{ed \cdot \partial PQ}{P} \right) \dots\dots\dots (12)$$

Alternative equation (12) into (10) gives

$$W = \frac{\frac{1}{2}(ed \cdot \partial PQ T)}{P} \dots\dots\dots (13)$$

As stated previously “ $\partial P$ ” is equal to “ $T$ ” so:

$$W = \frac{\frac{1}{2}(ed T^2 \cdot Q)}{P} \dots\dots\dots (14)$$

“ $T$ ” is equal to “ $tP$ ” so (14) can be rewritten as:

$$W = \frac{1}{2}(ed (t \cdot P)^2 Q) / P \dots\dots\dots (15)$$

Finally ,

$$W = \frac{1}{2} ed t^2 PQ \dots\dots\dots (16)$$

All variables required to evaluate welfare cost (dead- weight) based on the last equation created by tax are price demand elasticity “ $ed$ ”, tax rate “ $t$ ”, pre-tax price “ $P_1$ ”, and quantity “ $q_1$ ”. Nevertheless, this equation does not consider price supply elasticity. Cullis and Jones (1992) consider this point to avoid such a deficiency and introduce the following equation:

$$W = \frac{1}{2} t^2 (P_0 q_0) (e_s - e_d) / (e_s - e_d) \dots \dots \dots (17)$$

where “es” and “ed” refer to elastic price of supply and demand respectively.

#### 2.2.2.4. Distribution of tax burden

The taxation cost is likely to exceed tax revenue. Therefore, it is necessary to know who will bear these costs or how the tax burden will be divided.

The person who is legally responsible for paying the tax (*statutory taxpayer*) may not be the one who actually bears the burden of the tax (*economic taxpayer*), because of shifting the tax burden, also known as tax incidence (Economic Report of the President, 2004). This means that the persons who do pay tax to the government are likely to be different from those who actually cover the tax burden, according to the concept of tax incidence. Black (1997), Lymer and Hancock (2002), and Musgrave and Musgrave (1989) indicate that there is a discrimination between economic incidence and lawful incidence, which refers to the person or corporation responsible for paying tax: economic incidence refers to those who actually bear the burden of tax. Elasticity of demand and supply, market feature, and time period permitted for adaptation to happen have an effect on the dispensation of tax burden (Musgrave & Musgrave, 1989). Figure 2.4 indicates that imposing tax such as excise tax lead to transferring supply curve “S” to “S1” and the price rises from “P0” to “P1”. The burden really covered by the consumer is represented in the area between the initial price and the new one “POECP1”. While the area limited between the initial prices and “H” “HFEPO” describe the untransformed burden and has to be covered by the manufacturer. The essential conclusions are that the greater the price elasticity of demand, the smaller the burden transferred to the

consumer. Nevertheless, the greater the price elasticity of supply, the greater the burden transferred to the consumer. Figure 2.5 clearly indicates these findings.

Cullis and Jones (1992) adjust the following equation to calculate burden distribution in order to reveal the significance of price elasticity of demand and supply. This equation will be so helpful to answer inquires about who will pay the tax, or alternatively how the tax burden is divided between consumer and producer.

$$\frac{\partial P_d}{\partial t} = \frac{e_s}{e_s - e_d} \dots\dots\dots (18)$$

Similarly,

$$\frac{\partial P_s}{\partial t} = \frac{e_d}{e_s - e_d} \dots\dots\dots (19)$$

Where " t " considers the tax per unit which reflects to the variation between " Pd" and "Ps".

### **2.2.2.5. What is the relationship between excess tax burden, tax rate and tax revenues?**

A positive relation is found between tax rate and tax revenue; however, the issue is more complex than that and requires careful attention rather than a quick response. The following analysis will demonstrate that an efficiency cost (dead-weight) will grow since the tax rate rises. Nevertheless, tax revenue is not likely to be conducted in the same way as excess burden. A number of tax rates are assumed in order to test such cases.

The impacts of several tax rates on tax revenue and excess burden, (both demand and supply curves are elastic) are illustrated by figure 2.6. Position "A" mirrors pre-tax equilibrium where "P0" and "Q0" are the equilibrium price and quantity of good "X". Consumer surplus equals "PODA". Presenting a unit tax

“POP1” has an effect on the supply curve to move to “S1”. A new balance position is generated where yield is decreased to “OQ1”, price increases to “OP1” and consumer surplus decreases to “P1DB”. Moreover, new variables are generated due to presenting a tax such as excess burden that is represented by triangle "ABF", and the government will collect earnings equal to rectangle “POFBP1”. Imposing a new higher rate “POP2” moves supply schedule to “S2”, as a result price increases to “OP2”, yield reduces to “OQ2”, excess burden expands to “AGC” and tax revenue grows to “POGCP2”. It is worth noting that if tax increases to “POP3”, as a result of this, tax revenue will reduce to “POHEP3” while excess burden will spread to " AHE". Figure 2.7 demonstrates the development direction of tax revenue collected by government and excess burden undergone by the economy, by using the same concept of total revenue (TR) analysis as that used in private firms. Tax revenue can be noted to continuously grow as a result of the raised tax rate until it reaches its highest level. Any increase of tax rate will, afterwards, decrease the sum of amount of tax revenue. Excess burden (EB) will be greater, however, provided that the tax rate rises.

Musgrave and Musgrave (1989) concluded that if the definition of taxation quality is the tax revenues ratio to excess burden, any further growth of tax rate, after tax revenue reaches its maximum point, will decrease the quality of taxation. This review is connected to optimal tax theory, and will be traced in the following section.

### **2.3. Theory of optimal taxation:**

Section 2.2.2.2 illustrates that poll tax or lump sum tax is less of a falsification or redundant burden than excise tax. The main object of optimal tax theory is to search for decreasing excess burden and increasing tax revenue. However, the

majority of important commodities such as food have less price elastic demand. Therefore, imposing a higher tax rate on such commodities will make poor people suffer disproportionately as a high ratio of their income is used up on these commodities. There is obviously conflict between equity and efficiency. The following section will discuss the matter of how optimal tax theory could adapt between them.

### **2.3.1. The optimal tax on commodity:**

Ramsey's derivation of optimal commodity formula, or what is called Ramsey's rule, is the basis optimal commodity tax analysis relies on. It specifies: "small uniform intensification of the optimal taxes (that increase all taxes by the same proportion) will produce equal proportionate reductions in demand for all goods if the consumer is compensated to stay on the same indifference curve" (cited in Alwaily, 2006, p.145). If two independent goods "X" and "Y" are assumed to have variant price elasticity, optimal tax will provide proportional decrease in demand. Taxation on lower price elasticity goods must be higher than higher price elasticity goods to attain such a decline. Ramsey's theory can be achieved when tax rate is reciprocally proportionate to the price elasticity of demand.

Moreover, the same finding can be illustrated by using a mathematical method. The welfare cost "W" or excess burden "EB" can be measured by the formula (Cullis,1992 ):

$$EB_x = 1/2 (ex.Px . Qx . t^2_x ) \dots\dots\dots( 20)$$

Where, ex= price elasticity of demand for good X ; Px = price of good X ; Qx = quantity of the good X consumed ; tx = the rate of tax on good X .

Similarly,

$$EB_y = 1/2 ( ey . Py . Qy . t^2_y ) \dots\dots\dots( 21)$$

Where,  $e_y$  = price elasticity of demand for good Y ;  $P_y$  = price of good Y ;  $Q_y$  = quantity of the good Y consumed ;  $t_y$  = the rate of tax on good Y .

Total tax revenues "R" obtained from "X" and "Y" equal:

$$R = t_x.P_x.Q_x + t_y.P_y.Q_y \dots\dots\dots(22)$$

Lagrange (L) formula must be used to decrease excess burden affected by revenue restriction:

$$L = 1/2 ( e_x . P_x . Q_x . t^2_x ) + 1/2 ( e_y . P_y . Q_y . t^2_y ) + \lambda ( R - t_x P_x Q_x - t_y P_y Q_y ) \dots\dots\dots (23)$$

Taking the first differentiation for both "  $t_x$  " and "  $t_y$  " yields:

$$\partial L / \partial t_x = e_x P_x Q_x t_x - \lambda P_x Q_x \dots\dots\dots(24)$$

$$\partial L / \partial t_y = e_y P_y Q_y t_y - \lambda P_y Q_y \dots\dots\dots(25)$$

Setting both equations equal to zero and rearranging the variables yields,

$$e_x P_x Q_x t_x = \lambda P_x Q_x \Rightarrow e_x . t_x = \lambda \dots\dots\dots(26)$$

$$e_y P_y Q_y t_y = \lambda P_y Q_y \Rightarrow e_y . t_y = \lambda \dots\dots\dots(27)$$

By substituting equation (27) into equation (26):

$$e_x . t_x = e_y . t_y \dots\dots\dots(28)$$

Finally,

$$t_x / t_y = e_y / e_x \dots\dots\dots(29)$$

An inverse elasticity rule is the name of the last equation and it complies with Ramsey's rule. However, this analysis considers contradictory equity principals as low price elasticity goods are more likely to be necessity goods, which use up

a high ratio of the income of lower income groups. Taxation on good “Y” will be 8% while taxation on good “X” will be only 2%, and “ey” is equal “2” and “0.5” respectively according to the last equation.

Yet, some economists criticise optimal tax theory in many of its attributes, which include a major one that can concisely be discussed. First, a complex group of taxes and rates is needed to apply optimal tax theory, although the result will be second best particularly when leisure is considered in the tax base (Musgrave and Musgrave, 1989; Cullis and Jones, 1992), supposing that there are different selections between goods “X” and “Y” on the one hand and between income “I” and leisure “L” on the other, in order to elucidate this matter. However, if both goods “X” and “Y” are taxed equally, such falsification can be decreased. This case does not generate falsification between “X” and “y”.

“L” will be selected rather than “X” and “Y”. However, the question remains of what will happen, as an alternative, in the case that the taxation on “X” is greater than “Y”? To intensify the falsification between “X” and “Y”, “X” and “L”, such a state is expected, while it will decrease falsification between “Y” and “L”.

Second, administrative obstacles connected to the intricacies mentioned above exist. Intricacy may generate some losses and increases costs. Computing the optimal tax rate is very difficult because great effort is required to get the essential information, such as the awareness of utility levels and revenue distribution (Cullis and Jones, 1992; Tait, 1989). In addition, the omission of administrative cost is an essential defect of optimal tax theory (Abu Hammour, 1997; Heady, 1993). James and Nobes (2004) indicate that the administrative cost of operating a tax system should comprise the full assets cost to the public sector of each functional tax; in addition, the services obtained not paid for from

other divisions. Estimating the direct cost is possible, while doing so for indirect cost is very difficult, if not impossible. It is reasonable that this deficiency of estimating administrative costs, particularly indirect ones, is not only limited to optimal tax theory.

Third, optimal tax theory pays little attention to consumer behaviour. The value of commodities arises from realising that commodities are not easily consumed by other consumers at the same time. In Hirsch's (1977) opinion, consumer behavior has been omitted in the analysis of optimal tax theory. Furthermore, an optimal tax method is most likely to disregard variances in favouring between households that possibly arise from variances in demography, and other properties (Alwaily, 2006).

Abu Hammour (1997), Hausman (1988), Rosen (1976), and Sandmo (1976) explain that although all taxes have an effect on consumer conduct to some extent, either by decreasing available income or by raising the price of goods and services or both, taxation can also impact saving, and risk affecting labour supply, education selections and housing resolutions.

Both Tollison (1987) and Cullis and Jones (1992) illustrate the fourth aspect connecting to rent-seeking cost where manufactures and small groups of companies make an effort to force government and pay out some assets to undermine tax. Such costs of rent conservation compromise a real assets loss (Alwaily, 2006). Optimal tax theory requires that such extra costs does not maximise efficiency loss, (Tollison, 1987). He observed that the traditional or optimal taxation is under threat; optimal taxation has a pillar that the excess burden is reduced to a specific amount of increased income when such taxes are set on goods with relatively inelastic demand curve.

This optimal taxation rule, unluckily, is not able to resist the above analysis. According to Tollison, 1987, the area of "P23Ps" in figure 2.8 (appendix 2) is

calculated as a portion of duty of excise special tax cost, taxing an industry with a more elastic demand curve, but no organised rent, or rent protecting opposition to the tax, is socially preferable: (see figure 2.8 in appendix 2).

## **2. 4. The concept of taxable capacity for the national economy, and its measurement**

Taxable capacity and tax effort have gained due attention, particularly in developing countries, to study and examine the aim of increasing tax proportion in a country to fund government programmes and decrease constant deficit. However, very often socio-economic elements restrict the government's capability and desire to take up such policies. A discussion of these aspects is given in the following:

### **2. 4.1. The concept of taxable capacity:**

Taxable capacity represents a very early approach in the field of public finance. Dalton (1961) indicates that taxable capacity could be split into two types; absolute taxable capacity and relative taxable capacity. Both types will be dealt with in the following section. In practice, this study adopts measuring the relative taxable capacity because it is more accurate than the absolute taxable capacity.

During the 1960s and early 1970s, a considerable amount of research was devoted to studying tax related issues in developing countries. Much of the research was led by economists in the IMF in an effort to assist aid donors and international lending agencies in their evaluation of the fiscal performance of governments. Much of this analysis was conducted by economists such as Lotz and Morss (1967), Chelliah (1971) and Howard (2001).

Mirrlees (2010) stressed that tax capacity is a slippery, elusive concept. On examination, taxable capacity always turns out to be very difficult to define and

to be a matter on which opinions will differ rather widely. Despite this opinion, there have been various attempts to define taxable capacity.

Taxable capacity (also known as tax capacity) is one of the major components in the studies of taxation. Some scholars refer to the term "taxable capacity" as the maximum capacity of a community to bear taxes without much hardship. It indicates the degree of taxation beyond which the productive effort and efficiency of the society begin to fall. Thus, taxable capacity is the maximum limit up to which people can normally pay taxes, (Deepashree, 2006, p. 28): in other words, it is the optimal size of tax revenues. According to Howard (2001, p. 162) "taxable capacity can be interpreted as the amount of tax which could be justly or fairly imposed on a country".

The taxable capacity can be measured by finding the expected rate of tax to GDP and, through a regression equation of the actual tax burden on a variety of factors, influencing it. Musgrave (1987) identifies several factors that determine a country's taxable capacity: its stage of development, often measured by per capita income; the existence and extent of 'tax handles'; and the efficacy of its tax administration.

The literature of public finance is replete with attempts to define the concept of taxable capacity for the national economy.

Below are some examples of the alternative definitions of taxable capacity:

Firstly, tax capacity is defined as "the ability of a government to raise tax revenues based on structural factors including the level of economic development, the number of 'tax handles' available, and the ability of the population to pay taxes" (Hoek & Peter, 2008, p. 28). This definition emphasises that the taxable capacity is the national income's ability to bear the tax.

Secondly, the taxable capacity is the optimum size of tax revenues that must be collected when every country applies its own tax system efficiently (Hope, 1996). According to Hope (1996) taxable capacity can be seen as the total tax amount that would be collected if each country applied an identical set of effective rates to the selected tax bases - that is, as the yield of a representative tax system. Similarly, Govinda et al. (2005) defined the taxable capacity of a country/state as the revenue it can generate if it levied an average effective rate of tax on its base.

Thirdly, taxable capacity is the ability of the taxed person to bear the burden of the tax in relation to his/her source of income without experiencing a reduction in standard of living, or margin of profit and investment in the case of firms (Rajagopalachar, 1993, p. 260).

Fourthly, the taxable capacity is the potential ability of tax, in other words, it is the maximum possible tax revenues that can be deducted from the national income, without the economic or social pressures associated with the inability to pay them. This means that taxable capacity is the extent to which households and firms can pay a tax and a fiscal authority can collect it (Rutherford, 2002). In essence, the taxable capacity reflects the limit between the national income's ability to bear the maximum possible tax revenues and the negative impact on the tax bases as a result of exceeding that limit.

Finally, the ability to tax is determined largely by a country's taxable capacity and it is possible to consider an almost infinite list of variables that could conceivably affect taxable capacity (Williams, 2001).

It can be noted that although the definitions of taxable capacity differ in wording, there is a consensus that taxable capacity of the economy represents the optimum tax burden, which accommodates between the government's need for tax revenues and the ability of the gross national product to meet that need.

On the other hand, governments must also consider the ability of individuals to bear the tax burden by taking into account social and economic considerations, and distributing the tax burden among members of the society fairly (Gravelle & Shvedov, 2004).

In short, taxable capacity depends on the ability of the people to pay and the ability of the government to collect (Malik, 2010, p. 10).

Gupta (2007) has indicated that there are two concepts of taxable capacity:

(i) Absolute taxable capacity: which means the surplus of production over the minimum maintains that volume of production per head of the population, keeping the essential standard of living unchanged over a number of years. (ii) Relative taxable capacity, which means the extent of tax burden that should be imposed on different persons to finance a common expenditure. The relative taxable capacity is a percentage of absolute taxable capacity to net state domestic product (Gupta, 2001, p. 184).

#### **2.4.1.1. Laffer curve and the absolute taxable capacity**

Optimal tax theory may be an inappropriate means to satisfy inquiries raised by this study due to previous criticisms, which makes it necessary to examine the chance of utilising taxable capacity. According to Dalton (1961), absolute taxable capacity can be gathered and obtained as a tax income with no economic harm for a country, such as a decline of welfare level, contraction of the labour supply, or investment deterioration etc.

There is a wide-ranging belief that high taxes lead to reduction of economic growth in terms of weakness in the development of firms, the demotivation of labour, and increases in the cost of investment. Yet, the kinds of expenditure funded by tax revenues powerfully reflect the impacts of tax. On one hand, taxes negatively affect an economy when their revenues are used to fund unproductive schemes such as transfer payments. They, on the other hand, they

affect positively when their revenues are devoted to fund productive schemes such as education and public foundations.

It is possible, therefore to assume that comparatively high tax areas may be preferred to low ones . According to Dalton (1961) governmental interference in the economy in the shape of taxes should be chosen and planned in order to accomplish their aims with no loss to the economy. Exceeding taxable capacity and/or suitable practice of the tax system results in such loss or negative effects. In most of countries, economists firstly argue that government should consider the economic cycle when it has some surplus in the budget during economic prosperity, in order that the government during an economic depreciation may operate through a loss without significant tax rises. Secondly, in case a state owns natural resources, does that mean this country should not impose tax revenue? Taxes are not only restricted to achieving financial aims; in many places they have also been utilised to attain a number of objectives such as economic, social and political goals.

Absolute taxable capacity illustrates the highest tax rate which could be deducted from the economy with no adverse impacts or economic loss, and this is difficult to be identified and estimated. The relationship between tax rate and tax revenue is demonstrated by the Laffer Curve, which can be employed to measure an absolute taxable capacity and to determine the concept of ‘economic damage’. Adam Smith (1776) identified the relationship between tax rate and tax revenue, stating : “high taxes, sometimes by diminishing the consumption of the tax commodities, and sometimes by encouraging smuggling, frequently afford smaller revenue to government than what might be drawn from more moderate tax” (cited in Haughwout et al., 2004, p.570). Later, this idea was developed by Dupuit (1844) when he clearly drew the nature of the relationship between tax rate and its revenue, later known as the ‘Laffer Curve’. Dupuit pointed out that:

if a tax is gradually increased from zero up to a point where it becomes prohibitive, its yield is at first nil, and then increases by small stages until it reaches a maximum, after which it gradually declines until it becomes zero again. It follows that when the state requires raising a given sum by means of taxation, there are always two rates of tax, which would fulfil the requirement, one above, and one below that which would yield the maximum. There may be a very great difference between the amounts of utility lost through these taxes which yield the same revenue (cited in Auerbach, 1985, p.62). This prompted Auerbach (1985, p. 61) to write that “even the Laffer curve...might more appropriately be called the Dupuit curve.”

Professor Arthur Laffer (1974, cited in Wahid, 2002) suggested, as shown by the curve illustrated in figure 2.9 (see appendix 2) that tax revenue will increase equally with tax rate along the upward slope, where the normal range is represented by a bell-shaped relation between tax revenue. An opposite relation between tax rate and tax revenue will take place as soon as the peak of the curve is reached. According to Griffiths and Wall (2001) raising tax rate will occur at the same time as a reduction in tax revenue because a high tax rate that decreases the tax base has a discouraging impact in this downward sloping portion, the prohibitive range. However, raising tax rate more than the revenue maximising tax rate (RMTR), a peak on the Laffer curve, is likely to make tax revenue greater in the short term due to the new tax rate. Buchman and Lee (1982) distinguish between the short run and long run in the Laffer curve, where the latter has a more significant curve than the former.

Tax revenue (TR) will be valued to zero at two rates: (r) -zero and 100% as illustrated by figure 2.9 (appendix 2). In a simple manner,  $TR = r (GDP)$ , therefore, zero tax rate produces zero tax revenue in spite of GDP level. Although a 100% rate is presumed to produce zero tax revenue due to its discouragement to all yields, Kinsley (1978) indicates that revenue valued to be

zero at 100% tax rate is illogical as other motives have an effect on work effort in addition to a money motive alone.

The sum of tax revenue amount “TR” can be obtained by two different tax rates. “r1” located in the normal extent is not as high as the maximum rate, while “r2” located in the prohibitive segment is not as low as the maximum tax rate. Therefore, it is more likely to provide an opposite impact and reduce tax revenue by decreasing the tax basis (Alwaily, 2006).

The Laffer curve, from the supply side in particular, has been given due consideration by focusing on the stimulating impact of the tax rate modification (reducing/increasing) by economists. Other studies concentrate on deciding the greater tax rate revenue. The Laffer curve, therefore, has been utilised to evaluate complete taxable capacity (maximum tax rate) and indirectly to show the stimulating impact of tax rate modification.

For example, Clarke suggests that no type of tax rate should exceed 25% to eliminate loss pressure (Griffiths and Wall, 2001).

Although the majority of developed countries tend to increase tax rate to more than 40%, they have great positive growth rate of real income. Musgrave and Musgrave (1989) indicated that the ratio of tax rate to GNP varied from 8% to 18% in less developed countries, while it conversely varied between 30% and 40% in developed countries. Tax revenue in Sweden is estimated by Sturat (1981) to be maximised at a 70% of tax rate. He also indicated that Sweden's tax system in the 1970s was situated in the prohibitive extent of the Laffer curve, because the real tax rate was 80%.

Hsing (1996) in his study into the American tax system, discovered that the revenue increased to the highest amount when tax rates were between 32.67% and 35.21%. Ravestein and Vijibrief (1988) indicated that tax revenue would be increased to the highest amount at a tax rate of about 70% while the actual

tax rate was 67% in 1985 in the Netherlands. Griffiths and Wall (2001) concluded that summit of the Laffer curve would be accomplished at a tax rate of about 60%. The maximum tax rate on dividend income the in the United Kingdom was reduced from 83% to 60% according to their study.

Kiefer (1978) argued that there is a lack of tax rate for the entire economy which can be measured by using the horizontal axis. The elasticity of supply was taken into account to settle different views in the relation between tax rate and its revenue. He mentioned "those who find an inverse relationship between tax rate and revenues must believe that the relevant elasticity is high, that the relevant tax rate is high, or both. Those who find a normal range must believe that one or both of these parameters is low. Finally, those who deny the existence of an inverse relationship at any tax rate might really just believe that the uncompensated supply elasticity is zero or negative (or that demand is inelastic)" (cited in Fullerton, 1982, p. 4).

It can be concluded that each country has its own Laffer curve which varies from one period to another with varied tax rates.

The Laffer curve, as previously stated, has not been directly used to assign the motivated/unmotivated influence of altering tax rate on labour supply. A taxation system can have a great influence on people to accomplish economic activities, as economists affirm about the supply side. This debate assumes that a tax cut would stimulate individuals to work hard, which would result in extending tax basis and increasing tax revenue. Tax effect on individuals' selection between work and leisure can be identified by measuring the role diverse taxes (especially income tax) play on work effort. Two important impacts affect such selection: income impact and alternative impact, which mostly work in diverse directions. James and Nobes (2004) indicated that the

two, in theory, can be examined by utilising a variant curve that can clarify tax differences and their varied influence on work motivation.

Many attempts have been made to test the impact of imposing tax on labour supply. In the UK 70% of a sample indicated that the impact of income is equal to an alternative impact on motivating work, which means a neutral response to work with higher tax (Brown & Dawson, 1969). Only between 5% and 15% had an unmotivated impact on work (income impact is less than alternative impact). A motivated impact on higher tax (income impact is greater than alternative impact) was eventually indicated by a smaller percentage. Weak evidence was reported by Flemming and Oppenheimer (1996) for the impact of tax cuts at the upper end group of the income bracket, on the labour effort.

However, Griffiths and Wall (2001) point out that a high implied marginal tax rate can perform as an essential discouragement to low income earners. As Barlow et al. (1966) point out, only one eighth of their sample of 957 persons, decreased their work hours due to progressive income tax (cited in Alwaily, 2006). He concluded: "There are many more powerful motives affecting the working behaviour of high income people than the marginal income tax rate. People are aware of taxes and do not enjoy paying them, but other considerations are far more important to them in deciding how long to work" (Alwaily, 2006, p. 153).

Many elements such as gender, work nature (professional or non-professional), the family size and the age of children, as well as taxes are seen to have an effect on work effort. Mankiw (2003) showed the strong positive impact of tax reduction during the Kennedy presidency in the USA, which finally led to a reduction in the unemployment rate from 5.7% in 1963 to 5.2% in 1964 and then to 4.5% in 1965. Moreover, growth rate of actual GDP was 5.3% in 1964 and 6.0% in 1965. He concluded "tax cuts stimulate aggregate supply by

improving workers' incentive and expand aggregate demand by raising household disposable income" (p.154).

Nevertheless, tax cuts are likely to have an opposite impact where the reduction in tax rate 't' grows the associated price of leisure "PL" and individuals will be in favour of working rather than leisure. This impact is known as alternative effect. Leisure price "PL" as a function of wage rate "W" and rate of tax "t" can be written as

$$P_L = W - t(W) \dots\dots\dots(30)$$

Decreasing tax rate will, on the contrary, raise available income "Yd".

Individuals, therefore, are required to work less to obtain the same level of pre-tax cuts income. The following function where "h" stands for working hour is likely to express this relation.

$$Yd = h [ W - t(W) ] \dots\dots\dots(31)$$

Fields and Stanbury (1970) indicated that the reverse is true according to this hypothesis. However, this means that a researcher may be unable to identify the complete impact of tax modifications on the labour market.

Several groups of workers in different countries and times have been covered by studies examined the influence of taxation on work, which mostly they did not indicate any fundamental impact from taxation. These studies, moreover, show that both incentives and disincentives have minor impacts. James and Nobes (2004) discussed such inconsistent influences by indicating they tend to offset each other, so that the net of taxation on the supply of labour is likely to be small.

Lindsey (1987), and Griffiths and Wall (2001) have another significant viewpoint in this regard that decreasing tax rate may increase the cost of tax avoidance (as part of the black economy) regardless of the neutral impact of tax

cuts on discouragement to work. Tax base, as a result of that, will extend leading to an increase in tax revenue. In this context, the black economy in the UK has been evaluated at between 6% and 8% of GDP, while Griffiths and Wall (2001) suggest that some evaluations of the black economy are as high as 10% to 12% of GDP in the UK. It is a sum almost equivalent to the amount the Treasury obtains from income tax every year.

#### **2.4.1.2. Tax effort and the relative taxable capacity:**

Relative taxable capacity and tax effort methods will be taken into account in this part, trying to clarify questions offered by this study. However, evaluating relative taxable capacity has gained significant attention because it is an elusive concept (Prest, 1978). Toye (1978) indicated that taxable capacity has been given various meanings at different times and in different contexts. Bahl (1971) defined relative taxable capacity according to the representative tax system (RTS) method as the tax ratio that can be achieved when a country applies to its variant tax bases a group of mean effective rates calculated as net regression coefficient for the sample of countries involved in the study. It can be also be defined as the sum of taxation that can be deducted from GNP or GDP when a similar country forces many tax rates on its different tax bases, taking into account the ability and readiness of the persons to pay taxes, in addition to the government's readiness to impose taxes, and its ability to collect them.

Majority of taxable studies have attempted to apply a similar methodology between many developed and/or developing countries. Tait, Gratz and Eichngreen (1979), as a result, enhanced the use of the concept 'International Tax Comparison' (ITC) to refer to relative taxable capacity. Their comparison between many countries results in three possible cases:

1. The countries involved in the study completely utilised their relative taxable capacity with no potential of increasing tax revenue.

2. The country/countries used part of its/their taxable capacity. In other words, there were some adjustments to increase tax revenue either by raising the current tax rate or offering new taxes.

3. The country/countries progress further its/their tax capacity, which result in decreasing tax rates.

Thus, it is acceptable to inquire if there is any variance between the capability and desire to pay tax. There is logically substantial variance between such concepts not only in taxation but also in their usage. According to Abu Hammour (1997) the capability to pay or collect taxes is of minor importance while the desire to pay or collect taxes is available. The capability to pay, in other words, relies on the tax payers' monetary status (income and wealth). A country's tax system sometimes places onerous responsibilities on tax payers. Meanwhile, Chelliah (1971) indicates that a government's capability to collect taxes may be related to its goals, constitutional elements, efficient administration and the nature of political leadership.

Yet, the comprehension of taxpayers and the extent to which they are persuaded of the necessity for paying taxes are the limitations relating to the desire to pay them. If government dissipates or waste public revenues with no strong auditing and examination, tax payers will surely avoid tax and resist it. That means that taxpayers' resistance plays an important part in restricting the amount of collected tax; thus, the way tax revenues are used enhances or curtails the willingness to pay. There is an essential and interesting fact to be taken into consideration here that may be briefly summarized; Individuals may have the capability to pay without the willingness, which could also apply to the willingness of the government to collect tax. This is proven in many developing countries, such as Libya for instance, where the industrialised sector receives a very generous exemption and tax holiday although it has the ability to pay taxes.

### **2.4.1.3. The measurement of taxable capacity:**

From the above definitions, the taxable capacity can be seen as the possibility of imposing taxes using an efficient and effective method. This means taking into account the size and nature of tax bases in order to obtain maximum benefits with the minimum possible economic and social costs, and without incurring any loss of benefits to society and the national economy as a result of imposing the tax. However, absolute taxable capacity is difficult to conceptualise and impossible to measure in any objective sense. The relative taxable capacity is important to this study because it helps to compare the tax effort between the selected countries, and also to overcome the problem of currency unit's difference between the countries.

Although the concept of taxable capacity has been dealt with theoretically by some writers such as Musgrave (1959), Paul Baran (1957) and Kaldor (1963), the first attempts to measure taxable capacity statistically were by Martin and Lewis (1956).

Musgrave (1959) emphasises the relevance and importance of relative taxable capacity; this can be estimated by comparing different countries or sub-national units in a federation. Thus, two countries or sub-national units in a country which are similar in economic circumstances should be able to generate equal amounts of revenue and the differences could then be attributed to the differences in their preference patterns. Thus taxable capacity of different units in a federation can be estimated by estimating the 'average' behaviour of the States in raising revenues after allowing for economic factors that can cause differences in taxable capacity (Govinda et al., 2005).

Most specialised studies agree that measuring taxable capacity must be achieved through finding the expected or potential ratio of tax to gross national product and through the use of a regression equation of the actual tax burden on

the variety of factors influencing it. In other words, taxable capacity is the predicted tax- GDP ratio estimated from a regression, taking into account the country's specific characteristics (Le Minh et al., 2008). To measure international taxable capacity, some other research has used the cross-section analyses to estimate the function of the tax burden of a group of countries, with the assumption that these countries are similar in terms of growth rates, degree of development, economic structure, tax structure, degree of efficiency and effectiveness of the tax system, and that tax rates are imposed on various tax bases (Chelliah, Bass & Kelly, 1975; Truong & Gash, 1979; Le Blanca & Rojchaichanthorn, 2008). The relative taxable capacity using the regression approach is estimated by regressing the variables representing the tax bases and their proxies on the tax- GDP ratio of the states in cross-section regression. Apart from tax bases, "it also requires the identification of other factors that facilitate revenue collections, particularly those representing organization of the economy" (Govinda et al., 2005, p. 259).

However, this method is beset with many defects, in particular by several complex problems which are caused by a lack of uniformity in the factors which affect taxable capacity in the countries concerned.

Other studies (e.g. Adanu & Sun, 2002) used time series analysis to measure taxable capacity in each country separately.

It is possible to define the tax effort (which is sometimes called Tax Burden Index) as a portion of the society's taxable capacity which is borne by the society itself in the form of taxes, or the amount of taxable capacity which is used by the state. The tax effort can be measured by dividing the actual tax burden by the potential (estimated) taxable capacity.

If the Tax Effort Index is greater than one, this means that the tax burden exceeds the taxable capacity. In addition, the taxpayer suffers from tax stress or

fatigue resulting from the tax deduction exceeding his/her ability to pay. In other words, a high tax effort ratio, above one, indicates that the country is collecting more taxes than predicted by the structural characteristics of its economy ( African Economic Outlook , 2011).

However, if the Tax Effort Index is less than one, it indicates that the tax burden is less than the potential taxable capacity, and the country is collecting less tax than predicted (African Economic Outlook , 2011), and that it is possible to increase the tax deduction. In this case, the tax burden could be increased by using any combination of four methods: increasing the existing tax rates; imposing new taxes; improving methods of tax collection; or preventing the phenomenon of tax evasion and reducing tax avoidance.

If the Tax Effort Index is equal or close to one, this means that the tax burden is equal to the taxable capacity and the taxable capacity is fully exploited. It also means that, in this case, tax collection is as expected from structural characteristics (African Economic Outlook, 2011), so that the imposition of any additional taxes or raising of tax rates is not feasible.

In the light of measuring the tax burden and taxable capacity results, there are four probabilities for tax policy classification in any country (Toye, 1978), as follow:

		Tax Burden	
		High	Low
Taxable capacity	High	High taxable capacity & high tax burden.	High taxable capacity & low tax burden.
	Low	Low taxable capacity & high tax burden.	Low taxable capacity & low tax burden.

Although the limits of taxable capacity cannot easily be expressed by a fixed ratio, without taking into account several interrelated economic and social

factors which differ from one society to another, the change in these factors leads to change in the limits of the taxable capacity. Therefore, any tax system must take such factors into account, because " the desirable features of a tax system include minimal loss of efficiency, low administrative costs and that the system should take account of issues of both horizontal and vertical equity " (Connolly & Munro, 1999, p. 183). Therefore the most traditional explanatory variables in the conventional tax effort literature are those controlling a country's economic structure. These variables reflect the idea that the availability of "tax handles" (Bird et al., 2007).

This has prompted some researchers to take some of these factors into account when making econometric models, in order to estimate the taxable capacity of an economy. Some of them use the multivariate regression model, (e.g. Morss & Lotz 1967, 1970; Bahl 1972; Chelliah & Keely, 1975; and Musgrave, 1980).

#### **a) Regression Analysis Approach:**

This approach is an improvement over the traditional tax effort measure, namely tax-income ratio, where income is used as a measure of taxable capacity. The regression approach (also called a stochastic approach) establishes that in addition to aggregate incomes, the denominator in the tax ratio, other factors affect a country's taxable capacity.

According to this approach, tax effort is the ratio of actual state-local tax collection to the estimated yield from the model tax system (Burkhead & Miner, 2007, p. 207). Therefore, the regression approach takes into account the effect of several capacity indicators on tax capacity and tax effort. For this purpose, the average degree of relationship between the tax ratio and what are identified as the taxable capacity factors may be derived through multiple regression analysis. Since in this regression equation only the tax capacity factors would be included as independent variables, it is not intended to, and will not explain the

total variations in the tax ratio. The difference between the actual tax-ratio in a country and that estimated for it on the basis of the tax capacity may be attributed to tax effort. Tax effort then could be measured in one of two ways: i) some expression of the residual variance can be taken as the measure of tax-effort and the countries could be ranked according to the values of this expression, ii) alternatively, the estimated tax-ratio can be taken to represent the relative taxable capacity which a country would have had if it had used its capacity estimation of tax function. There are various models being developed for this purpose. The notable models are:

**a . i ) Stochastic Model :**

In this model cross section data are used to estimate tax yield. Several determinants exclusively determining capacity are chosen and tax-ratio or per capita tax is regressed upon these determinants. While the estimated yield measures capacity, the residual, i.e. the difference between the actual and estimated yield gives a measure of tax effort (Goode, 1984, p. 85). However, this method fails to distinguish residual variations due to factors affecting tax effort from those due to random disturbances arising out of sampling fluctuation.

**a. ii) Panel data:**

The intention of this model is to overcome the shortcomings of the stochastic approach. This method helps not only the identification of common traits in the tax behaviour of the countries/states but also to segregate the effects of country specific factors from those of pure random disturbance factors.

Panel data model has certain advantages over the conventional model. The basic logic of the two models is similar as both require identification of the

determinants at the first step, followed by tax function specification, and form of regression to be used, including the use of dummy variables and so on.

Briefly, the Regression Analysis Approach (the tax base availability approach) to assessing tax effort was employed by Lotz and Morss in the first international tax effort model (1967). Instead of using specific tax bases and tax rates derived from summing tax collections and the value of tax bases for all countries examined, Lotz and Morss used general indicators of the availability of tax bases, and coefficients of these indicators derived from a regression equation, to generate the marginal relationship between the indicators and the tax share. The reasons for using an alternative model to assess tax effort across countries were both theoretical and practical. The use of indicators to measure availability of tax bases was probably prompted by empirical considerations. Lotz and Morss simply did not have an adequate data base to measure specific tax bases and rates for developing countries LDCs. Consequently, the representative tax system approach used by U.S. Advisory Commission on Intergovernmental Relations (ACIR) could not be utilized. However, the use of a regression equation rather than a deterministic formula such as that used by ACIR was certainly prompted by methodological considerations. As noted above, the regression approach utilises more information from the data and allows a more appealing calculation of the marginal effects of changes in tax bases on taxable capacity. However, if the regression approach were used with specific tax bases as the independent variables in a tax capacity equation, the substitution problem would still remain. The Lotz and Morss tax base availability approach, while losing the direct linkage between a specific tax and its tax base that exists in ACIR approach, did allow for cross-country variations in tax base use to achieve a given taxable capacity. That is, by using general indicators of tax base availability such as the "level of development" and "openness", Lotz and Morss allowed for some unknown alternative use of tax bases from country to

country in order to obtain the same taxable capacity. Another feature of the Lotz and Morss approach derives from the use of cross section data to imply tax structure change over time. The expected positive relation between the tax share and the level of development indicator is presumed to result not only from a widening of existing tax bases as a country grows, but the creation of new tax bases as a country develops over time. That is, the cross section regressions are assumed to reflect a common pattern of tax structure development for each LDC over time. Thus, as the level of development of an LDC increases, new forms of taxation are assumed to gradually replace old ones.

**b) Representative Tax System Approach:**

The second approach analysing tax yield is popularly known as the Representative Tax System Approach (RTS). This method is applicable at individual tax levels; major proponents of this measure include the Advisory Commission on Inter-Governmental Relations. Subsequently, various improvements have been suggested by scholars such as Akin (1973), Bahl (1972), Manvel (1971), and others. This method essentially involves identifying actual tax bases or their suitable proxies for individual taxes and then calculating an effective rate for each tax as a ratio of actual tax revenue to the actual or proxy base. A normative tax rate is then derived from these effective tax rates over the observations. This gives the measure of taxable capacity. Individual tax potential can then be summed across countries to arrive at the aggregate tax potential. As in the case of the regression method, in the RTS method, by measuring actual aggregate collections against aggregate capacities, so an index of aggregate tax effort is derived. Since RTS uses standardised rates applied to standardised bases, the resulting tax effort measures give comparability among countries or states that simple comparison of statutory rates does not.

The Representative Tax System method has five basic elements: i) the revenue coverage ; ii) the classification of revenue into separate sources; iii) definition of a standard tax base for each revenue source; iv) the definition of a standard tax for each revenue source and; v) the estimation of RTS revenue for each country/state.

Both the Aggregate Regression Method and RTS method are commonly used to measure capacity and effort, and both have their own relative merits and demerits. The applicability of RTS method depends upon the availability of adequate and reliable data on the tax bases and actual tax rates. In the absence of such information, the Aggregate Regression Approach is considered as suitable. This approach does not require highly disaggregated data and also takes account of the inter dependence of the tax bases. As the Ninth Finance Commission (1989) rightly observed, sometimes the effective rates themselves can vary with the size of the tax base (the effective tax rate may be higher in a more developed country than in a less developed country), which is captured in the regression approach. In the regression approach the estimates are not derived by relating tax revenue to the actual or proxy tax bases, but only to macro-capacity indicators. A major weakness of the regression method is that the residual error is taken to represent tax effort. However, the residual error may also contain random factors. The RTS method relates the tax revenue to individual tax bases or their proxies and therefore, the logic of the method is more transparent. Notwithstanding these advantages, this method is riddled with the complex problem of non-availability of comparable, reliable and adequate data on tax base and rates, and also item-wise tax yield across the countries. In the absence of such information any attempt to estimate tax-wise yield results in a disaggregated level regression approach only.

In summary, the representative tax system approach can be used to obtain the taxable capacity for each state. First the average national tax rate for a given tax

base is defined as the rate implied by taking the total revenue actually collected on this tax base in all states and dividing this number by the total value of the taxable base in all states. Then each average national tax rate for a given base is multiplied by the actual tax base in a state to yield the taxable capacity of a given base for a particular state. Finally, the taxable capacity for each of the bases is summed for a particular state to yield the taxable capacity of that state. Thus, this method assumes that there are nationwide average tax rates that can be applied to each of the tax bases in a given state, and that when these products are summed, the estimated tax capacity of that state can be determined. If actual total tax revenues exceed estimated taxable capacity, a state is assumed to be making a higher 'tax effort' than the average of states. If actual tax revenues are less than estimated taxable capacity, a state is assumed to be making a lower 'tax effort' than the average of states. The implications of this exercise are that those states that are making a high tax effort are more deserving of central government grants than states making a low tax effort, since the low tax effort states could tax their residents more if they chose to. Those states making a low tax effort are assumed to be substituting national grants for state and local tax revenues.

### **2.5. The concept of tax effort:**

Leuthold (2002) indicates that tax effort is defined as the exertion a country puts into collecting its tax revenue, given the tax handles available to the country. This means that the tax effort is the extent to which a country utilises its taxable capacity (Gillis, 1989). Hoek and Peter (2008) defined the tax effort as a measure of how well a country is using its taxable capacity; that is tax effort is the ratio of actual tax revenues to taxable capacity (Hoek & Peter, 2008; McGee, 2008, p. 15). Thereupon the tax effort can be considered as a spent (exploited) part of the optimal (potential) taxable capacity. In any country, tax effort can be calculated by dividing its actual tax share by an estimate of how

much tax the country should be able to collect given the structural characteristics of its economy (African Economic Outlook, 2011). In other words, the tax effort can be measured by dividing the tax burden by the taxable capacity "index of tax effort" (Le Minh et al., 2008). Thimmaiah (1976) believed that "the proportion of the actual yield from all taxes to the aggregate potential revenue is interpreted as the total tax effort" (p.1514).

### **2.5.1. The importance of measuring the tax effort:**

Firstly, measuring the tax effort helps to make a comparison between the actual distribution of the individual tax burden and the objectives of the tax legislation on the one hand, and the taxpayer's ability to pay tax on the other hand. In order to ensure that this distribution comes close to tax justice, societies must attempt to find an optimal tax rate which takes into account the different economic, social and financial circumstances of the country. Indices of tax effort provide a tool for measuring differences between countries in how effectively they are using their potential tax bases (Hoek and Peter, 2008).

Secondly, to determine the ability of both the individual, and the national economy to bear the tax burden at different periods of time, thereby helping to make decisions regarding the imposition of new taxes or the changing of tax rates, through creating new ways to avoid the negative effects of taxes, where the tax effort is the degree to which taxable capacity is used (Malik, 2010. p. 10).

Thirdly, to search for a tax burden which ensures the achievement of the greatest social welfare possible, without using random estimation which is based on determining an inaccurate tax rate in advance. In an ideal world the optimal tax rate should be related to changes in several social and economic factors affecting the tax burden on the national economy, because the tax

burdens need to be proportionate to the abilities of the taxpayers to endure them (Maroun, 2010, p. 35)

Fourthly, the tax effort reflects the limits of the state's role in economic and social life, and shows tax rates should be controlled as a tool of tax policy, especially because "the tax system can reflect ideological positions" (Connolly & Munro, 1999, p.159 ).

Fifthly, to compare the actual tax burden with taxable capacity in the society, leading to an evaluation of existing tax policy, and putting forward suggestions to amend that policy, especially that the tax effort has been considered as representing the degree of intensity of the government's willingness to tap available resources (Amin, 2008, p. 309). The study of tax effort and taxable capacity helps the researcher to evaluate the tax structure's performance .Tax effort is an index measure of how well a country is doing in terms of tax collection, relative to what could be reasonably expected given its economic potential. It is a ratio that, by construction, is always positive (African Economic Outlook , 2011 ).

Sixthly, measurement of the actual tax burden for each economic sector or each administrative region helps to compare the tax burden, and to calculate the importance of the sector or the region, and its role in the economic development of the country. However, the study of tax effort and tax burden in this case contributes to finding solutions to problems of local finance, by identifying the share of each administrative region in central revenues. Indices of tax effort may indicate the appropriate policy for dealing with budget deficits. For example, countries with a high tax effort index may need to look at reducing expenditure rather than raising taxes (McGee, 2008, p. 15).

Finally, comparing the real tax burden and the contribution of tax revenues to total public revenue among different countries distinguishes between these

countries in terms of tax effort, and taxable capacity. This comparison also contributes to finding solutions to the problems of the financing of international organisations by determining their respective share in financing the expenses of these organisations. This system also helps international banks assess the suitability of granting international loans. In this respect, Leuthold (2002, p. 2) believed that "international lending agencies also use measures of tax effort as a basis for allocating international grants favoring high tax effort over low tax effort countries in order to deter low tax effort countries from substituting external funds for locally raised funds".

### **2. 5.2. Factors affecting tax effort and taxable capacity:**

Tax has an important role in the modern economy, but it cannot be imposed without limits in order to avoid negative side effects on society and the national economy. Tax can have many harmful effects, such as reducing the incentive to work and produce, and spreading tax evasion and avoidance, which leads to declining tax revenues in the end, because estimate of the tax effort as a ratio of the tax revenue to the taxable capacity will have to take into account the GDP or the GNI without ignoring various capacity factors such as size of population; administrative capability; degree of monetisation; availability of tax handles; etc. (Ramanujam, 2006, p. 1). Taking into consideration that the ability of the national income to bear the tax burden changes according to changes in political, social and economic conditions, any research into tax effort and potential taxable capacity in any economy should be seen to take into account several considerations (Zaki, 1992, p. 209), including:

1-The structure of the national economy and the degree of its development or underdevelopment. For example, an economy characterised by an established manufacturing sector has more easily identifiable and accessible taxpayers than an economy that is largely agrarian or principally comprised of small traders (Mertens, 2003). In this respect, the larger the agricultural share in an economy,

the lower the tax share is likely to be due to the difficulty of taxing agriculture directly and the relatively low level of monetisation in the agricultural sector (African Economic Outlook, 2011 ).

2- The pattern of national income distribution between the classes and segments of a society (Barth et al., 2000, p. 80).

3- Tax rates and the existing tax structure and support system.

4 - Considerations of social justice, which take the government's current policies into account.

5 – The economic and social problems which face the national economy.

6 - The potential impact of increasing taxes on production, savings, investment, distribution and prices.

Rajagopalachar (1993) finds that there are three major determinants of taxable capacity and they are: (i) Ratio of total tax revenue to national income of the nation; (ii) The benefits of public expenditure out of tax revenue; and (iii) The efficiency of tax administration (Rajagopalachar, 1993, p. 261).

Barth and Hemphil (2000) identify the following major factors to the taxable capacity: (i) The degree of openness of an economy; (ii) The level of development and income; (iii) The composition and distribution of income (Barth and Hemphil, 2000, p. 80).

Berglof and Vaitilingam (2000) have indicated that the literature also identifies several economic variables as bearing on a country's taxable capacity, such as: per capita GDP; share of value added produced in agriculture; openness to foreign trade; production of natural resources; monetisation of the economy (Berglof & Vaitilingam, 2000, p. 18).

The general level of economic development of a country, its openness to trade and the relative importance of agriculture in domestic production are the key

characteristics bearing on a developing country's ability to collect taxes, and thus its tax share. Empirically, these characteristics are captured respectively by per capita income, the ratio of trade to GDP, and the share of agriculture to GDP (African Economic Outlook, 2011).

In this study, the preceding discussion will be enhanced to deal with the factors and their proxy variables specifying taxable capacity as used with the econometric models. Previous studies that deal with measuring taxable capacity confirm that it should be considered as a function of:

- a) The size of foreign trade.
- b) Structure of the national economy.
- c) The income level and level of economic development.

The proxy measurement of the above elements in the second phase of this process will be considered on the basis of economic theory and logic correlation between 'taxable capacity/tax ratio' and these proxy variables. It is necessary to choose such a variable to reflect some ranges of biased decision. However, there are a number of impalpable elements greatly affecting tax ratio, for example, form of state, and sociological and geographic areas which may or may not be involved in the models by using indicator variables. The following discussion gives due attention to the proxy variables represented and the factors affecting taxable capacity:

**a) The size of foreign trade:**

The degree of economic openness has a direct and extensive effect on taxable capacity in developing countries. Thus, it is significant to specify the proxy variables of this factor. Three possibilities can be considered:

- i. The import ratio to GNP (M/Y).

ii. The export ratio to GNP ( $X/Y$ ).

iii. The total foreign trade ratio to GNP  $[(X+M)/Y]$ .

The most suitable variable is considered to measure the degree of economic openness by earlier studies. According to Hinrichs (1965) the first variable is  $(M/Y)$ , while Lotz and Morss (1967) pointed, in their first paper, to the third variable  $[(M+X)/Y]$ . However, Wakatsuki suggested the second variable  $(X/Y)$  to be superior to the two other variables  $(M/Y)$  and  $[(M+X)/Y]$  (cited in Lotz and Morss, 1970). Lotz and Morss (1970) themselves, in their second paper, promoted Wakatsuki's findings when confirming that the export ratio  $(X/P)$  was the most independent variable (Alwaily, 2006). These authors' argument for using these variables was because they considered them to be indicators of the size of foreign trade which dominates the national economy in the developing countries.

Export ratio was recommended by Chelliah (1971) because of its closer association with the tax ratio than the import and total foreign trade ratios. Bahl (1971) illustrated how important export ratio is; he pointed out that the export ratio only will be more suitable in the case that the foreign trade variable reflects the size of the basis that is amenable to joint income or export taxation.

It is theorised that taxable capacity has a direct and positive relation to the degree of economic openness variables. A number of reasons strengthen this hypothesis:

1. Imposing and collecting taxes easily from the foreign trade sector, especially in developing countries, makes it a significant source of tax revenue. Both exports and imports are handled through definitive ports that can be built and supervised by government (Musgrave & Musgrave, 1989).

2. Rapidly increased rate of the foreign trade sector indicates a significant degree of monetisation and industrial development, which in turn, supports and extends the tax base (Bahl, 1971). That means taxes are directly obtained from exports and/or imports and indirectly from the income resulting from them.
3. Customs duties, in developing countries, are significant ways in which to provide due protection to national industries and to reduce trade imbalances.
4. Although there are regression results, it is not easy, especially in this era where every country exerts great efforts to extend its export market, to accept a hypothesis that considers exports as a direct target for taxes, because such taxes will increase the price of exports and openly alter competitive scope. Moreover, passing export taxes to the foreign consumer obviously relies on the price elasticity of demand for export goods.

Askari, Cummings and Glover (1982) provided a new independent variable to the regression model namely, export index of the tax burden (EI), which is computed by the following formula:

$$EI = \sum_{i=1}^m (X_{ij}/X_{it}) (X_{ij}/Y_j)$$

Where EI= price elasticity of demand for commodity i .

$X_{ij}$ = the total value of country j's exports of commodity i.

$X_{it}$ = the total value of world exports of commodity i.

$Y_j$ = GNP of country.

$M$ = total number of commodities.

The sign of this variable (EI) coefficient is varied among the samples as used by this study. Other studies exemplify the degree of openness by the export ratio, which exclude mineral exports. That is because the mineral variable, as will be discussed, is included as an independent variable in the models as a typical measure of the sectoral structure of the economy factor. The section on the review of earlier studies will discuss closely related studies and their methodology and approaches.

### **b) Structure of the national economy:**

A country's economic structure is the essential factor that specifies taxable capacity. According to Musgrave and Musgrave (1989) the availability of tax bases is connected with the economic sector. Bahl (1971) indicates that the surplus available to government for taxation can be said to vary considerably among these sectors. In other words, these sectors' importance to tax revenues is specified by their share of total tax revenues. Three proxy variables have been used to represent the economic structure: 1. Product of the manufacturing sector; 2. Product of the local trade sector; 3. Product of the Mining sector. These proxies are discussed in more detail below:

First, Product of the manufacturing sector:

Developing countries have given due attention to this sector, which has obtained appreciable protection. It is reasonable to theorise some types of relation between this sector and taxable capacity, and this may be a two-way relation. Firstly, there may be a positive relation between the product of this sector and taxable capacity. Secondly, there is a reverse relation in developing countries between these two due to the abundant enhancement and tax exemptions that governments offer. Generous tax holidays are, moreover, often available for long periods; this is particularly one of the most common approaches among the developing countries. Yet, Tanzi and Zee (2001) indicted a number of

deficiencies of such a policy. Firstly, tax holidays provide taxed corporations sensible bases for avoiding tax. Secondly, the tax holiday period is subject to misapplication and extension. Thirdly, such a motivation affects investment quality and tends to falsify investment options. It attracts short term projects, which are of restricted economic profit potential compared with long term investments.

Second, Product of the local trade sector:

Malki (1978) and Abu Hammor (1997) utilised this variable as an independent variable in the taxable capacity regression method. Both pointed out a negative relation between this variable and taxable capacity. The explanation provided to demonstrate the negative relation refers to the wholesale and retail sales corporations which represent temporary and small establishments. Abu Hammor (1997) indicated that some account-auditing problems are connected with such small enterprises that widely permit for tax avoidance. Such a justification may be logically accepted in the case that it is restricted to direct taxes such as a profit tax, since the profit margin is relatively low in small corporations. Moreover, Musgrave and Musgrave (1989) illustrated that the administration of income tax is not much easier where employment is in mostly in small corporations. It is seemingly unsatisfactory in the case of considering indirect taxes, particularly value added tax (VAT) that relies on the efficiency of the tax system efficiency.

Third , Product of the mining sector:

A positive and important relation between the product of this sector and taxable capacity has been illustrated by previous studies. Chelliah (1971), for example, noted that the mining sector is a very essential determinant of taxable capacity in developing countries with extractive industries. Similarly, Tait, Gratz and

Eichengreen (1979) examined the economic composition factor represented by mining and agricultural variables as indicators of taxable capacity.

There is an important and positive relation between the product of mining sector as an independent variable and taxable capacity, this relation is explained by:

- 1) As the extractive companies are usually foreign owned, tax avoidance levels will be lower compared with domestic companies. Governments tend to do this for political reasons i.e. to avoid provoking the local corporations.
- 2) High stable investments demonstrate that investment in extractive industries is focused on a few large firms connected with high profitability that strengthen both the availability of tax base and administration simplicity (Chelliah, 1971; Bahl, 1971).

**c) The income level and economic development:**

There is a hypothetically and logically positive relation between the degree of development of an economy and its taxable capacity: the more development degree increases, the more taxable capacity increases. The variables represented in the development degree should be taken into account. Three variables are considered as the most significant indicators frequently used to give an approximate evaluation of the development level and its influence on taxable capacity. However, economic development has profound and broad ranges and affects most if not the whole sector. Hence, to estimate it precisely either by a single variable or by a simple combination of variables is very difficult. The variables are:

- 1) The level of individual income ( $Y_p$ ). 2) The agriculture portion in GNP ( $A_y$ ); 3) The monetisation degree ( $M_2$ ).

First, the level of individual income: The income per person level has a direct effect on the capability to pay taxes. It is used as a proxy variable of the

economic development level in the regression method. There is a positive relation between per capita income ( $Y_p$ ) as an independent variable and tax ratio ( $T/Y$ ) as a dependent variable due to economic reasoning. There are many reasons for that:

a) The higher the level of income per person or GNP is, the greater taxable surplus is, and consequently there is a larger tax base. That means an increase of per capita income demonstrates a higher development level. The latter could refer to higher tax payment capability and a greater extent to the collection of taxes (Chelliah, 1971). If there are, for instance, two countries "A" and "B" have the same total revenue and the same price indicators but variant per capita income, say, \$500 for A and \$1250 for "B", Country "B" is apparently in a better status to yield income tax than country "A". This hypothesis is consistent with the consumption theory, especially that part of marginal propensity to consume (MPC). It indicates that MPC for wealthy people is smaller than that of poor or middle-income people.

b) The potential of transferring resources from individual to public use may be very restricted in low per capita income countries, where the majority of this income is required to cover survival needs (Musgrave & Musgrave, 1989).

c) A regular increase in per capita income potentially leads to an enlarged demand for public commodities and services. Hence, this raises the government's requirements for extra financial sources to confront the demand growth for its services. It is reasonable to indicate that a government's capability to collect taxes and its need to comply with its obligations is fairly specified by its objectives. As mentioned previously, the greater taxable surplus is, the more tax revenue government obtains as new tax sources are provided.

Mixed findings regarding the significance of per capita income as an independent variable in the taxable capacity regression methods have been

illustrated by earlier studies. However, most findings were consistent with real facts. Direct taxes are more significant than indirect taxes for developed countries, as is widely known. Therefore, most taxable capacity studies, which are limited in developed countries, have only confirmed that per capita income ( $Y_p$ ) was statistically significant. Nonetheless, ( $Y_p$ ) is statistically insignificant when taxable measurement studies are restricted to developing countries. Such a result is consistent with the fact that indirect taxes have a significant role in these countries. A review will be conducted on these studies, and most related ones, later in the section on earlier studies.

One or more of the following conclusions, however, may lead to differences in the result:

- i) Variation of periods: Each study concentrated on a different period and that involved variant data. The period and data used in the study were logically reflected by the regressions results.
- ii) Different countries: The sample of each study is varied in quality and quantity. For instance some studies did not differentiate between developing and developed countries, while others dealt only with developing countries.
- iii) Different variables: Studies have a significant difference in using independent variables. Shin (1969), for example, suggested the rate of change in the consumer prices index ( $\Delta P/P$ ) and the rate of growth in population ( $\Delta N/N$ ) in addition to other independent variables. Lotz and Morss (1970) added the degree of monetisation as well as other variables: however, they disregarded the variables of ( $\Delta P/P$ ) and ( $\Delta N/N$ ) that Shin used.
- iv) Since the adopted methodology groups the sample into low, middle and high-income countries according to their geographic region, different results may arise.

Second: The Agriculture Portion of GNP: The income proportion yielded in the agricultural sector is one significant indicator of a country's development phase. A significant and reverse relation between the agricultural sector ratio to GNP and tax ratio are statistically indicated by all earlier studies. There is a negative influence on tax ratio that may be clarified by the following:

- a) In general, the higher a proportion of the economy agricultural sector represents, the lower per capita income becomes (Chelliah, 1971), because in this sector wages are relatively low.
- b) According to Musgrave and Musgrave (1989), it is very difficult to tax the agricultural sector because a large section of this sector's yields are consumed domestically and it is largely a non-monetised sector.
- c) Agricultural yield in developing countries is usually produced by small farmers. In other words, the profit that they make may be very low and cannot be subjected to tax unless and provided that it gains a minimal standard.
- d) The agricultural sector is mostly considered as a subsistence sector because of its relevance to a lower commercialisation and industrialisation level. That means a lower potential for taxable capacity (Bahl, 1971).
- e) Government has a very limited potential to bring in and collect taxes from the agricultural sector because of the preceding reasons, and political pressure.
- f) Some countries promote the agricultural sector and offer a wide range of advantages to accomplish subsistence needs for national security reasons.

Third, The degree of monetisation: According to Black (1997), money has three essential functions. It is a valuable store, a unit of account, and a medium of exchange. The third function indicates the idea of using money to facilitate the process of exchanging one's product for those of the rest of community. This function leads to a barter economy quickly becoming less common. As taxes

nowadays gain a monetary kind, the degree of monetisation and the use of money as a medium of exchange represent great importance. As previously mentioned, a large portion of agricultural products are nonmonetised because products are domestically consumed, or such a sector is very difficult to be taxed in a barter economy.

The level of monetisation means that simplifying, imposing and collecting taxes is difficult. Therefore, a positive relationship between taxable capacity and the monetisation level is reasonably anticipated. Moreover, a positive relation between inflation and tax ratio is indicated to test the variable of the rate of change in the consumer prices level ( $\Delta P/P$ ) (Shin, 1969).

Now, unless the increase in the money supply "M" is not related to a similar increase in the production (of the closed economy) and imports (in the open economy), prices, generally, will not remain unchanged. In addition, tax revenues may increase in infinite terms. On the other hand, if a government decides to raise the money supply by printing new money to fund its spending, and such a phenomenon is not attached by an increase in production and/or imports, or it is attached by low levels of these, this will lead prices to rise and as a result the consumer price index will increase.

Finally, it is necessary to choose a definition of money as a variable of monetisation? There are many measures of the quantity of money as stated below:

- a) Currency "C" refers to the sum of superior paper money and coins.
- b) M1 comprises currency plus demand deposits.
- c) M2 involves M1 plus savings deposits.
- d) M3 comprises M2 plus long-term deposits.

"M1" is normally decided as an independent variable to reflect the level of monetisation in the tax ratio regression models.

## **2. 6. The previous studies on tax effort:**

The basic aim of this section is to take into account the methodologies that have previously been used to measure relative taxable capacity and to evaluate which methodologies are most suitable for measuring relative taxable capacity in Libya.

There is a body of literature in public finance regarding the tax effort and taxable capacity at the international level; included in this body are works by researchers such as: Oshima (1957); Son (1961); Plasschaert (1962); Martin & Lewis (1956); Perst (1978); Datta (1977), as well as a study by Tait et al. (1979); Tanzi (1987); Tanzi (1992); Stotsky and Wolde Mariam (1997); Mertens (2003) and Bird (2007). These studies attempted to measure the tax effort and taxable capacity, according to the different social and economic factors in the countries under investigation. Some influential studies in this area are outlined as follows: -

Williamson (cited in Sookram & Saridakis, 2009) conducted one of the oldest studies to measure a methodical relation between the development growth and government revenue in 1961. He utilised two independent variables in his sample of thirty three developed and developing countries. His outcome illustrated a positive and significant relation between tax ratio and per capita income, which functioned as a proxy variable for the degree of development. Such a result is consistent with the view that the higher development level is, the higher tax surplus is achieved, in addition to its consistency with economic theory. Nevertheless, Williamson's outcome is opposite to that of many other studies which were conducted only with developing countries, and that

indicated unimportant relations between per capita income and tax ratio. This could be explained by the reality that both developed and developing countries were involved in Williamson's sample, and it is generally perceived that income taxes represent a large portion in the total revenue of developed countries.

Plasschaert's endeavour in 1962 followed this study. His sample was limited to twenty less-developed countries and his focus was on per capita income and import ratio as the independent variables. He referred to a result contradictory with Williamson's outcome. That means Plasschaert emphasised that import ratio arose as an important and positive determinant of tax ratio. On the other hand, per capita income lacked of statistical significance (Chelliah, 1971) and (Hope, 1996).

Study by Hinrichs(1965), which measured the tax effort and taxable capacity in 60 countries including 40 developing countries during the period of 1957-60, which tried to find the relationship between the ratio of public revenues to GDP, and two independent variables: imports and per capita income.

The study found that in the developing countries the degree of economic openness (measured by imports) was a determining factor for the ratio of public revenues to GDP, not per capita income (Williams, 2001, p .62). More precisely, Hinrichs has found a relationship between a country's *openness*—that is, the trade-GNP ratio—and the ratio of government revenue to GNP. For the poorer developing countries, openness appeared to be a better indicator of the government revenue share than per capita income (Corden, 1997).

In fact, trade taxes represented a remarkably even share in the total revenue in developing countries. Hinrich (1965) evenly sustained Plasscharet's result on examining the relation between government revenue and the development level, and the degree of openness, for a sample of sixty countries. Further tests were conducted for several sub samples. The sixty countries were divided by Hinrich

into several groups in accordance with per capita income level "Y/N" such as countries of "Y/N" under \$150 (fifteen countries), countries of "Y/N" between \$150-299 (fifteen countries), countries of "Y/N" between \$300-749 (fifteen countries) , and countries of "Y/N" over \$750 (fifteen countries) . He took into account the same variable as other studies and applied a simple regression for each independent variable exclusively and a multiple regression for both. His conclusion, on the one hand, highlighted a strong positive relation between tax ratio and per capita income for the whole sample (sixty countries). On the other hand, he emphasised the invaluable importance of per capita income and tax ratio when developing countries (forty-five of the sixty) only were considered. In addition, import ratio is a fundamental determinant of the size of tax revenue for developing countries in general, and for countries with per capita income less than \$300 in particular. The coefficient of  $R^2$  emphasised the result that the simple regression (containing M/Y as independent variable) may somewhat clarify more variation than the multiple regression (involving both Y/N and M/Y).

Thom's study of fifty-two countries (twenty developed and the rest developing countries) produced results consistent with both Plasschaert and Hinrich's findings. However, when Thom studied developing countries exclusively the result was not compatible with the studies of Plasschaert and Hinrich. He did not address any meaningful relation between the degree of economic openness (measured by import ratio to GNP) and tax revenue (Alwaily, 2006).

In a study by Lotz and Morss (1967) entitled "Measuring tax effort in developing countries" and covering the period of 1962-65, an attempt was made to measure the tax effort for about 72 countries (main sample) including 52 developing countries (LDCs) and 20 Middle Developed Countries (MDCs). They examined such relations for the entire sample (72 countries) and for each group separately. Lotz and Morss' findings have been arranged to emphasise

the percentage difference between actual collection and projected taxable capacity (Radian, 1980, p. 30). They made an important contribution to identifying the determinants of the tax ratio ( $T/Y$ ) by including the “openness” of a country as a better estimator of taxable capacity in poor countries (Howard, 2001), so that by measuring the relationship between the share of taxes in the Gross National Product ( $T/Y$ ) and independent variables of the average per capita income ( $Y_p$ ) and the ratio of foreign trade (as degree of openness) to Gross National Product ( $F/Y$ ), they showed that the export ratio was more closely associated with the tax ratio than either the import or the foreign trade ratio (Snider, 1996)

This study concluded that the income per capita and the degree of economic openness (expressed as a ratio of imports and exports to GDP) were both important explanatory factors and determinants of the tax share (Gupta, 2007), where they have a positive relationship with the ratio of taxes to national income, also they are able to explain a high proportion of the variance. As can be seen from table 2.1, significant coefficients were obtained for the whole sample (72 countries) and for the 52 LDCs taken separately, but not for the 20 MDCs taken separately (significant at the 1% level). They found a positive and significant relationship between  $Y_p$  and  $F/Y$  and  $T/Y$ , which showed that for every percentage point increase in the importance of foreign trade ( $F/Y$ ), the tax ratio increased by 0.079 percentage points for the main sample (Lotz & Morss, 1967). The result for the LDCs showed that the explanatory variables remained significant despite a decline of the t-value of independent variables from 10.89 and 2.74 to 2.963 and 2.573 for the main sample and the LDCs respectively (Alwaily, 2006). Table 2.1 (see statistical appendix) shows the result of estimating this model.

Lotz and Morss attempt to account for those factors measuring a country's taxable capacity in order to determine a country's tax effort. In general, the

taxable capacity of a country is the ability of a country to raise tax revenue. Traditionally this has been viewed from the revenue-raising side only as aggregate income above subsistence, and has been assumed to automatically constitute a "surplus" amenable to taxation. Increases in this surplus are increases in taxable capacity. Lotz and Morss define taxable capacity in this manner and define tax effort as the extent to which a government actually utilizes taxable capacity.

Therefore, in a tax effort model it is necessary to explain only those variations in the tax share due to taxable capacity factors in a multiple regression equation.

Tax effort is given by the residual. This produces a linear model of the form:  $T/Y_i = XB + U_i$  where (X) is a matrix of (k) taxable capacity factors for (N) observations, (B) is a vector of (k) coefficients and ( $U_i$ ) is a vector of (N) disturbance terms. A regression over the sample of n countries will yield the

estimating equation,  $\left(\frac{\hat{T}}{Y_i}\right) = X\hat{B}_i$ . This is the expected tax capacity—the tax capacity that would result when a particular country's values for the regressors are plugged into the estimating equation. Given the actual tax collections of this country,  $T/Y_i$  we can then construct  $TE = \left(\frac{T}{Y_i}\right) / \left(\frac{\hat{T}}{Y_i}\right)$  and compare this ratio with that of other countries in a tax effort ranking.

In their 1967 study, Lotz and Morss argue that in addition to aggregate national product specified in the denominator of the tax share, other factors heretofore unaccounted for also affect taxable capacity. These include the level of economic development, the size of the foreign trade sector, "openness", the size distribution of income, the industrial origin of output, and the composition of government expenditures. They used the ratio of the sum of imports and exports to GNP, rather than the import ratio or the export ratio, as the index of openness (Hope, 1996). Lotz and Morss made an important contribution to this analysis by including the "openness" of a country as a better estimator of

taxable capacity in poor countries than the per capita income measure of development (Howard, 2001).

Data limitations force Lotz and Morss to consider only  $Y_i$ ,  $Y_i/P$ , and  $F/Y_i$ . The rationale for including the relative size of the foreign trade sector had been given earlier by Hinrichs (1965): that it is administratively easier to tax trade flows than domestic transactions and that the degree of "openness" reflects the degree of monetisation, urbanisation, and commercialisation of the economy. Using a two or three year (mid 1960s) average for each of 72 Middle developing countries (MDCs) and Less developing countries (LDCs), Lotz and Morss ran several OLS regressions. Significant coefficients were obtained for the whole sample and for the 52 LDCs (those with less than \$800  $Y_i/P$ ), but not for the 20 MDCs taken separately. Thus Lotz and Morss dropped the MDCs from the rest of their study, arguing that the public share of a high income country ". . . is more an index of political preference for the appropriate size of a government's role than an index of taxable capacity" (Lotz and Morss, 1967, pp. 488- 489).

An important impetus for the original international tax effort model presented by Lotz and Morss (1967) was the work done by the U.S. Advisory Commission on Intergovernmental Relations (ACIR).

Weiss (1969) collected data from sixty-six developing countries for his study, which tested the elements influencing government revenue. He used quantitative and qualitative (dummy) variables. He added to the "installed" variables several dummy variables reflecting social, political, regional and cultural variances. Cultural homogeneity (CH) and representative political system (REPR) variables contributed meaningfully to the statistical clarification of the varied revenue proportion when they reverted in the sub-sample of forty-seven countries. Moreover, Weiss signalled four socio-economic variables that

were likely to be used as good representatives, instead of income per person, as a general indicator of a country's development level: the "economically active population"; percentage in agricultural positions; literacy rate of population aged fifteen years and over; urban drift; and an index of the degree of mass communication. He found that both per capita income and openness were statistically significant. The regional group analysis indicated that there were variant elements in different parts of the world operating on the revenue. This was due to the close social and political distance between countries of the same geographical area ( Alwaily, 2006, p.169).

Shin (1969) contributed considerably when he took into account, for the first time, several independent variables and reverted them on tax ratio so that the study is extended to the tax effort and taxable capacity. Shin added three independent variables: agricultural income ratio to GNP "MY"; the rate of prices change " $\Delta P/P$ " ; and the rate of growth of population " $\Delta N/N$ ", while most earlier studies restricted themselves to per capita income and foreign trade ratio. He explained that agricultural income ratio evaluated the level of industrialisation, commercialisation, and urbanisation of an economy. It was anticipated that agricultural income ratio variable adversely affected taxable capacity, and that the rapid growth of population would reduce taxable capacity. That was likely to be accepted under the assumption that the population growth rate is in excess of the growth rate of GNP.

The United Nations Conference on Trade and Development (UNCTAD) developed a tax effort model (1970) which differed from the Lotz and Morss models in that it pooled cross section and time series data. Thirty-six LDCs were included in the study, and time series of from two to fifteen years were used depending on the country's data availability. The total pooled observations totaled 346.

In the pooled equations of this study, all of the variables were significant at the 5 percent level, while in the cross sectional equations  $F/Y_2$  was not significant. While the regression coefficients for  $Ag/Y_2$  did not vary much between the pooled and the cross section regressions, the coefficients for  $F/Y_2$  varied greatly between the regressions run on the two types of samples. In terms of ranking the 36 LDCs by tax effort using actual  $T/Y_2$  tax effort derived from pooled data, and tax effort derived from time averaged cross sectional data, there was no significant difference in the rankings.

The rate of inflation regressor,  $\Delta C_p/C_p$ , was used in the preliminary equation run by UNCTAD and had also been used by Shin. The rationale for employing this regressor was that under a progressive tax structure a higher rate of inflation may lead to a higher tax ratio or, alternately, that a higher tax ratio may cause a higher inflation rate (Shin, 1969, pp. 215-217). UNCTAD suggests that the highly significant and positive relation of  $\Delta C_p/C_p$  to  $T/Y_2$  derives from the high correlation between  $T/Y_i$  and  $E_c/Y_i$  found for most countries and that the higher is  $E_c/Y_i$  the greater the likelihood of inflation (UNCTAD, 1970, p. 28). UNCTAD argues that this rationale does not bear on taxable capacity and so excluded  $\Delta C_p/C_p$  from the regression equation for the purpose of comparison of pooled and cross section country rankings.

While the pooling technique increases the sample size it necessitates another assumption relative to the use of averaged cross section data. In pooling the data, UNCTAD implicitly assumed that factors which determine taxable capacity cross-sectionally also determine taxable capacity over time. That is, one would have to assume that long run or permanent secular (cross section) determinants of the tax share are the same as short run or temporary cyclical (timeseries) determinants of the tax share.

Lotz and Morss (1970) essential contribution in their second paper was the use of a monetisation variable, which measured per capita "M1" (coins and notes), with meaningful results. It is interesting to notice that this monetisation variable had high significance when regressed with per capita income; however, it led to a point of no significance of the later variable. They eventually concluded that a limited definition of money "M1" as independent variable is more suitable to other definitions. Tax effort was analysed by the study of "UNCTAD" (United Nations Conference on Trade and Development) for thirty-six developing countries for the period 1950-1966. The study added two independent variables—the share of agriculture in GDP and inflation rate. It also traced a meaningful relation between all independent and dependent variables. Nevertheless, the high intercorrelation between agricultural proportion and per capita income included inflation and led to descend the two later variables from the regression. The study's conclusion was that countries having a low agricultural proportion in income and a high degree of open economics are expected to have the highest tax ratio and vice versa.

A study entitled "A Regression Approach to Tax Effort and Tax Ratio Analysis" was produced in 1971 by Bahl, who measured the impact of two independent variables on the ratio of taxes to gross national product ( $T/Y$ ), the share of the mining sector (oil and minerals) in the GNP, on the grounds that this sector reflects the degree of openness of the economy to the outside world ( $NY$ ) and the share of the agricultural sector in the gross national product ( $AY$ ). Using a cross-sectional data for a sample of 47 developing countries during the period of 1969-1971, he found a significant, positive relationship between the mining share and the tax ratio using data for the 1960's (Bahl & Tumennasan, 2002). The study's details result in the table 2.1. Bahl made a clear distinction between the tax effort and the tax ratio models. After decomposing the inter-country tax ratio variances, he introduced two approaches to identifying the determinants of

these variances. First, to explain the variations in tax ratio, (defined as tax/GDP ratio), he proposed a stochastic model with tax ratio as its dependent and  $X_i$  as a set of independent variables that were used as proxy measures for the determinants of differentials in taxable capacity and tax effort. This may be termed the tax ratio approach. Second, he proposed that if a researcher wanted to identify inter-country differences in tax effort, then  $X_i$  is defined as a set of variables that will reflect only the variances in taxable capacity. According to Bahl, the basic difference between the tax ratio and tax effort views of the problem turns on the restrictive definition of the independent variables in the latter approach (Tosun & Abizadeh, 2005).

The Bahl study (1971) summarised many of the previous tax ratio and tax effort models, examined their differences, and presented a tax effort model that dealt with some of the methodological and theoretical problems associated with the tax effort approach. Bahl stressed that if the regression equation is to explain only taxable capacity, care must be exercised in selecting the independent variables and the regressor proxies for these variables so that they reflect only factors related to a government's ability to tax, not a government's willingness to tax (Bahl, 1971, pp. 571-572). Bahl noted that tax effort, TE, can have many determinants, but he concentrated on three: the relative productivity of public as compared to private investments, a desire on the part of government to intervene in the resource allocation process for distributional reasons, and historical institutional arrangements for certain activities between public and private sectors. All of these determinants affect a government's willingness to tax (Bahl, 1971, pp. 582-583).

In developing his version of the tax effort model, Bahl pointed out that data limitations precluded the inclusion of taxable capacity variables such as personal income, income distribution, and the level of subsistence sector income in the tax share regression equation (Bahl, 1971, p. 554). Bahl included three

variables measuring taxable capacity in his model: the size of the foreign trade sector, proxied by  $XY$ ; the stage of development, proxied by  $AY$ ; and a measure of the sectoral composition of value added, proxied by  $NY$  (Bahl, 1971, p. 585). Taxable capacity is assumed to be related to the size of the foreign trade sector first because a greater level of exports relative to income suggests both a greater degree of monetisation and an industrial structure that is administratively amenable to taxation and, second, because the subsequent larger imports may be taxed with a minimum of administrative difficulty. The foreign trade sector was proxied by the export share rather than the theoretically more satisfactory exports plus imports to aggregate national product (since this measure reflects the total available trade tax base) because of a high degree of collinearity between the import share and export share (Bahl, 1971, p. 586). Bahl used  $AY$  as the proxy for the stage of development because of certain theoretical and empirical problems associated with the use of  $YP$  as the proxy.

Bahl noted that empirically  $YP$  satisfactorily explained tax ratio variations between MDCs and LDCs but did not satisfactorily explain variance among only LDCs in previous studies. He offered two reasons for this failure: first,  $YP$  hides important structural differences that affect taxable capacity, specifically the relative size of the monetised sector; second, conversion of local currencies into U.S. dollars makes for a large error factor in intercountry comparisons because of disequilibrium exchange rates and their incomplete measurement of the relative purchasing power of a currency in any case. The use of  $Ag/Y_i$  mitigated these problems. Also, Bahl felt that causation between  $YP$  and  $T/Y_i$  runs both ways; consequently, the specification of  $YP$  as an independent regressor in an OLS single equation regression leads to biased and inconsistent (parameter estimates (Bahl, 1971, p. 581).

A higher level of activity in the agricultural sector was assumed to be associated with a larger subsistence sector, less commercialisation and industrialisation,

and a lower per capita aggregate income. Furthermore, value added in the agricultural sector may imply a lower taxable surplus because the incomes of agricultural wage earners may be relatively low, profit margins may be relatively low when agricultural output is produced largely by many small farmers, and small agricultural enterprises are not as administratively amenable to taxation as enterprises in other sectors (Bahl, 1971, p. 590). Bahl used a third independent regressor—the mining share. It was hypothesised that sectoral income distribution affects taxable capacity independently of the overall level of development and size of the foreign trade sector. The mining share,  $NY$ , was used because it was asserted that the mining sector produces a larger surplus than any other sector and is therefore a positive determinant of taxable capacity. Mining operations are confined to a few large firms that are relatively easy to tax via income, or exports (Bahl, 1971, p. 590).

Bahl specified the tax ratio as a simple linear function of the above three regressors in a single equation OLS regression using late 1960s averages for the variables over 49 LDCs. He found that  $AY$  and  $NY$  were significant explanatory variables and had the expected signs, while  $XY$  was insignificant, apparently because of the high degree of collinearity between it and  $NY$  (Bahl, 1971, p. 593). That is, the regression coefficient of  $NY$  to a large extent included the influence of  $XY$  as well. Bahl also undertook a comparison of tax effort using the Bahl equation and the 1967 Lotz and Morss equation (using Bahl's data) and found that they did not result in significantly different tax effort rankings.

Similarly to Lotz and Morss (1967 and 1970), Bahl found regional effects to be a significant determinant of inter-country tax share variations (Bahl, 1971, pp. 600-604). That is, when Bahl specified his model with an additional five dummy regressors to represent different levels of taxable capacity among regions, the  $\bar{R}^2$  of the estimating equation increased by a statistically significant

amount (from 0.411 to 0.522). As in the Lotz and Morss model, interaction effects do not add significantly to the statistical explanation in terms of  $\bar{R}^2$ .

Also, in a further study by Bahl, which was entitled "A Representative Tax system : Approach to Measuring Tax Effort in Developing countries". The article tested the tax effort for 49 developing countries for the period of 1966-1968 by using his previous model. The paper was published in 1972. This study found that T/Y related inversely to AY and positively to NY. It indicated that an increase in the share of the agricultural sector in the GDP meant a decrease in taxable benefits due to the relatively low level of agricultural sector income, as shown in table 2.1. (Abu-Hammour, 1997).

In a study by Chelliah (1971) entitled "Trends of tax system in the developing countries" a sample of 27 developing countries during two periods was used, the first 1953-1955, and second 1966-1968. He related the tax share to explanatory variables such as mining share, non mineral export ratio and agriculture share (Gupta, 2007). The study indicated that the tax ratio in developing countries was affected by economic attributes (characteristics) and changed during the stages of development. This means that the proportion of the tax deduction rises with an increase in incomes and wealth, and expenditure which occurred because of the development and expansion the current tax bases and created new tax bases. The findings of this study indicated that the proportion of tax to GDP rose from 11.3% to 13.8% between the two periods.

Then the same study increased the sample size to 50 countries, including 24 developing countries for the period of 1966-6 only, and this study indicated that the average proportion of income taxes to GDP was 5.1% in the developed countries while it was 2.2% in the developing countries. The average ratio of total taxes to GDP was 15.5% in the developed countries and 12.3% in the developing countries. Also this study found that the capacity to collect and pay taxes increases with the level of development (Gupta, 2007).

Chelliah, Bass and Kelly (1975) were experts of the IMF who studied the relationship between taxes and GDP on a sample of 47 countries during the period of 1969-71. This study is one of the most important studies which have calculated the tax burden and taxable capacity and the tax effort; it used at the outset the relations between taxes and GDP, which were called "Lotz-Morss Equations". Then the study built a taxable capacity model, and assumed that the tax effort was influenced by the following factors:

A- per capita Gross National product ( $Y_p$ )

B- per capita export income ( $X_p$ )

C-ratio of mining sector product to the GDP ( $NY$ )

D-ratio of exports to GDP ( $XY$ )

E-ratio of exports, excluding mineral exports, to GDP ( $X'Y$ )

F- per capita GNP, excluding income from exports ( $Y_p - X_p$ )

G- ratio of the agricultural sector product to GDP ( $AY$ )

L-ratio of the foreign trade to GDP ( $F/Y$ ).

They obtained the best fit using the agricultural share, the mining share, and the export ratio in GDP as explanatory variables. They found that mining was positively related to the tax share while agriculture was negatively related and the export ratio is insignificant (Eltony, 2002).

The study provided evidence that countries with larger per capita non-export income, more open to trade, and with larger mining but smaller agricultural sectors have, on average, a higher "taxable capacity" or ease of collection (Aisen & Veiga, 2005). The results of this study as illustrated in table 2.1 (equations of F-K).

Two alternative methods were suggested by Tait and Eichengreen (1978) to the international comparison of imposing tax. The first one was the standard tax rate (STR) method and the other was the standard tax elasticity (STE) method,

to which the arithmetic approach was adopted for both of them. They did not consider the elements specifying taxable capacity and their proxy variables. A common element between these methods and the representative tax system (RTS) existed where all of them needed to find the loss of total tax earnings. Four essential components were taken into account by the previous methods:

1. Taxes on capital earnings, individual incomes, and business profits.
2. local taxes.
3. Taxes on foreign trade (exports and imports).
4. Other taxes.

Calculated actual tax yields (ATY), which are required by the standard tax rate (STR) method, can be acquired by dividing each kind of tax over its basis. The mean of (ATY) is named a standard tax yield (STY). The standard tax rate (STR) is acquired by dividing (ATY) by the (STY).

If the (STR) is less than one, this shows that a country, on one hand, has not utilised its taxable capacity yet, and vice versa. On the other hand, if the (STR) is equal to one; this indicates that a country has completely utilised its taxable capacity. This method supplies a sign showing how far a country has utilised its tax bases and the decisions that are likely to be taken as to which taxes are more reasonable for a raise or a reduction.

The actual tax yield (ATY) is calculated for two periods individually in the standard tax elasticity (STE). The (STE) increase rate of (ATY) is divided by the increase rate of the (STY) to get it. If the (STE) is higher than one, Taxes are flexible and vice versa. This model highlights the increase rate of actual tax yield and also indicates some tax earnings growth as a result of the modifications in base rate.

Although Tait and Eichengreen (1978) mostly criticised earlier studies connected to this subject, particularly those adopted the econometrics models, on the grounds that independent coefficient has a lower degree; moreover, these studies faced some regression problems. The same methodology was taken up in their research (1979) about international comparisons of imposing tax for sixty-three chosen developing countries for the period 1972-1976. The sample was divided into two subgroups. The first one was countries with GNP more than \$10 billion and the other was for those with GNP less than \$10 billion. The conclusion proposed that the equation was reasonable only for the countries with small economies. The countries were classified in accordance with their population size into two sub samples. The first, group "A", involved countries having a population below or equal to 10 million, and the second was group "B" involved countries having a population of more than 10 million. In addition, the sample was categorised into three geographical subgroups, Africa, Asia and Latin America. The Lotz & Morss equation and the CBK equation in addition to three others were used to calculate taxable capacity for each group. The authors concluded that the expression function, involving non-exportation income ( $Y_p - X_p$ ), the portion of mining in GDP ( $N_y$ ) and the portion of non-exportation mining in GDP ( $X'y$ ), was still the most reasonable one.

Truong and Gash (1979) followed another route by objecting to specifying whether economic combination results in higher or lower taxable capacity for developing countries. They used multiple regression model that included income per person and "export/GDP" or "import/GDP" ratios as the explanatory variable. In addition, indicator variable "I" was involved where "I" =1, if a country took part in a particular form of economic combination such as a free trade area, customs union, or common market, and zero otherwise. They indicated that the taxable capacity in developing countries is reduced by an economic combination plan. Taxable capacity, however, grows with

establishing free trade areas compared with other members of customs unions or common market.

Askari, Cumming and Glover (1982), in their study on taxing system and tax policy in Middle Eastern countries, amended Chelliah's model by adding four explanatory variables: portion of agriculture in the GNP ( $A_y$ ); sum of exportation and importation ratio to GNP ( $F_y$ ); export elasticity index (EI) and money supply to GNP ( $M_2/Y$ ). Although this form performed better than Chelliah's model, Askari et al. showed some reservations to a model which depended widely on the portion of mining in GNP ( $N_y$ ) to clarify differences in taxable capacity. They therefore substituted this variable with the mineral exportation ratio to GNP ( $X_m/Y$ ). They used importation ratio ( $M_y$ ) rather than foreign trade ratio ( $F_y$ ) because there were collinearity problems. This model alteration clarified the significant difference in the explanatory variable.

However, it can be argued that such a result was not accurate: Firstly, concerning the explanatory power's viewpoint ( $R^2$ ), the first form produces better at 0.772, 0.866 and 0.602 for the first form and for the entire group and the other two subgroups (19 middle eastern and 48 other LDCs) respectively, while it was 0.646, 0.803 and 0.588 for the second form for the same samples. Secondly, the mining portion ( $N_y$ ) as an independent variable yields a better conclusion in the first equation of Askari et al.'s form than mineral export ratio ( $X_m/Y$ ) in the rechecked equation.

Chelliah's study (1971), s CBK study (1975) and Tait, Grantz and Eichengreen's study (1979), published by IMF, were tested by Newlyn (1985) who provided criticism for these studies due to their methodology, which he argued led to a prejudiced result. So, Newlyn developed another model called tax effort measurement (TEM). It depended on the total of the initial growth in revenue ( $\Delta R_d$ ) as a result of discretionary modifications in the tax base that involved changes in the existing tax rates and offering or omitting taxes over a specific

period. Under this method, the modification in the sum of annual tax revenue ( $\Delta XR$ ) over the same period should be computed. The "TEM" was identified as the ratio of ( $\Delta Rd$ ) to ( $\Delta XR$ ), as the following equation:

$$TEM = \sum_{i=1}^n \Delta RD / \Delta XR$$

The computation should go forward to modify the tax effort measurement ratio (TEM) for each country to tax effort index (TEI) by dividing the former over the average sample value of "TEM". If the result for any country goes beyond a unity or 100%, that means the tax performance is met and vice versa. Yet, this study will not use Newlyn's model since it requires determining the initial growth of revenues resulting from discretionary modifications. The elimination impact difficulties of tax base growth from the discretionary modifications impact are likely to restrict the use of such a method. This model, moreover, disregarded the willingness to pay taxes and tax burden. It is significant to argue that excessive rates of imposing tax must be avoided.

A study by Musgrave and Musgrave (1989) provided a model that explains the affectivity of tax effort to four explanatory variables (reflects the average response of tax bases), for estimated relative taxable capacity using cross-sectional data of some less developed countries (LDCs). The explanatory variables were : per capita income (YP); Share of exports in Gross national product (X/Y) ; Share of the extractive industries product in Gross national product (E/Y); and Share of the agricultural product in Gross national product (A/Y). The explanatory power of this model amounted to 50 %, and they showed that relative taxable capacity depended on the economic structure of each country. The study found that the relationship between relative taxable capacity

and each independent variable is positive, except that which is between the capacity and the share of agriculture in the GDP (Abu-Hammour, 1997) .

Also this study indicated that index number of the tax burden (tax effort) can be accounted for by dividing the actual T/Y to the predicted (T/Y), and this helps us to evaluate and compare the tax effort between the various countries. That study also expected that the ratio of taxes to GDP would be less than 18% in developing countries.

A study was conducted by Leuthold (1991) on eight African countries over the period 1973-1981. He offered the total foreign subsidies and loans as explanatory variables, beside many others. The performance of regression model was poor where the trade portion coefficient was the only one out of five coefficients that was of anticipated indicator and statistically different from zero. The study suggests many reasons to change the tax revenues ratio to GNP or GDP: development phase, accessibility and non-tax income sources etc. He concluded that "care must be taken in the interpretation placed on the tax effort index [...] because it is unclear whether or not all relevant influences on tax effort have been included" (p. 184). All relevant elements in regression models are impossible to be involved because of econometrics problems. A model similar to the one illustrated by Bahl (1972) and confirmed by Tait and Eichengreen (1978) was adopted by Roberti (1992). The main idea of Roberti's approach is demonstrated by specifying the sum of tax revenues and then connecting each tax to its basis, and also relating each tax basis to GDP. This approach is sometimes named a "chain approach". Such a process of measuring the tax ratio of individual income tax is illustrated by the following equation:

$$T/GDP = (T/H) \cdot (H/SH) \cdot (SH/SH^*) \cdot (SH^*/H) \cdot GDP$$

Where

$T$ = individual income tax revenue.

$H$ =prospective income tax.

$SH$ =income subject to tax.

$SH^*$ =income the tax actually imposed.

$GDP$ =Gross Domestic Product.

" $T/H$ " described the mean income tax rate on the potential tax base, " $H/SH$ " considers discharges that is likely to happen in the possible basis. " $SH/SH^*$ " is taken into account to be what might be called the base erosion. " $SH^*/H$ " demonstrates the potential tax handle rate on which revenue taxes are actually levied.

This approach is somewhat complex and does not refer to tax effort. Moreover, it is better related to calculating the tax rate for each tax instead of taxable capacity.

Another two studies are worthy of mention here: in the first an ordinary least square was functioned by Sarojini (1992) to evaluate taxable capacity for fifteen Indian states covering two periods: 1970-1973 and 1980-1983. Each period was averaged to eliminate the variations impact on the variable. Two explanatory variables only were used. Abu Hammour (1997) dealt with taxable capacity in Jordan for the period 1973-1995. The form he used included the portion of the wholesale and retail trade sectors in  $GDP$  ( $WA$ ); in addition to five more explanatory variables. He used the two stages least squares (2SLS) model rather than using "OLS" to evaluate taxable capacity. He also examined whether log-linear modeling or linear one approach was better, concluding that linear modeling was more appropriate. The most significant conclusion of this study regarding the Jordanian economy was that Jordan did not achieve the maximum use of its relative taxable capacity during 1973-1989. That means tax effort for

each year during this period was lower than one. Nevertheless, not only did Jordan fully use its taxable capacity during 1990-1995, but also went beyond its taxable capacity to the extent that the tax effort for each year aggregated to more than one. Such a situation it is likely to be somewhat connected to the impacts of the second Gulf War.

Al Mutawkel (2000) took up, in his study about Yemen and twenty-five other developing countries, a form of two explanatory variables (income per person and importation ratio) to evaluate taxable capacity and tax effort. He concluded that both variables were significant. He illustrated that the taxable capacity of Yemen was 14% of the Yemeni GNP. Al Mutawkel considered computing the income elasticity of tax revenue from 1976 to 1990, which was found to be 1.3%. That meant that if GNP raised by a unit, tax revenue would have been be raised by 0.13 of this unit.

Finally, Eltony (2002) conducted an updated study connected to this subject. Such a study functioned cross-sectionally and pooled time series data using the "OLS" method from 1994 to 2000, for sixteen Arab countries. He presented one more significant variable, outstanding foreign debt (OFD) in addition to the frequently explanatory variables that has been used in earlier studies. Thus, the model he evaluated consisted of six explanatory variables. The Gulf Cooperative Council (GCC) Countries (such as oil countries) and the other ten countries as non-oil Arab countries formed the two subgroups sample. Such an evaluation was applied for these subgroups and for the entire sample. There was a statistically significant result of the mining portion and income per person for the GCC countries. All explanatory variables were conversely significant except the production portion in the GDP for the result of the second group.

Outstanding foreign debt (OFD) was statistically significant and had a positive indicator, which was likely to reflect the effect of IMF financial reform programs taken up by many countries in this group. The most significant sign

likely to be calculated was that for the majority of the entire sample, the actual tax revenues were less than the possible tax revenues. That meant there was some potential to obtain more tax earnings as the countries did not make full use of their taxable capacity.

Table (2.1) Results of the estimated taxable capacity in previous models

Model		Morss & Lotz Model			Bahl Model		Chelliah, Kelly & Bass Model				
Period		62-1965	62-1965	62-1965	69-1971	66-1968	69-1971				
Sample		72 adv,dev	52 dev	20 adv	47dev	49 dev	47 countries				
Source		A	B	C	D	E	F	G	H	I	K
constant		10.47 (N/A)	10.21 (N/A)	23.65 (N/A)	15.66 (11.07)	14.95 (9.68)	11.65 (7.77)	11.47 (7.84)	10.36 (6.31)	14.46 (8.12)	15.66 (11.07)
The independent variables	Y <sub>p</sub>	0.0081* (10.89)	0.0085* (2.963)	0.002 (0.826)	---	---	0.002 (0.5)	---	---	---	---
	F <sub>/Y</sub>	0.079* (2.74)	0.0712* (2.573)	0.0373 (0.55)	---	---	0.06 (2.36)	---	---	---	---
	NY	---	---	---	0.35 (4.44)	0.2951 (3.68)	---	0.044 (5.45)	---	0.32 (3.85)	0.35 (4.44)
	AY	---	---	---	-0.08 (2.37)	-0.0742 (2.07)	---	---	---	-0.07 (2.04)	-0.08 (2.37)
	(Y <sub>p</sub> - X <sub>p</sub> )	---	---	---	---	---	---	0.001 (0.38)	0.005 (1.32)	---	---
	X`Y	---	---	---	---	---	---	0.05 (1.17)	---	---	---
	XY	---	---	---	---	---	---	---	0.15 (3.35)	0.04 (1.10)	---
R <sup>2</sup>		64%	20%	---	44%	---	11%	38%	18%	45%	44%

The Table sources:

Alkatheri, Mustafa , *Revenue collection system and Economic development in Morocco* , publications of Arab organization for Administrative Sciences , Amman , first edition ,1985 , p. 200.

Gupta, Abhijit Sen (2007), *Determinants of tax revenue efforts in developing countries*, IMF, working paper No.184.

Hamma , Khalil *Tthe tax structure in Jordan* , Reasearch of Yarmouk Magazine , Yarmouk University , Irbid , Jordan , vol.5 , No.2, 1989 , p. 63..

Lotz ,J.R and .Morss, E. R., 1967 , `` *Measuring tax Effort in developing countries* `` , I.M.F staff papers , Vol: 14 , pp.487,497 .

Musgrave, R and Musgrave. P, *Public Finance in Theory and Practice* , Arabic edition, 1992 ,translated by Dr. Mohamed Alsabakhi , Almerekh publishing house , Saudi Arabia , Riyadh , p.470.

Raja J. Chelliah , Hassel J. Bass and Margeret R.Kelly , `` *Tax Ratios and Tax Effort in Developing countries 1969-71* `` , I.M.F , Staff papers , vol : XXII , No :1 , March 1975 , pp.204-205.

Roy W.Bahl ,`` *A Representative Tax system* , Approach to Measuring Tax Effort in Developing countries `` , I.M.F , staff papers , vol ( XIX ) , No: 1 , March , 1972 , p. 109

Table (2.2): Summary of findings of empirical studies

Author	Significant Explanatory Variables (Sign)	Other variables included in the regression	Goodness of Fit	Countries covered	Time period
Lotz & Morss (1967) <sup>a</sup>	Per capita GNP(+), trade share(+)		64%	72 developing and developed countries	1962-65
Lotz & Morss (1967) <sup>a</sup>	Per capita GNP(+), trade share(+)		20%	52 developing countries	1962-65
Lotz & Morss (1967) <sup>a</sup>	Per capita GNP(+), trade share(+)		Not reported	20 developed countries	1962-65
Bahl(1972) <sup>a</sup>	Mining share(+), agriculture share (-)		44%	47 developing countries	1969-71
Bahl(1972) <sup>a</sup>	Mining share(+), agriculture share (-)		Not reported	49 developing countries	1966-68
Chelliah (1971) <sup>b</sup>	Mining share(+),non-mineral export share(+),agriculture share(-)	Per capita non-export income, export ration.	25-50%	50 developing countries.	1953-55 and 1966-68
Chelliah, Bass and Kelly(1975) <sup>b</sup>	Mining share(+), agriculture share(-)	Trade share, non-mineral exports, per capita non-export income.	11-45%	47 developing countries	1969-71
Tait, Gratz and Eichengreen(1979) <sup>b</sup>	Mining share(+),non-mineral export share(+), export share(+)	Per capita income, per capita non-export income, agriculture share.	26-54%	47 developing countries	1972-76
Tait, Gratz and Eichengreen(1979) <sup>b</sup>	Mining share(+),non-mineral export share(+), export share(+)	Per capita income, per capita non-export income, agriculture share.	34-59%	63 developing countries	1972-76

Contd.

Table 2.2 (Cont.).

Author	Significant Explanatory Variables (Sign)	Other variables included in the regression	Goodness of Fit	Countries covered	Time period
Tanzi(1981) <sup>c</sup>	Mining share(+),non-mineral export share(+)	Per capita non-export income	15-52%	34 Sub saharan African countries	1977
Tanzi(1992) <sup>c</sup>	Agriculture share(-), import share(+), foreign debt share(+)	Per capita income	54%	88 developing countries	1978-88
Leuthold(1991)	Trade share(+), agriculture share(-)	Foreign grants, mining share	38%	8 African countries	1973-81
Stotsky and WoldeMariam (1997) <sup>c</sup>	Agriculture share(-), mining share(-), export share(+),per capita GDP(+), IMF dummy(+)	Manufacturing share, import share	57-94%	46 sub Saharan African countries	1990-95
Author	Significant Explanatory Variables (Sign)	Other variables included in the regression	Goodness of Fit	Countries covered	Time period
Ghura (1998) <sup>c</sup>	Per capita income(+),agriculture share(-), trade openness(+), existence of oil and non oil mining sector(+), structural reforms(+),human capital development(+), inflation(-), corruption(-)	Percentage change in terms of trade, percentage change in real exchange rate , change in external debt to GDP ratio	Not reported	39 sub Saharan African countries	1985-96
Piancastelli (2001) <sup>c</sup>	Trade share(+), agriculture share(-), manufacturing share(+), services share(+)	Per capita GDP	38-84%	75 countries	1985-95

Table 2.2 (cont. ).

Author	Significant Explanatory Variables (Sign)	Other variables included in the regression	Goodness of Fit	Countries covered	Time period
Eltony (2002) <sup>c</sup>	Per capita GDP(+), mining share(-)	Import share, export share, manufacturing share, agriculture share, outstanding foreign debt	50%	6 oil producing Arab countries	1994-2000
Eltony (2002) <sup>c</sup>	Per capita GDP (+), import(+), export(+), mining share(+), agriculture share (-) outstanding foreign debt(+)	Export share, manufacturing share	78%	10 non oil producing Arab countries	1994-2000
Bird, Martinez-Vasquez & Torgler (2004) <sup>d</sup>	Population growth(-), agriculture share(-), inequality(-), shadow economy(-), institutions(+), entry regulations(-)	Per capita GDP	48-85%	110 developing and transitional countries	1990-99
Gupta (2007) <sup>e</sup>	Per capita GDP(+), agriculture share(-), trade openness (-), foreign aid (+)	Corruption, political stability, share of direct and indirect taxes		105 countries	1980-2004

Source : Gupta , Abhijit Sen ; 2007 ; *Determinants of Tax Revenue Efforts in Developing Countries* ; IMF working paper, wp/07/184.

a. Dependent variable is ratio of tax revenue to GNP.; b. Dependent variable is ratio of tax revenue (excluding social security payments) to GNP.; c. Dependent variable is ratio of tax revenue to GDP.; d. Dependent variable is ratio of tax revenue to GDP and ratio of current revenue (minus grants ) to GDP.; e. Dependent variable is ratio of central Government revenue ( excluding grants ) to GDP.

## 2.7 CONCLUSION

This chapter reviewed tax effort, taxable capacity and many other ideas related to them. It addressed a number of techniques and approaches that try to estimate tax effort and taxable capacity. The essential elements and their proxy variables, which specify taxable capacity, were observed. The final part in this chapter was dedicated to discussing the related studies of this subject. A number of significant points can be summarised from the studies reported in this chapter:

1. Although the Laffer curve estimation can theoretically be used to evaluate Absolute taxable capacity, it will not be used in this study because there is not enough data.
2. Relative taxable capacity was severally defined. Some of these definitions refer to the methodology of model that has been used to evaluate relative taxable capacity. Representative tax system (RTS) method provided, for example, a definition valid for this model only. Nevertheless, it is likely to be concluded that the term "relative taxable capacity" refers to the ratio which can be gathered from GNP by the government as taxes, considering two most significant factors: the ability and the compliance to pay and gain taxes. Both must be taken into account due to their direct effect on the level of tax gains.
3. Wide tax bases are preferred over a narrow tax base, because the latter may be linked to a higher tax burden rather than a wide tax base.
4. Two main techniques, econometric and arithmetic method, have been used to evaluate relative taxable capacity and tax effort. Such techniques contain a number of approaches. The former relies chiefly on three elements; the development degree, the economy sector, and the economic openness degree. Several variables can be represented in each of these elements. Earlier studies adopting the econometric method took into account the fact that taxable

capacity is a function of these elements. One or more of these variables is included in the econometric approach.

5. The difference of earlier studies results concerning income per person ( $Y_p$ ), as an independent variable in the econometrics methods, is believed to be important variable. While ( $Y_p$ ) was statistically significant for developed countries, referring to the influence of direct taxes in those countries, ( $Y_p$ ) was statistically insignificant for developing countries in which indirect taxes are more vital.

6. This discussion of earlier studies has indicated an essential and exciting advantage connected to the methodology used for evaluating relative taxable capacity. More than one model will be adopted by this study connected to both econometric and arithmetic methods. Such models will be utilised to involve those variables that show certain basic characteristic of the Libyan economy.

In terms of theory, contemporary studies of the tax effort should focus on some important variables, such as: oil revenues, non-oil exports, currency in circulation, money supply (M1), and tax penalties.

In practice, they must also include comparative studies of the tax effort, especially among oil-producing countries.

The study of tax effort studies requires the application of new methods such as ordinary ridge regression (ORR) and unbiased ridge regression (URR), because the majority of economic factors are related to each other. Also, successful tax studies also require the creation of wide and accurate databases.

## Chapter Three

### The Development of the Libyan Economy

#### **The development of the Libyan Economy, 1970-2005**

This chapter provides an overview of the Libyan economy for the period 1970-2005. It consists of four parts, as follow:

Libya's economic structure and contribution of individual sectors to GDP is presented in the first part. In the second part, the development of the Gross domestic product (GDP) is outlined. The third part explores the main characteristics of the Libyan economy, while the fourth part provides analyses of the structure of income and production in the Libyan economy.

#### **3.1 - Libya's economic structure and sectoral contribution to GDP**

In this section, an analysis of the GDP structure of the Libyan economy and the contribution of different sectors to it are examined.

The Libyan GDP is composed of several economic activities, and can be generally classified into two parts: the income from extraction of crude oil and natural gas, and income from non-oil economic activities, which include several sub-sectors such as agriculture, manufacturing and services; and others.

##### **3.1.1- The development of value added in the agricultural sector:**

Over the study period, this sector witnessed a great adjustment in terms of its importance to Libya, as the oil sector came to completely dominate the national economy (Ghanem, 1985). Agricultural product reached LYD 33.1 million in 1970 at current factors cost - which represented 2.6% of the total GDP in that year.

Although it produced an output of LYD1447.5 million in 2005 at current factors cost (as shown in table 1), its relative importance to the gross domestic product declined to 2.2%.

However, if estimated by the cost expenses, the total product of this sector reached approximately LYD20.3 billion and represented 4.6% of the gross domestic product during the years 1970-2005 (tables 1 & 2 in the statistical appendix).

During the same period the relative importance of agriculture to the non-oil sector reached 8.4%; the annual ratio of agricultural product to GDP increased during this period, ranging between 1.6 % and 10.3 %, but did not exceed the highest percentage of 11.1% in 1998.

Despite some improvement in the relative importance of the agriculture sector as of the beginning of the 1990s, agricultural activity did not have significant relative importance in the composition of GDP in Libya. The relative importance of the agriculture sector rose nearly 0.9 percentage points only in 2003 over what it was in 1970. In addition, compared with some Arab countries where the agricultural sector has greater importance, the poor performance of agriculture of Libya was evident (see table 2 in the statistical appendix). This was due to the poorer environmental conditions, for example 90% of Libyan land consists of desert areas.

### **3.1.2- The development of value added in manufacturing industries:**

The product of the manufacturing sector reached LYD22.5 million in 1970 at current factors cost, which represented 1.7% of the gross domestic product and 4.7% of the total non-oil sector product (see tables 1 & 2, statistical appendix).

The growth rate of the product of the manufacturing sector fluctuated during the period 1970-2005. It increased almost more than 139 times compared to 1970, reaching LYD3131.7 million in 2005 with a compound annual growth rate of 15.1%, and representing 4.7% of GDP and 13.6 % of the total non-oil product in 2005. During the period 1970-2005, the highest ratio of the manufacturing sector product to GDP was 9.4% in 1996 (see table 2). However, the share of this sector in

GDP composition was less than the share of the agricultural sector during 1970-76, and 1980-82. However, it rose between 1984 and 1996.

Nevertheless, compound annual growth rate (CAGR) of the manufacturing sector was higher than what it was in the agricultural sector during the period of 1970-2005. This was a result of the successive development plans which aimed to develop the manufacturing sector, either through the establishment of new projects or by improving the operational efficiency of existing projects, or by the exploitation of idle capacity.

### **3.1.3- The development of value added in other non-oil sectors:**

The category of other non-oil sectors refer to services, electricity, gas, water, construction, trade, transportation, storage, communications, finance, insurance and real estate. The total product of all these economic activities was approximately LYD420.1 million in 1970, with a compound annual growth rate of 11.4%. It reached LYD18522.4 million in 2005. Its relative importance decreased from 32.6% to 27.6% of the gross domestic product between 1970 and 2005.

The total product of this sector during 1970-2005 reached approximately LYD196327.1million, which represented 44% of the gross domestic product.

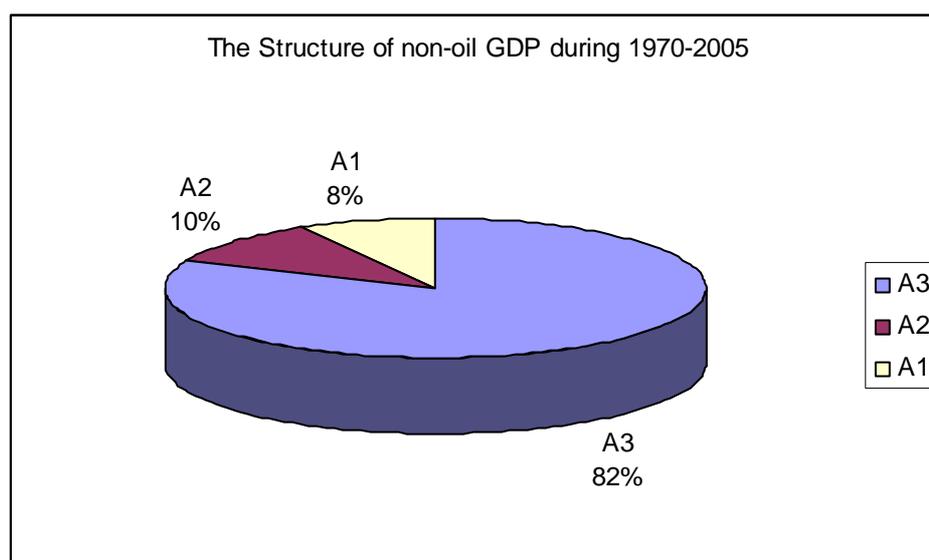
Generally speaking, the share of these sectors (including the service sector) to the entire non-oil product slightly decreased from 88.3% in 1970 to 80% in 2005. This can be explained by the gradual rise in the share of the agricultural and industry sectors in the non-oil product.

However, the services sector largely dominated non-oil economic activities, accounting for nearly 69% of total non-oil GDP during 1970-2005, (Economic Research Centre, 2009). As a result of the inability of commodity production to meet domestic demand, imports increased in order to cover the increased local demand, so that Libyan imports grew at a CAGR of 13.5% during the study period (table 3).

### **3.1.4- The development of value added in the non-oil sector:**

The total non-oil activities included: the agriculture, forestry and fishing sector; the manufacturing sector; other non-oil economic sectors. By 2005, the product of this sector had increased by 48 times more than it was in 1970. It grew from LYD475.7 million in 1970 to LYD23101.6 million in 2005, with a compound annual growth rate of 11.7 %. It came in second rank after the oil sector in the structure of gross domestic product during the period 1970-80 and 2003-2005 (see table 12). However, this part of the economy took a leading role between 1982 and 2002 as the government made attempts at restructuring the national economy. The relative importance of the total non-oil sector continued to increase from 1982 onwards, until it reached 76% of GDP in 1996, compared to 36.9% in 1970. This was a reflection of the newly adopted diversification of the income sources strategy. The transition five-year plan (1976-80) targeted "work to generate economic surplus in the non-oil sectors to be able to finance investments after the depletion of oil reserves" (The Planning Secretariat, 1978, p. 6).

*Figure (3.1) Gross Domestic product*



Where: A1: Agriculture & forestry and fishing sector, A2: The manufacturing sector; A3: Other non-oil economic sectors.

Source: Statistical Appendix, Table 1.

The succeeding five-year development plan (1981-1985) also aimed at "making an increase in the output of non-oil industries - value added - more than the growth rate of output of the oil industry" (The Secretariat of Information, 1989, p. 56).

This embedded all economic policies that aimed to "achieve balanced and increasing development in non-oil economic activities in order to compensate for any shortfall in oil reserves" (The Planning Secretariat, 1978, p. 12). For example, the Libyan government tried to diversify the economy in several ways, such as: encouraging non-oil exports, which grew from 9% to 24% of total exports during 1970-2005 (Economic Research Centre, 2009); adopting a privatisation policy under which the gross fixed capital formation for the private sector improved from 15% (in 1970-80) to 17% (between 1990 and 2005); also by investing oil revenue in the establishment of petrochemical industries .

Table 3.1 The evolution of GDP at current factors of the income cost of non-oil activities in Libya (million dinars)

Years	A1	A2	A3	Rate of overall increase		
				A1	A2	A3
1970	33.1	22.5	420.1	-	-	-
1980	236.4	210.4	3581.3	614.2	835.1	752.5
1990	391	547.1	4062.6	65.4	160	13.4
1997	1250.4	848.9	7584.2	219.8	55.2	86.7
2005	1447.5	3131.7	18522.4	15.8	268.9	144.2

A1: Agriculture & forestry and fishing sector, A2: The manufacturing sector; A3: Other non-oil economic sectors.

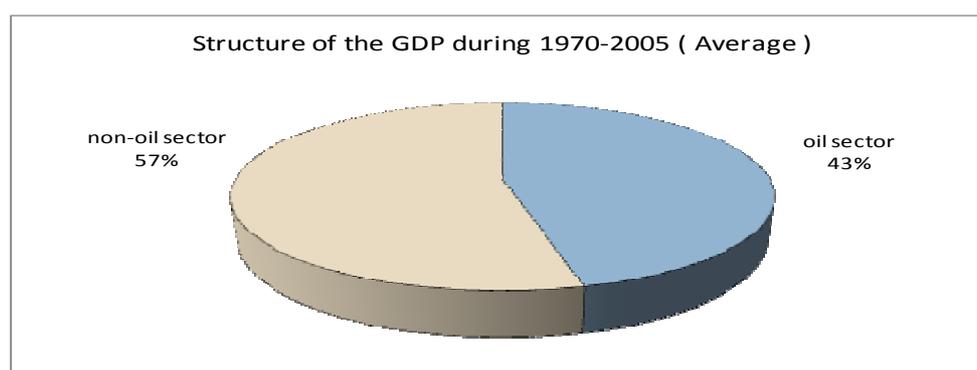
Source: Statistical Appendix, Table 1.

### **3.1.5- The development of value added in the oil sector:**

The total product of the oil sector was LYD812.6 million in 1970 by current prices. Over the study period it increased 54 times, reaching LYD43946.7 million in 2005. Its compound annual growth rate was 12.1% during the period 1970-2005.

As for the relative importance of the oil sector in the composition of GDP: it was 63% in 1970; thereafter it started to decrease from 1982 onwards until it reached only 22.1% in 1998, then returned to a gradual rise again, representing 65.5% in 2005. This was partly a direct impact of the sharp decline in the production, export and prices of crude oil during the 1980s, although it can also be explained by the “preservation of the country’s oil wealth from the waste and depletion (exhaustion) of oil resources in a short period may not be able to develop other economic activities of the national economy to compensate the continuing shortage of oil reserves” (The planning secretariat, 1978, p. 14).

*Figure 3.2 Structure of Libyan GDP, 1970-2005*



### **3.2 Development of the Gross Domestic Product :**

With respect to the GDP at current factors cost of production (for all sectors), it had increased by more than 4 times by 2005 compared to what it had been in 1970, with a compound annual growth rate of 12 %. The total GDP (at the constant price of 1970) developed from LYD1288.3 million in 1970 to LYD5231.2 million in 2005, with a compound annual growth rate of 4.1% (see table 4).

Table 3.2 shows that the overall economic performance underwent a positive growth in the first half of the 90s, even though the growth rate (at current prices) during the eighties was negative (-4.3%). This was due to the decline in oil prices and production.

However, GDP started to increase again, with a growth rate of 6.9% during the period of 1990-99. This happened as a result of corrective programmes that helped reform the structure of the national economy and diversify the productive base, so that the Libyan economy no longer depended on oil revenue as the main or primary source of national income (The General People's Committee of Planning, 1989, p. 12).

For three decades, great efforts were exerted by the Libyan government in this direction. Although these efforts were considered being somewhat satisfactory, yet they were far from being optimum in making major leaps in the national economy. Table 3.2 illustrates GDP growth during 1970-2005 at current prices.

Table 3.2 evolution of GDP at current prices, 1970-2005

period	GDP (Milliard dinars)	Compound annual growth rate ( CAGR )
1970 – 79	37.8	21.8%
1980 – 89	78.4	-4.3%
1990 – 99	106.1	6.9%
2000-2005	223.5	30.6%
1970-2005	445.8	12%

Source: Statistical Appendix, Table 1.

### **3.3. The Main characteristics of the Libyan Economy**

The main characteristics of Libyan economy may be summarised as follows:

First: The Libyan economy is a developing economy which is relatively small in size (the GDP was ranked 61st among 180 nations in 2005 (Nation Master, 2005). It is mainly an economy in which foreign trade plays a crucial role in developing the GDP (the ratio of foreign trade to GDP was 68% on average during 1970-2005). The volume of exports largely depends on external factors, with domination of oil product exports on the Libyan export structure.

Second: The public sector dominates most economic activities due to the adoption of the system of socialism and social and economic planning. The economic planning

focus has been on building the material base (material investment) of society without giving great importance to building the social base (human capital).

Third: There is a structural imbalance in the national economy due to heavy dependence on the production and export of oil as the primary source of revenue in the national income, which contributes about 77% of export earnings on average during 1970-2005.

Fourth: A very striking feature of the Libyan economy is the relative failure of the banking and monetary sector, and the absence of an active and healthy financial market. In fact the Libyan stock market was only established in 2005 (Libyan Stock Market, 2010).

Fifth: The shortage in technically qualified workforce has eventually led to a heavy reliance on foreign workforce, which accounted for 11.3% of the total workforce in 2006.

### **3.4- Income and product analysis in the Libyan economy**

There are two parts to this section; the first one reviews economic evolution during several periods. Development of individual income is the second part.

#### **3.4.1-The economic development in Libya and its impacts on tax effort / burden in subsequent periods:**

The impact of economic development on the tax effort can be divided into three periods. This division is based on the distinctive features of the economy within each period.

- 1) : From 1970 till 1979.
- 2) : From 1980 till 1989.
- 3) : From 1990 till 2005.

First, during the period 1970-1979:

The Libyan economy during this period was mainly considered as a free-market economy. In the early 1970s, there was a significant increase in the profitability of oil exports compared to earlier periods. It was marked by a high growth rate of the domestic product and total taxes in general. The surplus in trade balance amounted to LYD14.5 billion. This was due to: 1) increased income from oil exports became the primary source of GDP and total tax revenue, which accounted for 77% of total revenue: and 2) the relative increase in oil prices in the mid 1970s. As a result, the government's tax revenue was increased from LYD66.7 to LYD591 million between 1970 and 1979.

At the same time, public expenditures did not constitute a significant burden on the public budget during this period, because there was no heavy dependence on tax revenue in the public budget. During this period, the percentage of tax revenues to GDP was low (see table 3.5).

Table 3.5 demonstrates that, in general, the 70s witnessed: a) a relatively low tax burden, b) increase of taxable capacity due to the variability of economic activities, especially oil production and oil exports; c) flourishing investment projects in the private sector and increases in individual incomes. Overall there was an improvement in economic performance and the availability of financial resources for the public treasury. However, there were some problems in the economy; public expenditures were not efficiently managed according to the priorities of strategic development policies and plans <sup>(1)</sup>. There were also shortages in other types of natural resources than oil. In addition, the private sector started to shrink, especially in the field of light industry, as a result of some economic and social changes that were happening during this period. For example, even the relative expansion in the grants and loans allocated to support the private sector in certain areas did not help much (table 3.3 shows the

distribution of planned investments between the private and public sector). It was obvious that the government was more supportive of the public sector.

There were a number of pieces of legislation and operational procedures that paved the way for the transformation of the economy to help the public sector dominate economic activities. In the 1980s, the public sector eventually completely took over the national economy. Among these important tax legislations at this period were: the Customs Act number 67 of 1972 and income tax law number 64 of 1973.

Along with those, there was other supportive legislation that regulated other forms of tax, namely the Jihad tax, stamp duty and taxes for the blind. Public organisations were also subjected to income and customs taxes through the 39 act in 1973.

Table 3.3 The relative distribution of planned capital formation in Libya during the period of 1970-80 (million dinars).

Periods	Fixed capital formation				Commercial bank loans for the self-employed and individuals
	Public sector		Private sector		
	Value	percent	Value	percent	
1970-72	669.1	69.1	298	30.9	48.4
1973-75	2114.4	79.1	555.9	20.9	85.3
1976-80	7714.4	88	1023.9	12	( *) 276.6
1970-80	10497.9	85	1877.9	15	410.3

( \* ) Includes data up to 1979.

Sources:

- (1) The Secretariat of Information (1989), " Libya's revolution in twenty years 1969-89", sep 1989, tables (2-5), p.226.
- (2) Central bank of Libya, the economic bulletin, 1982, vol.22, No.4-6, table.12.
- (3) Central bank of Libya, the economic bulletin, 1986, vol.27, No.4-6, table.12.
- (4) Economic research centre, Total Economic, financial and demographic data in Libya during 1962-2006, Benghazi, Libya, July 2009.

## Second: the period 1980-1989:

The second period saw a greater control of the government over the economy.

During the period of 1981-1988 the Libyan economy was suffered from a shortfall in the planned investments in the private sector, which reached less than 8% of the total investment allocation <sup>(2)</sup>. Participatory production in the form of joint ventures was encouraged as an alternative to the earlier private sector through credit facilities which did not exceed LYD3.5 million in total (see table 3.4).

Table 3.4 The relative distribution of planned capital formation in Libya during the period 1981-88 (million dinars).

Fixed capital formation					Credit facilities granted by commercial banks (Monetary and non-monetary)		
Period	Public sector		Private sector		years	(A)	(B)
	value	percent	value	percent			
1981-85	10692.8	90	1189.1	10	1985	384.79	--
					1986	402.79	0.807
1986-88	2627.9	78	747.7	22	1987	395.92	1.023
					1988	389.9	--
1981-88	13320.7	87	1936.8	13	1989	389.56	1.667
					1989-85	1962.96	3.497

(A) For former private sector; (B) for Craftsmen and productive projects.

Sources:

(1) The Secretariat of information (1989), "Libya's revolution in twenty years 1969-89", sep 1989, tables (2-5), p.226.

(2) Central bank of Libya, the economic bulletin, 1997, vol.37, No.4-6, table.10.

(3) Central bank of Libya, the economic bulletin, 1997, vol.37, No.7-9, table.10.

(4) Economic research centre, Total Economic, financial and demographic data in Libya during 1962-2006, Benghazi, Libya, July 2009.

---

Therefore, in 1981 the public sector started to take control over many economic activities such as the distribution of goods and there was a cancellation of private

trade for a certain period and restrictions on land ownership in the private sector, while facilitating the establishment of public companies and organisations.

As a result, the public sector was fully in charge of carrying out strategic projects, local and foreign trade, and offering distribution services. However, this sector expanded so much as to be unable to efficiently control all economic activities, which eventually led to its inefficiency and high production costs. This meant that the public sector was a heavy burden on the treasury from the 1980s, due to the decrease in oil revenues and shrinkage of the tax base.

Table 3.5 shows that the growth rate of GDP started to decline in this period, and so did the productivity of manufacturing industries and non- oil products, because of a decline in oil prices.

Table ( 3.5 ) The most important economic developments in Libya during the different periods

variables	1970-79			1980-89			1990-2005			Margins
	value/Number	relative distribution	Growth rate	value/Number	relative distribution	Growth rate	value/Number	relative distribution	Growth rate	
GDP at factors of the income cost	37.8	-	21.8%	78.4	-	-4.3%	329.6	-	15.5%	(a)
the agriculture sector product	0.8	2%	17.4%	3.4	4.0%	6.6%	16.2	4.9%	9.1%	(a)
the manufacturing sector product	0.8	2%	26.4%	3.5	5.0%	9.5%	19.9	6.0%	12.3%	(a)
product of the non-oil sector without agriculture and industry	14.7	39%	23.1%	38.2	49.0%	2.0%	143.4	43.5%	10.6%	(a)
product of the oil sector	21.5	57%	21.1%	33.3	42.0%	-12.7%	150	45.5%	20.3%	(a)
product of the non-oil sector ( all non-oil sector )	16.2	43%	23.0%	45.2	58.0%	2.8%	179.5	54.5%	10.7%	(a)
total of the direct taxes revenues	0.85	31%	32.1%	3.4	40.0%	1.3%	7.27	38.6%	4.8%	(b)
total of the indirect taxes revenues	1.9	69%	25.6%	5.1	60.0%	-0.1%	11.5	61.4%	8.9%	(b)
total taxes	2.7	71%	27.4%	8.5	10.8%	0.4%	18.8	5.7%	7.2%	(a)
total taxes on Business incomes	0.24	29%	32.4%	1.6	45.0%	2.2%	3.52	48.4%	9.2%	(c)
tax on income of the real estate	0.007	3%	-4.3%	0	0.0%	0.0%	0.03	1.0%	-	(d)
tax on income of trade , industry and crafts	0.04	16%	-6.0%	0.06	4.0%	-1.2%	0.34	9.6%	8.1%	(d)
corporate income tax	0.2	84%	76.4%	1.5	96.0%	2.3%	3.2	90.4%	9.3%	(d)
total of tax on the individuals incomes	0.31	37%	28.4%	1.4	40.0%	3.8%	2.77	38.1%	0.1%	(c)
tax on salaries & wages	0.278	90%	27.6%	1.12	83.0%	3.3%	2.3	84.0%	0.2%	(e)
tax on the free professions income ( million LYD )	0.86	0%	76.4%	1.9	0.0%	-9.0%	43.9	1.6%	28.9%	(e)
the General income tax	0.031	10%	49.0%	0.226	17.0%	8.2%	0.4	14.3%	-4.5%	(e)
tax on the banks deposit benefits and saving accounts( million LYD )	0.199	0%	0.0%	0.564	0.0%	9.3%	1.72	0.1%	-6.4%	(e)
tax on the external incomes	0	0%	0.0%	0.001	0.0%	0.0%	0.4	0.0%	30.5%	(e)
tax on the agricultural income and ownership of livestock( million LYD )	0	0%	0.0%	0.002	0.0%	0.0%	0.002	0.03%	-19.6%	(c)
import taxes	1.4	74%	25.7%	2.5	49.0%	-4.5%	5.27	45.6%	6.1%	(f)
other customs taxes	0.168	9%	19.0%	0.52	10.0%	-18.7%	3.97	34.4%	18.3%	(f)
total of customs and production taxes	1.6	83%	24.4%	3.03	60.0%	-7.3%	9.24	80.1%	10.8%	(f)
stamp taxes	0.317	17%	36.3%	0.65	13.0%	-5.3%	2.13	18.5%	10.1%	(f)
tax of the entertainment	0.001	0%	0.0%	0.002	0.0%	-3.2%	0.003	0.0%	-24.2%	(f)
tax for the blind	0.0009	0%	0.0%	0.0006	0.0%	-10.7%	0.0004	0.0%	-	(f)
other indirect taxes	0	0%	0.0%	1.4	27.0%	0.0%	0.17	1.5%	-	(f)
increase in the total population (million)	( 1 ) *	-	-	( 1.23 ) *	-	-	( 1.21 ) *	-	-	(f)
Average price index ( 1970=100 ) %	129.5	-	5.9%	284.4	-	7.2%	769	-	8.4%	-
Average of the direct taxes per capita ( Dinar/Year)	30	-	-	90.9	-	-	-	-	-	-
Average of the indirect taxes per capita ( Dinar/Year)	67.8	-	-	134.6	-	-	-	-	-	-
Average of the total taxes per capita ( Dinar/Year )	97.8	-	-	225.5	-	-	-	-	-	-
Average of the GDP per capita ( Dinar/Year )	1384.8	-	-	2103.4	-	-	3897.3	-	-	-
Average of the tax per capita to average of his share of GDP %	7.1	-	-	10.7	-	-	-	-	-	-
total exports of goods and services	22.7	73%	21.3%	34.7	67%	-10.4%	141.1	64.0%	17.1%	(g)
total imports of goods and services	8.2	27%	25.9%	17.2	33%	-3.4%	78.5	36.0%	17.4%	(g)
total of the foreign trade	30.9	82%	22.3%	51.9	66%	-8.3%	219.6	67.0%	17.2%	(a)
the status of the trade balance	14.5	38%	19.6%	17.5	22%	-16.0%	62.6	19.0%	16.9%	(a)
employees compensations	10.1	-	23.5%	25.1	-	2.2%	91.8	-	10.5%	-
increase in the libyan labor force ( thousand employees )	146.1(*)	-	-	311.1(*)	-	-	638.4(*)	-	-	-
increase in the non-libyan labor force ( thousand employees )	209.4(*)	-	-	-104.7(*)	-	-	31.3(*)	-	-	-
increasing of the total labour force ( thousand employees )	355.5(*)	-	-	206.4(*)	-	-	669.7(*)	-	-	-
Annual average of the libyan labour force ( thousand labours )	451.6(*)	72%	3.7%	685.5(*)	71%	5.2%	1147.8(*)	87.9%	3.5%	(h)

continued

follows table ( 3.5 )

variables	1970-79			1980-89			1990-2005			Margins
	value/Number	relative distribution	Growth rate	value/Number	relative distribution	Growth rate	value/Number	relative distribution	Growth rate	
Annual average of the non-libyan labour force ( thousand labours )	174.7(*)	28%	20.1%	278.9	29%	-6.4%	157.6(*)	12%	2.0%	(h)
Annual average of the total labour force ( thousand labours )	626.2(*)	-	6.9%	964.4	-	2.3%	1305.4(*)	-	3.3%	
the non-oil revenues ( actual )	4.8	23%	32.2%	9.8	28%	3.9%	41.8	31%	9.0%	(i)
the oil revenues ( actual )	15.7	77%	26.2%	24.9	72%	-17.5%	94.7	69%	22.7%	(i)
the public revenues ( actual )	20.5	54%	27.3%	34.7	44%	-12.0%	136.6	41%	19.0%	(a)
the administrative expenditures ( actual )	4.7	35%	11.5%	12.4	42%	2.3%	53.6	61%	12.1%	(k)
the development expenditures ( actual )	8.7	65%	32.7%	16.9	58%	-12.6%	33.8	39%	16.1%	(k)
the public expenditures	13.4	36%	22.2%	29.3	37%	-6.4%	87.3	27%	14.0%	(a)
Deficit/surplus in the administrative budget	0.05	1%	-	-2.6	-48%	-	-11.7	-24%	-	(L)
Deficit/surplus in the development budget	6.98	99%	21.8%	8	148%	-22.4%	60.9	124%	29.5%	(L)
Deficit/surplus in the public budget	7.03	19%	39.8%	9	7%	-21.6%	49.2	15%	33.7%	(a)

The table was prepared by the researcher .

values in milliard libyan dinars, unless stated otherwise .The Growth rate is the compound average growth rate .(\*) Numbers.

(a) the relative distribution to the GDP; (b) the relative distribution to the total taxes ; (c) the relative distribution to direct taxes; (d) the relative distribution to the tax on the business incomes.  
(e) the relative distribution to the tax on the individual incomes ; ( f)the relative distribution to the indirect taxes ;(g) the relative distribution to the foreign trade ; (h) the relative distribution to average of the labour force ; ( i) the relative distribution to the total revenues ; (k) the relative distribution to the public expenditures;(L) the relative distribution to (deficit/surplus) in the public budget .

During this period, the increase of indirect tax revenues was at a diminishing rate because of the decrease of the growth rate of imports. The fallback in the increasing rate of direct tax revenues, which almost reached 1.3% during this period, as compared to 32.1 % in the 1970s, was due to the reduction in the size of the tax base. Many private economic activities were removed from the tax funding circle due to the marginalised role of the private sector in the beginning of 1980s.

Moreover, the increase in the population, the rise of the cost of living index (1970=100), and increase in the average tax revenues per capita which reached LYD225.5 per year compared to the LYD97.8 per year as an average for the earlier period (1970-79), all led to an increase in the tax burden. Although the size of the tax base was low during this period, due to many private projects leaving the economic exchange field, without making any applicable discounts on the tax rates, this meant that many taxes imposed during that period brought no material advantages.

Income tax mainly consisted of a salary tax, especially in the public sector. This tax did not match the taxpayer's estimated ability to pay due to a cap on salary schedules, and many social bonuses being cancelled, together with rising living costs.

There were some other phenomena worth mentioning - namely: the emergence of parallel markets, the fluctuations in foreign currency exchange rates and the instability of service and product prices. Though these activities generally generate high rates of revenues, this did not reflect the tax ability or overall economic development. It was only an added burden on the individual.

The oil market in the 1980s also witnessed a relative decline in oil prices and revenues, which led to the growth of domestic public debt and an increase in current and investment public expenditures, which reached their highest rates in the history of the country. In addition, some projects were either cancelled or frozen during the transformational plan. There were also modifications of tariff items to look for alternative financing resources.

Then, in the mid 1980s, oil prices drastically declined and so did the oil revenues of foreign currency, causing an imbalance in the balance of payments. The growth of non-oil products revenues (between 1980-1989) led to a deficit in the administrative budget reaching LYD2.6 billion. This was an outcome of exceeding the ceiling of expenditure of the non-oil revenues at their current price.

The treasury then resorted to deficit financing by providing a flow of money, which led to inflation, the emergence of the black market in some basic products and eventually an increase in the volume of illegal trade.

Meanwhile, a number of austerity measures were undertaken, such as: a) a decrease in imports; b) layoff of some foreign workers in 1984; c) a decrease in travel allowances and other social benefits; d) an exchange rate devaluation for the Libyan currency. On the other hand, taxes were imposed on land property and real estate following Act 2 in 1986. Another act was issued against the smuggling of goods, known as Act 17; in 1989. There was also a growing tendency to give the private sector some restricted economic roles. Yet all these measures -though effective- were not quite sufficient to help with the development of the economy and tax effort. Therefore, a total reform in the economic system was called for, especially in terms of the role of the public and private sectors in developing the Libyan economy.

To sum up, the 1980s were marked by some distinct features in the Libyan economy: namely, the new socialist transformation, the leading role of the public sector, a reduction in the role of the private sector, decrease in tax effort and increase in tax burden, and certainly there were no clear economic and tax policies during this period.

### Third, the period 1990 - 2005:

Through some established private companies, the private sector started to play a role in the economy. The government also sold the shares of some public sector companies and gave some production units to their producers. Apart from this privatisation of some public sector units, the private sector was encouraged to take

initiatives, especially in the areas of import and export, providing products and services. Banks also contributed through giving credit facilities to the private sector in the form of small loans.

Table 3.6 The Gross Fixed Capital Formation and Credit Facilities granted by Libyan Commercial Banks (million LYD).

period	The Gross fixed capital formation								*credit facilities	
	public sector			private sector			total			
	value	percent	CAGR	value	percent	CAGR	value	CAGR	A	B
1990-96	7183.1	13.1%	12.1%	2004.7	17.0%	-8.8%	9187.8	6.3%	157.019	2880.8
1997-05	47473.3	86.9%	29.1%	9809	83.0%	31.7%	57282.3	29.5%	-	-
1990-05	54656.4	100.0%	20.2%	11813.7	100.0%	11.4%	66470.1	17.8%	-	-

(\*) credit facilities granted by commercial banks " monetary and non-monetary" .. ( A ) for craftsmen and productive projects .. (B) for private sector .

Source: Economic research centre, Total Economic, financial and demographic data in Libya during 1962-2006, Benghazi, Libya, July 2009.

Below are some features of the third distinctive period of 1990 to 2005 (see section 3.4.1):

First, there was an increase in the growth rate of GDP, which reached 15.5% on average for the whole period (1990-2005).

Second, the production of the non-oil sector reached LYD179.5 billion with a growth rate of 10.7%, which shows that this sector became extremely influential in the national income. It contributed 54.5% of the GDP.

Third, the growth rate of direct tax revenues increased by 4.8%, and indirect taxes by 8.9 %, due to the development of private productive enterprises and an increase in the growth rate of import taxes, reaching almost 6.1 %. Regulations of production taxes were modified and extended to cover additional products in 1992.

Some customs regulations also allowed an evaluation system on products to prevent tax evasion, as well as customs being removed across some neighboring Arab countries, and conditional customs exemptions on some Arab-made products.

However, these measures did not add much to tax customs revenues due to the low growth rate of foreign trade between Arab countries, and limitations of products for export which were duty free.

During this period, the administrative budget also suffered from a deficit due to administrative expenditures exceeding non-oil revenues. During the period of 1990-2005, administrative expenditures reached LYD53.6 billion, while non-oil revenues were merely LYD41.8 billion.

Generally speaking, during this period, there was some specific expansion in the tax base, and a slight decline in the tax burden, but the tax base did not reach the requested economical level due to the inflexibility of the tax system.

The absence of a stock market and economic instability led to investments not being at their best, since investors had to make very tough decision as to whether to invest or save money. The investors' vision was blurred and decisions of return on investment were not clear, the degrees of investment risk were high and circumstances of uncertainty prevailed at this time. Therefore, the private sector continued to hesitate to take initiatives, especially in the absence of investment facilities. The real problem lay in the obstacles that private investors faced in obtaining credit facilities. There were a great deal of restrictions and bureaucratic procedures in order to get even limited loans. Repayment installments were not regularised. Priority was given to corporate and operating business only in certain fields, and unfortunately these fields were not the ones most needed economically at the time. There were also more restrictions and conditions on the number of business partners an investor could have.

The complexity of procedures of business start up led to a lot of manipulation and the emergence of some fake companies, and productive projects which did not comply with the legal requirements.

Added to this, because of the low investment returns and irregular credit facilities, many companies failed to pay their loans or interest rates owed to the banks.

It should be noted, however, that the inability of the private sector to pay its financial debts was a consequence not a cause of default of the loans granted to this sector by the banks.

Therefore in 1999, the General Planning Council in Libya started an economic reform covering some important procedures and recommendations concerning: the monetary system, encouraging individual and corporate savings, encouraging real estate investment, improving conditions for low-income citizens and finally, developing and improving the tax system and simplifying its procedures.

#### **3.4.2- The development in individual money and real income from 1970-2005:**

The available data indicates that there was a relative rise in the average per capita nominal income, which increased by about 18.8 times by 2005 compared to what it had been in 1970, with a compound annual growth rate of almost 8.7% (see table 5). The real per capita income (1970 = 100) increased at a compound annual growth rate of 1.1% approximately, this was due to the remarkable growth rate in GDP, which amounted to 12% as an average for the period 1970-2005 (table 5).

Many factors contributed to the growth of Libyan incomes, including: the increase in oil revenues, following a number of economic policies that aimed at increasing the individual's real income, raising the standard of living, subsidising some basic goods, lowering and fixing the prices of some basic goods and services e.g. oil products, electricity and house rents.

The average annual income per employee in the public sector - at current prices - also reached LYD3016.5 on average during the same period due to the growth in the rate

of compensations of employees in this sector by 11.2 %. This even exceeded the growth rate of employee numbers during this period, which was 3.9 % (see table 6 in the appendix).

## Notes.

(1) There are many causes of these phenomena to mention only a few:

a- Lack of investment on human resources which levelled up with the development process.

b- Inability to establish a sound production base especially in the area of export industries through depending almost exclusively on oil and neglecting other resources.

c- Wasting of money resources which took the form of not putting them in their best usage. Therefore public expenditures were not productive and so were most public projects and even manpower.

d- Most of the targets of the consecutive development plans were not achieved and there were not any new areas of investment.

e- There was no real improvement in the quality of basic services besides their high cost and the wide spread of bureaucracy.

(2) While gross fixed capital formation (actual) during the period (1981-88) was as the following table:

Gross fixed capital formation for all sectors ( \* ) ( actual values , million dinars )

1981	1982	1983	1984	1985	1986	1987	1988	total
2900.3	2771.5	2524.3	2127.7	1558.1	1375.9	949.9	1049.8	15257.5

( \* ) Includes the public sector and private sector.

Source: The General people's committee of planning, The Economic & social indicators during 1962-96, Dec 1997, tables 1,3 p.33;p.35.

Economic research centre, Total Economic, financial and demographic data in Libya, during 1962-2006, Benghazi, Libya, July 2009.

## Chapter Four

### Development of the Public Finances in Libya.

This chapter reviews the development of public revenue; public expenditure; and the status of public budgets in Libya during the period 1970-2005.

#### **4.1 The development of public revenue during the period 1970-2005**

The analysis of public revenues is extremely important in financial and economic studies. It helps identify the main resources available for generating revenue, and to classify and rank them according to their relative importance. It also sheds light on the flexibility of the economy to tackle sudden emerging changes in its economic activities, the financial position of the country and the extent to which the treasury can cover public expenditures. It also shows if revenues are well used or not.

Financial resources available to the Libyan treasury vary and mainly include taxes, fees, services revenues, and revenues from oil and natural gas extraction (Ajam & Maithem, 1999, pp.99-100).

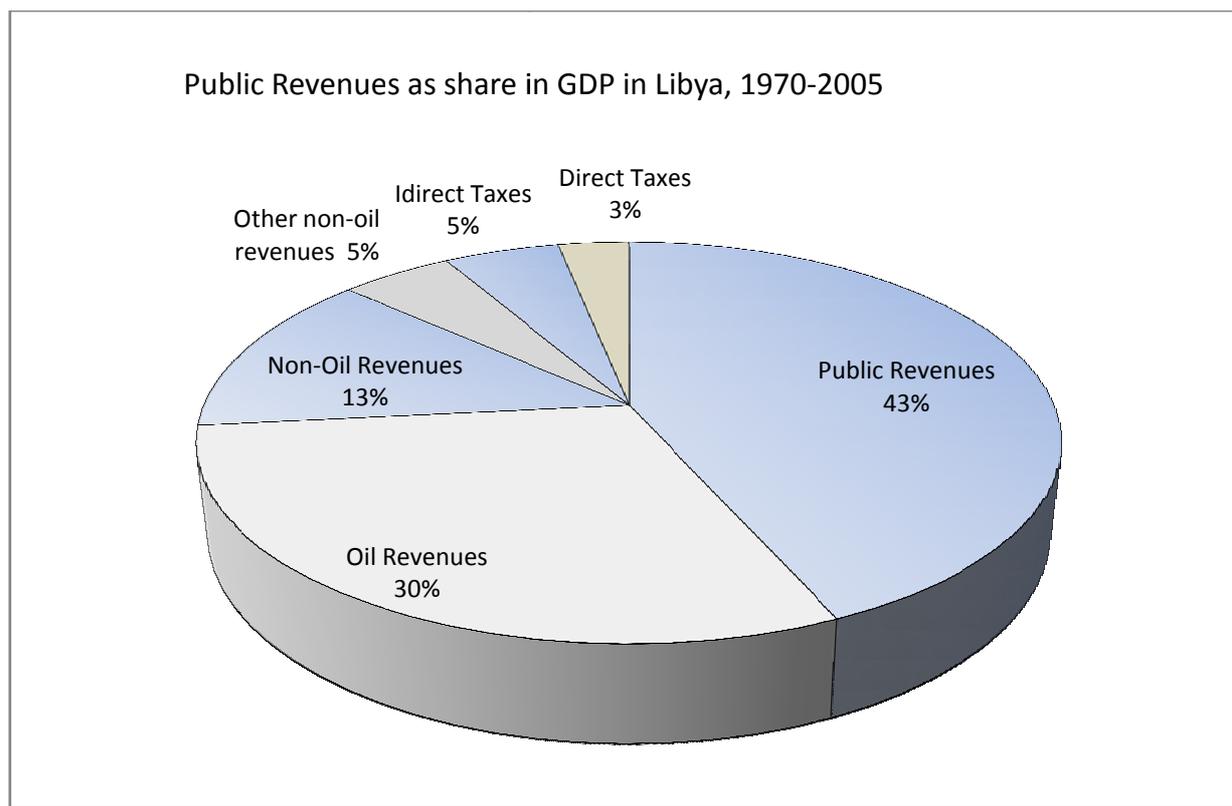
Through the review of the data in Table 7 ( in the statistical appendix) it can be seen that there was an increase in public revenue in Libya from LYD535.8 million in 1970 to LYD 38943.3 million in 2005: this was a remarkable increase, with a compound annual growth rate of 13%.

However, the rapid increase of Libyan public revenue was mainly due to an increase in oil revenues, which increased from LYD453 million in 1970 to LYD34378 million in 2005, with a compound annual growth rate of 13.2%. It was also due to the increase in tax revenues on salaries since the 1970s, import duties, and indirect taxes.

Oil revenues alone constituted the biggest share of public revenues over the study period, reaching 66% of total public revenues on average during the period of 1970-2005, as shown in Table 8 (in the statistics appendix) . Although oil revenues declined during the study period due to fluctuation in oil prices (see Table 9 in the statistics appendix), it still represented the largest share of revenues.

As for tax revenues: indirect tax accounted for an average of 13% of the total revenues: mostly derived from customs taxes, and production fees, whereas direct taxes produced only around 8% of the total revenues. Indirect tax revenues accounted for 39% of all public non-oil revenues, compared to 23% by direct taxes.

Table 11 ( in the statistical appendix ) shows how non-oil revenue ( NOR) as a share in GDP generally increased during the period of the study, from 6% in 1970 to around 10% in 2004 - i.e. with an average of 13% during 1970-2005. The ratio of direct taxes (TD) to the gross domestic product was 3% on average, whereas the average share of indirect taxes (TI) was 5%. As shown in table 11, this increased tax burden mainly lies in the indirect taxes, which represented a proportion of 4% to 6% of the gross domestic product between 1970-99.



#### **4.2 Development of public expenditure in the period of 1970- 2005**

As shown in Table 12 in the statistical appendix, public expenditure increased from LYD434.5 million in 1970 to LYD18555 million in 2005, with a compound annual growth rate of 11.3%. Meanwhile, the public budget allocations were also growing at

a rate of 11.3%. As for the relative importance of public expenditure in the gross domestic product at the current income factors during 1970-2005, it ranged between 45% in 1981 and 17% in 2003, with an average of 32% - see Table 13 in the statistical appendix.

Public expenditure also increased in the period under investigation compared to public revenues, which were growing with a compound annual growth rate of 13%, whereas public expenditure was growing at a compound annual rate of 11.3%.

As shown in Tables 13 and 14 in the statistical appendix, public current expenditure accounted for 54 % of the total public expenditure during the period 1970-2005. It increased from LYD288.5 million in 1970 to reach LYD8282 million in 2005, with a compound annual growth rate of 10.1%.

As for investment expenditure, it represented 46% of total public expenditure on average. Furthermore, it increased from LYD146 million in 1970 to LYD10273 million in 2005.

Generally speaking, the steady increase in the public expenditure of the Libyan government during 1970 and 2005 was due to the following reasons:

First, there was a continuous increase in the payment of salaries to individuals employed in the public sector (compensation to employees) which reached a compound annual increase rate of 11.2% during 1970-2005. The total of salary provision alone during 2001-05 was LYD45822 million, which accounted for 22% of GDP in the same period - as shown in Table 37 in the statistical appendix.

Second, the excess provisions within the administrative budget, meaning the actual administrative expenditure was generally in excess of the provisions in the budget in most of the years under investigation.

Third, the persistent high inflation rate in Libya, which led to an increase in public expenditure as compared to its current value. This inflation led to the need to extend expenditure to keep pace; for example, using the constant price of 2003 (2003=100) it can be found the cost of living index had increased to 104% by 2005 .

Fourth, there was an extremely high demand on public services due to the remarkable increase of the population, so that although per capita administrative expenditures did not exceed LYD1487 in 2005, the government faced increases in public expenditure due to an increase in population.

### **4.3 The status of the public budget during the period 1970- 2005.**

The Libyan public budget is generally characterised by achieving a constant surplus in most years under investigation. On average, this surplus was around LYD1714.7 million during 1970-2005, and it had a compound annual growth rate of 16.4% over the same period. Generally, public revenues were able to cover around 136% of public expenditures (see Table 45).

If we compare oil revenues with investment expenditures (see Table 18), it was clear that the oil revenues achieved a surplus in all years of study except in 1986 and 1994. In fact the ratio of investment expenditure to oil revenues was only 56% on average.

However, Table 19 clearly shows that the non oil revenues were not able to cover the current expenses since the administrative budget was suffering a constant deficit, which amounted to LYD394 million on average between 1970 and 2005. Figures show that the ratio of current expenditure to non-oil revenues reached 131% on average during 1970-2005, meaning that the deficit ratio was 31%.

The budget surplus as a ratio of the gross domestic product was around 11% during 1970-2005, as shown in the data in Table 20. The biggest source of this surplus was the oil revenues, which were mainly used to cover investment expenditures.

Meanwhile, the Libyan authorities pursued a fiscal policy with finance made available through a deficit in the public budget for some years, including: 1983 , 1984 , 1986 , 1987 and 1994 , and by financing through a deficit in the administrative budget for the period of 1990-2005. This financing by deficit actually means a “deliberate increase in public expenditures more than the public revenues. When the State is taking this policy, it takes the form of public budget with an intended deficit which will be financed by the loans, in order to reactivate the national economy and

employment through the injection of additional purchasing power” (Haykl, 1980, p. 207).

The excessive public expenditure left gaps which were filled with loans from the central bank of Libya, which increased the size of the domestic public debt. Thus deficit financing can be illustrated by using the data of Table No.21, and by finding the difference between:

- 1) The treasury and public enterprises account at the central bank of Libya (as one of CBL’s liabilities).

Table (4.1): Net claims on the public treasury to the Central Bank of Libya and the commercial banks (to the banking system) ( million dinars )

Years	( A )	( B )	( C )	Years	( A )	( B )	( C )
1990	4327	2890.6	1436.4	1997	3536.6	2148.6	1388
1991	4489.1	3052.6	1436.5	2000	1135	(275.5)	1410.5
1992	4818.6	3374.5	1444.1	2001	940.5	(611)	1551.5
1993	3988.1	2544	1444.1	2002	(376.5)	(1577.7)	1201.2
1994	4215.4	2764.4	1451	2003	(4708.3)	(5952.8)	1244.5
1995	4518	3067	1451	2004	(19464.8)	(18691.1)	(773.7)
1996	3939.1	2502.1	1437	2005	(32588.31)	(31734.5)	(853.8)

( A ) Net claims for banking system . ; ( B ) Net claims for central Bank of Libya

( C ) Net claims for the commercial banks.

Source: Central bank of Libya, the economic bulletin: 1998, vol.38, Tables 2, 3, 7.

Central Bank of Libya, the Annual reports of 2003 (No.47), 2004 (No.48) and 2006(No.50).

( During 1990-93 , B calculated as  $B = A - C$  ).

and 2) The treasury and public enterprises Loans and Advances (as one of CBL’s assets). After making this calculation, it can be shown that this difference consisted of negative values during the period 1988-2002, and that this difference amounted to about LYD550 million annually on average for the period 1970-2004, indicating the high indebtedness of the treasury and public enterprises to the CBL.

As a result, the Central Bank of Libya (CBL) has expanded its monetary issuance (money supply), as shown in table 4.2, to meet the increasing demand for cash and the expansion of credit operations for the treasury and individuals. These all led to the emergence of pressures on prices. Using the constant prices of 1984 (1984=100) it can be found that the general cost of living index increased to 447% in 2005 from 34.9% in 1970 compared with the constant prices of the base year 1984.

Table ( 4.2 ) Money supply ( million dinars )

Years	1970	1980	1990	1997	2005
Value	240.6	2856.83	4452.3	8007.7	14028.1

Source : the Statistical appendix , table 22

In fact, adopting a policy of deficit financing is not effective, especially in a developing country, which according to Al-Ali Sulaiman (1988, p. 143) “which generally suffer from the stagnation of their productive machinery and underdevelopment in the composition of their economic structure”.

For that, the increase in public expenditure cannot lead to the stimulation of economic activity due to the corruption, but could be reflected in higher prices (Niblock, 2001). In addition, it encourages the financial authorities to continue to expansion of the expenditure.

However, any attempt to overcome this reliance on deficit financing by using tax policy to improve the government's financial status must take consideration of the determinants of the tax effort, and the taxable capacity of the national economy in order to achieve the full objectives of public policy without any damage to economic activities, and to avoid exceeding the reasonable burden on individuals incomes.

These issues will be dealt with later in this research.

## Chapter Five: The Libyan Tax System

### 5.1 Introduction:

This chapter explains the Libyan tax base, together with its rates in accordance with Libyan legislation. It clarifies the most significant developments and trends of tax revenue and provides an analysis of tax structure along with a discussion of the relative importance of different types of tax. It also examines the marginal propensity to tax and income elasticity of tax in the Libyan economy during the period from 1970 to 2005. Finally, the evaluation of Libyan income tax system is discussed

The tax system in Libya is based upon two main methods for tax deduction (*for imposing tax*) which are as follows: direct method (Direct Taxes) and indirect method (Indirect Taxes).

### 5.2 Libyan Tax Structure:

The Libyan tax system consists of two broad types of taxes: direct tax and indirect tax as shown below:-

- 1- Direct Taxes : following table provides detailed structure of direct tax :
- 1-1- Direct taxes on income (Act No.64 of 1973 and Law No.23 of 1996 )
  - 1-1-a : tax on real estate incomes
  - 1-1-b : tax on the business incomes: -
    - 1-1-b- I : Tax on the incomes of trade & industry and crafts.
    - 1-1-b- II : tax on the corporate incomes.
  - 1-1-c : tax on the individuals incomes: -
  - 1-1-d : Additional taxes, include: -
    - 1-1-d- I : tax of Al-Jihad (Law No. 44 of 1970).
    - 1-1-d- II : tax of the Palestinian National Fund (Law No. 67 of 1970).

- 1-1-d- III : social security contributions (Law No.13 of 1980&Law No.16 of 1985 and Law No.20 of 1999).
- 1-1-d- IV : tax of the Great Man-Made River (Law No. 10 of 1983 and Law No. 19 of 1991)
- 1-2- Direct taxes on capital, include: -
  - 1-2-a : tax on vacant ( unused ) lands : Law No. 116 of 1972 .
  - 1-2-b : tax on properties of real estate (the ownership): Law No. 2 of 1986.
  - 1-2-c : Tax on ownership of livestock : Law 17 of 1991
- 2- Indirect taxes , include the following:
  - 2-1 - Indirect taxes on consumption and production, include:-
    - 2-1-a : customs taxes: Law No. 67 of 1972,then law No.10 of 1981 and law No.13of 1999.
    - 2-1-b : production & consumption tax: Law No. 16 of 1964 and Law No. 19 of 1992.
    - 2-1-c : tax of the entertainment: Law No.39of 1968(tax on entry to entertainment sites)
    - 2-1-d : tax for the blind: Law No.4 of 1972(tax on entry to cinemas, its earnings are in favor of the blind)
    - 2-1-e : monopoly Tax : ( tax on the monopolies Economic activities , include: -
      - 2-1-e- I : salt monopoly: Law No. 25 of 1968 .
      - 2-1-e- II : tobacco monopoly: Law No. 26 of 1968.
  - 2-2 - Indirect taxes on circulation (Act No. 65 of 1973 which replaced by Act No.12 of 2004), include:
    - 2-2-a : stamp tax on official edited documents .
    - 2-2-b : stamp tax on actions & disposes (transactions and facts).

### **5.2.1 The rate of direct taxes**

As shown in section 5.2 , the income tax structure consists of a multiple tax system, whereby direct taxation include various taxes, such as: tax on real estate incomes, tax on the business incomes, and tax on the incomes of individuals. Over the study period, various rates were applied for different types of tax base according to the nature and source of income, such as income from capital and income from work, or mixed income from both

capital and work. With regard to the tax rate levied on income, progressive rates were introduced (see Table 5.1). However, other taxes were levied at fixed rates, such as tax on agricultural income, tax on external incomes and tax on bank deposits and saving accounts at banks, as shown in Table 5.2.

During the period 1923-1968, Italian income tax law was used in Libya, with modifications to suit Libyan circumstances. In 1968 the first Libyan Income Tax Law was issued, (Mahmud, 1997, p. 131).

During the period under investigation, income taxes in Libya passed through three main stages of evolution, the stipulations of which were governed by a succession of various laws, as follow:

- The first stage 1968-73: - income tax law No.21 of 1968.
- The second stage 1973-2004:- income tax law No.64 of 1973, which was amended by Act No.23 of 1996.
- The third stage 2004 – 2005:- income tax law No.11 of 2004.

#### **5.2.1. a The Libyan Income Tax System, 1968–1973**

During this period, income tax in Libya was payable under law No.21 of 1968 which imposed on taxable incomes according to their sources as follows:

Tax on real estate income was levied at 15%.

Tax on income of trade; industry and crafts: Tax on Income from commercial and industrial activities and crafts were levied at 13%.

Tax on the corporate incomes: progressive rates were applied as follow:

First 10000 LYD .....	15%
Next 40000 LYD .....	18%
Next 50000 LYD .....	20%
Over 100000 LYD .....	25%

The incomes from agriculture; free professions; and foreign sources were levied at flat rates of 5%; 10%; and 10% respectively. That law also imposed a levy on taxable salaries; wages at a rate of 8% with the following exemptions: salaries below LYD480 for a single person, LYD720 for a married man (with or without children).

General tax on income: This tax was also assessed under law No.21/1968 and taxed at the following progressive rates:

<u>Net annual income (LYD)</u>	<u>Rate</u>
First 4000	0%
Next 2000	5%
Next 2000	7.5%
Next 2000	10%
Next 4000	12.5%
Over 14000	15%

#### **5.2.1.b The Libyan Income Tax System, 1973-2004**

According to the income tax law No.64 of 1973 there were different types of tax levied in Libya, whereby the individual income taxes were levied at different rates for income from real estate, agriculture, commerce, industry, crafts, independent professions, and income from wages and salaries. Corporate taxes ranged from 20–60%, with a general income tax of up to 90%, in addition to a Jihad tax that was levied on individual incomes, (Gale, 2007)

## Income tax rates according to tax law no. 64 of 1973\*

<u>Tax type</u>	<u>Rate range</u>
Tax on real estate income	15%-25%
Tax on agricultural income	5%
Tax on commerce , industry and crafts	15%-30%
Tax on independent (free) profession income	15%-35%
Tax on Wages and salaries	8%-35%
Tax on corporate income	20%-60%
General income tax	0%-90%

( \* ) *Progressive rates, except on agricultural income, tax on bank deposits and tax on external incomes.*

The Libyan salaries and wages tax applied to all salaries, bonuses and benefits that accrued from employment in Libya. Tax rates ranged from 8% to 35%. Foreign companies were able to pay their foreign nationals overseas, but needed to deduct the Libyan tax due (UK Trade & Investment, 2009).

The tax rates on salaries and wages during 1973-2004 were as follows:

No.	Gross Salary Brackets		Tax Rate
	Per Year	Per Month	
1	1800	150	8%
2	1200	100	10%
4	1800	150	15%
5	1800	150	20%
6	1800	150	25%
7	Over 8400	Over 700	35%

*Source: Sultan; Abdussalam, 2009.*

There were some exemptions for certain taxpayers, as follow:

Social Status	Per Year	Per Month
Single	480	40
Married man with no children	720	60
Married or widower or divorced with children	900	75

*Source: Sultan; Abdussalam, 2009.*

#### Tax on companies, 1973-2004:

Companies were assessed for tax in two stages, a preliminary assessment when the company's accounts were submitted and a final assessment when the tax department made a detailed examination of the accounts submitted (usually not more than two years after submission). Taxes were levied on profits assessed by the tax department who assumed a certain profit margin for different business activities (e.g. 6%-10% profit on importation, 20%-25% profit on services). Corporation taxes ranged from 20% on LYD10,000 profit to 60% on profit of over LYD150,000. The details of the corporate tax bands are shown below.

No.	Brackets	Income tax rate	Jihad tax rate
First	10000	20 %	4 %
Following	20000	25 %	4 %
Following	30000	30 %	4 %
Following	40000	40 %	4 %
Following	50000	45 %	4 %
Over	Over 150000	60 %	4 %

*Source: Sultan; Abdussalam, 2009.*

General income tax, 1973-2004:

In accordance with tax law no. 64 of 1973, the total of personal income tax on total income over LYD 200,000 was 90%. The law no. 23 of 1996 raised the threshold for tax payable on income from LYD4000 to LYD6000.

The general income tax rates were as follow:

Details	Amount	Rate
First	6000	Exempt
Following	3000	15 %
Following	5000	25 %
Following	8000	35%
Following	15000	45%
Following	25000	55%
Following	40000	65%
Following	100000	75%
Over	202000	90%

Source: Sultan; Abdussalam, 2009.

However, given these stipulations on tax, it should be noted that that due to taxation issues being complex in Libya, and the fact that rules were not interpreted in a consistent way, practices during the time under study were subject to change with little notice, (Libyan British Business Council, 2009). This situation prompted the authorities responsible for Libyan fiscal policy to seek advice from the International Monetary Fund (IMF), which recommended that the Libyan authorities simplify their tax system, develop tax payment arrangements for corporations, and restructure their tax and customs departments (Freedom House, 2009). So, the government responded to the advice of the IMF and took essential steps to reform the tax sector (Al-

Baddawy, 2009). Many fundamental tax changes were implemented as new tax laws were issued, such as law no.11 of 2004. In 2005 import taxes were abolished. In addition, a series of three General People Congress (GPC) secretariat resolutions (numbers 394-6) were issued in early October 2006, which called on Libyan citizens to openly declare their tax obligations. These resolutions also prompted the establishment of a high-level review of the tax declarations of senior-level government and private-sector officials (Country Commercial Guide; 2009).

#### **5.2.1. c The Libyan Income Tax System, 2004 – 2005**

On the 6th of March 2004 the General People Congress issued a new income tax law (no. 11 of 2004) which replaced the previous income tax law (no. 64 of 1973) and which came into force as from the date of its issue (Sultan, 2009).

According to the new tax law, general income tax was abolished, the top tax rates on wages and salaries were reduced, and the personal tax exemption bands were increased. The corporate tax remained progressive, on a sliding scale from 15 to 40 percent, compared to 20 to 60 percent under the previous law (ANIMA Investment Network, 2009).

In accordance with the new tax legislation, resident individuals were taxed on their worldwide income; non-resident individuals became subject to Libyan tax only on Libyan-derived income. The income of individuals became subject to varying tax rates depending on the category of income at the following rates: agricultural activities (5%); commercial, industrial and handicraft activities (15-35%); professional activities (15-30%); employment income (8-15%); partnership income (10-20%); foreign income

(20%); and income from deposits in banks and financial institutions (5%). Capital gains were taxed as normal business income, (Country Codes and International Resources, 2009).

#### **5.2.1.d The Main Features of the new Income Tax Law**

The Libyan Income tax law (no. 11 for 2004) consists of 112 Articles divided into five parts, as follow (El Neihom, 2007):-

##### **5.2.1.d .1 General provision:**

From article No. 1 to article No. 34 the general provisions are explained, such as tax subjection; tax assessment; procedures for the submission of tax declarations; procedures of tax appeal; tax collection; fines for delays of tax payment; tax debts; and tax exemptions.

##### **5.2.1.d .2 Taxes on individuals and partnerships:**

Articles nos. 35 to No. 71 are distributed through eight chapters which include specific tax rules, as follow:

##### **5.2.1. d .2.1 General Provisions. (Articles 35- 46):**

The main points of these articles are as follow:

They imposed specific taxes on the following incomes: a) agricultural income; b) Income of trade, industry and crafts; c) Income of partners; d) Income of independent works (free professions); e) Income resulting from work and the like; f) Foreign income for residents in the country; g) and income resulting from deposits with banks.

Exemptions from these imposed taxes were granted to those persons whose annual taxable incomes indicated in (a, b, c, d, e) was less than LYD1200 for a single person , or LYD1800 for a married person with no dependent children, or LYD2400 for a previously married person, widowed or divorced, having dependent children.

Also, the following amounts were exempted from tax: 1) Life insurance premiums up to a maximum of LYD600; 2) General insurance premiums up to a maximum of LYD420.

#### **5.2.1. d .2.2** Tax on Agricultural Income. (Articles 47- 48):

This tax was applicable to the net income resulting from pure agricultural exploitation of agricultural lands, whether afforested or not planted with trees.

The tax rate was 5% annually.

#### **5.2.1. d. 2.3** Tax on income of trade, industry and crafts. (Articles 49-52):

The income resulting from the exercise of any commercial, industrial or craft activity, even if incidental or unrelated to crafts, was subjected to tax. Also any income arising from any other source to which another specific tax was inapplicable was subjected to tax, unless excluded by special provision of the Law.

The following activities were considered as commercial activities:-

- a) Land division and sale thereof.
- b) Management of fixed and movable productive and service properties.
- c) Brokering activities (commission business).
- d) Use of agricultural lands by their owners.

The tax rate on income from commercial activities is 20% for the first LYD10,000; 25% for the subsequent 20,000 tranche ( bracket ); 30% for the

subsequent 30,000 tranche, and a flat 35 % on income above this amount.

Tax on income from industry and crafts is levied at a 5% discount per tranche over taxes levied on income from (other) commercial profits (Country Commercial Guide).

The details of annual tax rate were as follow:

	Commercial profits	Industry and craft profits
First (10,000 LYD): .....	20%	15%
Next (20,000 LYD):.....	25%	20%
Next (30,000 LYD): .....	30%	25%
Additional income: .....	35%	30%

**5.2.1. d .2.4** Tax on the income of partners in productive units to which the dictum (partners, not wage-workers) is applicable. (Articles 53-55):

The annual tax rate was as follows:

The first (LYD10,000) of income: .....	10%
The next (LYD20,000) of income: .....	15%
Additional income:.....	20%

**5.2.1. d .2.5** Tax on Income of Independent work ( Free Jobs). (Articles 56-57):

This tax is imposed on the incomes of liberal professions performed by the taxpayer independently, using the work as a main factor therein.

The annual tax rate was as follows:

The first (LYD10,000) of income: .....	15%
The next (LYD20,000) of income: .....	20%
The next (LYD30,000) of income: .....	25%
In excess thereof: .....	30%

**5.2.1.d .2.6** Tax on Income resulting from work and the like. (Articles 58-63):

This tax was imposed on permanent and temporary income derived from work and similar incomes, including: Remuneration against work (salaries and wages); allowances; commissions; gratuities; privileges; representation allowances; and all periodical or non-periodical payments, whether in cash or in kind.

The exemptions from this tax were as follow:

- 1) Contribution of the taxpayer to the social security system.
- 2) Income received by the taxpayer in return for the actual expenses incurred thereby for performing his/her work.
- 3) Any deduction from the taxpayer as a result of imposing disciplinary penalty thereon by deduction or fining.
- 4) Cash allowance for accumulated leave at the end of service.

The Libyan salaries and wages tax applied to all salaries, bonuses and benefits that arise from employment in Libya. Personal tax rates ranged from 8% to 15% in progressive rates (Libyan British Business Council, 2009)

This means that the upper limit of tax rate on individual income from labor and any service or function, permanent or temporary, was 15 percent (Heritage Foundation, 2009).

The income tax of persons' salaries and wages remained in the tax structure. It varies thereafter from a minimum to maximum rate according to three brackets (Egyptian Export Promotion Center, 2009).

The following salary tax rates had to be deducted from the gross salary, less employee social insurance contribution, employee social solidarity fund contribution and income tax exemptions mentioned below:

No.	Gross Salary Brackets		Tax Rate
	Per Year	Per Month	
1	4800	400	8%
2	4800	400	10%
3	Over 9600	Over 800	15%

Source: Sultan, Abdussalam; 2009.

While the exemptions from wages and salaries tax were:

Social Status	Per Year	Per Month
Single	1200	100
Married man with no children	1800	150
Married or widower or divorced with children	2400	200

Source: Sultan, Abdussalam; 2009.

Foreign nationals employed and paid in Libya were able to remit 50% of their net salary in foreign currency to his or her home country.

The percentage was increased to 75% in exceptional cases, for example in the case of desert-based employees.

Foreign companies choosing to pay their foreign nationals overseas were permitted to do so but were required to account for these payments and to deduct the Libyan tax due, and pay it to the Tax Department, (The Business Environment, 2009).

#### **5.2.1. d .2.7 Tax on Foreign Incomes on those resident in the Country.**

(Articles 64-68): This tax was imposed on the income of citizens and residents' generated from outside the country. Foreign employees coming to

the country under contract of employment were exempted from this tax .The tax rate was (20%) of the taxable income.

**5.2.1. d .2.8** Tax on interest from bank deposits. (Articles 69- 71)

This tax was imposed on interest resulting from deposits with banks, whatever the period of these deposits. The tax rate was 5% of the taxable income.

**5.2.1. d .3** Tax on Companies – Corporate Income Tax (Articles 72 – 80):

This tax was imposed on the income resulting inside the country and abroad by national companies and branches of foreign companies in Libya, whatever the type and nature of their activities.

The annual corporate tax rates range varied from 15% on LYD200,000 profit to 40% on profit of over LYD2,000,000 according to the following progressive brackets:

No.	Brackets	Income Tax Rate	Jihad Tax Rate
First	200000	15 %	4 %
Following	300000	20 %	4 %
Following	500000	25 %	4 %
Following	500000	30 %	4 %
Following	500000	35 %	4 %
Over	Over 2000000	40 %	4 %

Source: Sultan, Abdussalam; 2009.

This tax was payable on the net profit assessed by the tax department.

Corporation tax was charged under Law 11 of 2004. This was done in two stages:

1) Preliminary assessment: Tax was assessed on income of the preceding year. Under Libyan tax law, a company is required to submit a tax declaration at the end of its financial year, which usually runs from January to December. A company can choose a different financial year if it has obtained approval from the Libyan tax authorities, and if so this must be stated in its article and memorandum of association. (Libya Tax Resources, 2009).

2) Final assessment: After the preliminary assessment is filed by the company, the tax department made a final assessment using the new tax rate of the company's income.

Foreign companies submitted preliminary (self) assessments of their tax liabilities, which Libyan tax authorities then reviewed against a theoretical (and rarely attainable) industry average. After a period of time, the tax authorities issued a final assessment, incorporating whatever additional information they believed relevant. A company could appeal this final assessment. Companies with no fixed address or few tangible assets were often overlooked (Country Commercial Guide, 2008).

**5.2.1. d .3.1** Additional taxes on companies (Other corporate taxes):

A further 0.5% was also payable on any official receipt, including receipts for contract registration duties, corporation taxes, personal tax etc. (Libyan British Business, 2009).

**5.2.1. d .3.2** Registration tax for contracts: This tax was 2% for the main contract and 1% for a sub-contract.

More specifically, any contract negotiated in Libya for anything other than a direct supply had to be registered with the Tax Department within 60 days of signing the contract.

A duty of 2% of the total contract value, and 1% on sub-contracts was payable on registration. All invoices were required to bear the tax department stamp to show that the registration duty had been paid. Fines were levied at a rate of 3% per monthly delay (The Business Environment, 2009).

Foreign oil companies were subject to a special tax regime, defined in the Petroleum Law of 1955, later amended, with three tax brackets at 8, 10, or a flat 15 percent of income instead of the 25 percent previously (Al-Baddawy, 2009).

Under the provisions of the original petroleum law and concessionary agreement terms, income tax was based on 50 per cent of operating companies' net profits. This tax-rate had been applied during the 1955-1971 period.

The principle of a 50-50 profit sharing formula was first introduced in Venezuela in 1948 and subsequently in Saudi Arabia in 1950, Kuwait in 1951, and Qatar and Bahrain in 1952. On 1 September 1970 (September Agreement), the operating companies agreed to pay a supplementary tax to compensate the government for previously undervalued Libyan crude posted prices, and accordingly lost revenues. The supplementary tax was to be applicable until the end of each concession. It varied from company to company depending on the past output levels and the number of years a company had operated in Libya. It added approximately 5 per cent to the basic 50 per cent income tax rate. When both posted prices and tax rates were first successfully negotiated to higher levels in 1970 - outside OPEC - the Libyan government concluded the Tripoli Agreement with the operating companies on 20 March 1971. The Tripoli Agreement, among other things, increased the basic income tax rate to 55 per cent. This rate, which became

the standard tax rate in all Middle East exporting countries, was marked up again to 60 per cent in October 1974 by a unilateral decision of the Libyan government. On 1 January 1975, a new tax rate of 65 per cent was applied in Libya and other member countries according to an OPEC recommendation. The new rate was applicable in Libya up to the end of the period studied, (Mahmud, 1997, p. 182).

**5.2.1. d .4** Penalties : (Articles: 81–89) which mentioned all kinds of penalties.

**5.2.1. d .5** Final provisions: (Articles: 90–112) clarified some final matters and issues such as the organisation of co-operation with the tax authority; conditions of whole and part exemption from the tax and penalty for delayed payments; with the repeal of the previous income tax law, number 64 of 1973.

**5.2.1. d .6** General income tax (GIT): This tax was imposed on the General Income of individuals. According to the new law, this tax was cancelled and ceased to exist. (Sultan; Abdussalam, 2009).

**6.2.1. d .7** Jihad Tax: This tax was payable under Law 44 of 1970 and is levied on personal incomes and corporation profits (The Business Environment, 2009).

**5.2.1. d .7 .1** Jihad tax on personal incomes (individuals) or (personal jihad tax): It varies from 1% to 3% according to income.

Jihad tax rates on salaries and wages remained unchanged.

The following are the progressive rates of this tax, deductible from gross salaries less Employee Social Insurance Contribution and Employee's Social Solidarity Fund Contribution, as follow:

Details	Tax Rate
If salary does not exceed LYD50 per month	1 %
Over LYD50 to 100 per month	2 %
Over LYD100 per month	3 %

Source: Sultan,; Abdussalam, 2009.

**5.2.1. d .7 .2** The Jihad tax on companies: This tax also remained unchanged; it was levied at a flat 4% on companies' annual taxable profits (net income) for the funding of national defense (Egyptian Export Promotion, 2009).

**5.2.1. e** Social security deductions. These deductions included social security contributions and Employee Social Solidarity Fund contributions. The details were as follow:

**5.2.1. e .1** Social Security contributions: These contributions were imposed in accordance with Law No. 13 of 1980, as amended by Law No. 1 of 1991. The contributions were payable by all employees working in Libya, whether local or foreign, based on gross income. Contributions could be made either weekly or monthly. The gross salary with regard to foreign nationals was required to include an amount for housing and subsistence, regardless of whether this was paid to the employee or not. (The Business Environment, 2009).

### Social Security Contribution Law No. 13 of 1981

The initial social security deductions, according to law No.13 of 1980, were:

Details	Rate
Employee contribution	3.75 % of gross salary
Employer contribution	11.25 % of gross salary
Total Contribution	15 % of gross salary

The total contribution of employees and employer had to be paid by the employer directly to the Department of Social Security Contributions, (Sultan, 2009).

The revised social security deductions, according to law No.1 of 1991 were:

The social security contributions were payable on the 10th of the month following the payment of salary. Late payment carried a fine of 5%. The rate of social security contributions effective from 1st June 1991 were as follow:-

Details	Foreign Companies	Libyan Participation
Employee	4.75 %	4.75 %
Employer	11.25 %	10.50 %
Government	-	0.75 %
Total Contribution	16.00 %	16.00 %

(Source: The Business Environment, 2009).

#### **5.2.1. e .2 Employee Social Solidarity Fund Contribution:**

A rate of 1% of the gross salary was deducted from the gross salary of each employee and was paid to the Social Solidarity Fund Department (Sultan, Abdussalam, 2009).

**Notes:**

1) The Libyan tax structure does not include a gift or inheritance tax, also neither locality taxes nor tax on insurance premiums - i.e. these are deductible expenses - (Heritage Foundation, 2009). In addition, the tax system does not impose any taxes on dividends and no withholding taxes. (Libya Tax Resources, 2009).

2) Penalties for late payment

Tax not paid by the due date becomes immediately due, together with all other tax that may not yet be due for payment, and is subject to a penalty of 1% per month on the amount due plus collection charges (The Business Environment, 2009).

3) Tax appeal

If the tax payer does not accept the tax department assessment, he has the right to file an objection or an appeal (Mayet, 2009).

The taxpayer can accept the Tax Department's assessments or can object.

The objection can be made to:-

A) An arbitration committee or

B) A Court (The Business Environment, 2009).

4) Double Taxation Agreements:

Libya concluded seven double taxation agreements with several countries in the Middle East (Country Commercial Guide, 2008).

Hereinafter, a summary of tax base in accordance with tax laws:

(1-A) Tax on real estate income: Levied on income resulting from investments in constructed real estate as well as investment in lands, and lease of agricultural lands, which are all incomes resulting from capital. Notable is that such tax has lost its applicable relevance in Libya due to the issuance of Law no. 7 (1978) which banned the rental of real estate.

**(1-B) Tax on business income, which includes:**

(a) *Tax on Commerce, Industry and Crafts:* This tax is levied on activities involving both elements of capital and human effort, whether in the commercial, industrial fields or handicrafts. It is imposed on taxpayers, individuals and companies, joint ventures and limited partnerships as well as companies limited by shares.

In 1984, Law no. 8 was issued, which banned the practice of business and brokerage in the private sector, which led to a reduction of the tax base on commerce, industry and crafts.

(b) *Tax on Corporate Income:* This tax was imposed on Libyan companies and branches of foreign companies, no matter of whatsoever type of business or objective, which was subject to commercial law, such as corporations, limited liability companies and cooperative companies, whether its income had been earned internally or externally, and whether they were owned by individuals or state-owned.

Table ( 5.1) Tax base and rates imposed on it, according to the Income Tax Law 64/1973 and its amendments

Tax base and Taxrates in Libya																	
income brackets	real estate income		income of trade , industry and crafts				corporate incomes		wages&salaries		free professions income			General tax on the income*			
	law	64-1973	law	23-1996	law 11 of 2004	law	64-1973	law	11-2004	law	64-1973	law	23-1996	law	64-1973	law	23-1996
bracket 9	LD		LD	LD	commercial profits LD	LD		LD	LD	LD	LD	LD		LD	LD		
bracket 8																	
bracket 7																	
bracket 6																	
bracket 5																	
bracket 4																	
bracket 3																	
bracket 2																	
bracket 1																	

where , add-income : additional income ; LD : Libyan dinar; ( \* ) General income tax has been abolished by law 11 of 2004 .

*Table (5.2) The Tax base and fixed rates imposed on it annually*

Tax	Tax law 64/1973
Tax on bank deposit benefits and savings accounts.	15% ( 20% )
Tax on external incomes	15% ( 20% )
Tax on agricultural income	5%

Rates between brackets are the fixed tax rates according to tax law 23/1996

(1-C) Tax on individual incomes, including:

- (a) *Tax on wages and salaries:* This tax was imposed on the income of a employee resulting from a service or job whether permanently, or temporarily in the form of wages or salaries, paid by private or public businesses or if internal or external bodies paid such salaries.
- (b) *Tax on independent (free) professions income:* The base of this tax was the net income resulting mainly from employees and specifically from the intellectual effort as well as physical effort in any activities, which the taxpayer practiced at his/her own expense within the country.
- (c) *Tax on bank deposits:* Such a tax was imposed on income resulting from the taxpayer's income from interest of savings accounts and other deposits in national banks, regardless of the duration or value. A large portion of this tax did not take into account any personal exemptions, such as cost of living and private insurance.
- (d) *Tax on external incomes:* This tax was levied on all income arising outside the state of any kind whatsoever, and was imposed on external incomes of citizens or resident foreigners in the country who had projects within the State.

- (1-D) Tax on agricultural income: The tax legislation specified the tax base of this tax, which included net income resulting from production of raw agricultural activities without any industrial processes. This meant that the base of this tax was the income from agricultural crops produced directly by the land. Such a tax could be paid in kind.
- (1-E) General income tax: The base of this tax was the sum of specific tax bases imposed on various incomes, i.e. the net incomes subject to specific taxes in case of diversity of sources of income for the taxpayer. Also, this tax was imposed on profits distributed to partners or shareholders in companies subject to corporate tax. This tax was canceled in accordance with Act No. 11 of 2004.
- (1-F) Additional direct taxes, which included:
- (a) *Jihad Tax*: this was an additional tax for the benefit of the Jihad Fund, imposed on all profits and incomes subject to tax income excluding agricultural incomes. In addition, it was imposed on national entry and exit visas and motor vehicle licenses - see the rates in Table 5.D.
  - (b) *Tax of the Palestinian National Fund*: A tax imposed on all wages and salaries as well as similar incomes of all Palestinian workers, for the benefit of the Palestinian Red Crescent.
  - (c) *Social Security Contributions*: Such compulsory contributions were imposed with a rate of 15% out of the income of workers and employees in Libyan and foreign public and private sectors, whether they were employees or workers, and whether they were working under contracts with third parties or self-employed. If the taxpayers were working within the administrative corps and national

institutions, social security contributions were paid by the insured person, and the employer, as well as the public treasury.

#### 5.2.1. f Exemption from the Specific Income Taxes:

- There were several exemptions from the payment of specific income taxes (see Table 5.3). The most important of these exemptions is to protect the minimum cost of living and private insurance.

Table (5.3) Tax exemption for specific income taxes, (LYD: means Libyan Dinar)

<b>TAX EXEMPTIONS GRANTED UNDER TAX LEGISLATION</b>	<b>TYPE OF TAX</b>
(1) Minimum cost of living (LYD/year): 480 LYD for a single person, 720 LYD For married person with no dependents, 900 LYD for married person with dependents. (*)	(A), (B), (E), (I)
(2) Private insurance premiums and social security contributions	(D), (E), (I)
(3) Expenses necessary for the performance of work and equivalent of discount penalty or administrative fines	(D)
(4) Benefits of accommodation and subsistence in business premises in remote areas	(D)
(5) Income of short-term jobs for domestic non-local experiences, provided that it does not exceed one month	(D)
(6) End of service benefits	(D)
(7) Wages and salaries and the like incomes earned abroad for works performed and paid to non-national employees	(G)
(8) Total cash bonuses paid by institutions or third-party companies to resident members in the country for their cooperation; they maintain their businesses locally provided that neither the State nor its any of its institutions may contribute therein.	(G)

(9) Exemption and earned income taxpayer subject to this tax for a period of two years of practice; whether at home or abroad (this exemption was canceled with effect from 1990).	(E)
(10)(20%) of the income as maintenance expenses	(A)
(11)Private accommodation of taxpayer (residential premises)	(A)
(12)Real estate allocated for agricultural purposes	(A)
(13)Real estate allocated for practicing the taxpayer's business	(A)
(14)Establishment expenses and premiums of the depreciation of fixed assets for the production of income subject to this tax	(B)
(15)Taxes and duties paid on the occasion of any business other than taxation of business profits, industrial and general income tax	(B)
(16)Bad debts	(B)
(17)Social security contributions which should not exceed 10% of the total receivables by employees	(B)
(18)Contributions to charities (with the requirement not to exceed 2% of net income)	(B)
(19)Loss stage and consumption of goodwill for the project.	(B)
(20)Joint ventures subject to taxation of business and industrial profits	(C)
(21)Ratio (30%) of tax due on the national corporate companies on the condition that it should abide by its obligations, (this exemption was canceled by Act 23 of 1996.)	(C)
(22)The benefits of savings accounts if the value of the amount saved at national banks did not exceed LYD5000	(F)
(23)Interest on individual deposits with foreign banks abroad subject to external income tax	(F)

(24) Interest to companies of their deposits in banks subject to corporate tax	(F)
(25) External incomes for foreign employees who entered the country upon an employment contract signed with the State, public or private bodies, companies or individuals	(G)
(26) LYD4000./year (increased LYD6000 under the Act 23/1996)	(H)

(\*) According to Act no. 11 for the year 2004: LYD1200 for single person, LYD1800 for married with no dependents, LYD2400 for the married or widowed or divorced with dependents.

Where:

- (A) Taxes on real estate income
- (B) Taxes on commerce, industry and crafts income
- (C) Corporate income tax
- (D) Tax on salaries, wages and the like incomes
- (E) Tax on the income of independent (free) professions
- (F) Tax on interests of bank deposits and savings accounts
- (G) Tax on foreign income
- (H) General income tax
- (I) Tax on agricultural income

#### Additional taxes imposed on certain incomes subject to specific income tax:

In addition to imposing taxes on income, however, some types of income are also subject to additional taxes, as described in table 5.4.

Table (5.4) Additional taxes imposed on certain types of income

Additional Tax		Relevant Income
Jihad Tax	2% from the income tax exemption, and rate of 4% from the taxable amount	(A), (B), (E)
	4% on total income	(F), (G)
	1% if the monthly income was less than LYD50. 2% if the monthly income was less than LYD100. 3% if monthly income greater than LYD100.	(D)
Security subscription premiums of 3.75% of total income		(D)
Tax of Palestinian National Fund, of a rate 7% of total target taxpayers' total income		(D)
Stamp Tax		(D)

**NOTE:** Additional taxes are levied on certain types of income subject to specific tax referred to earlier with the same symbols contained in the previous Table (5.3). (LYD: Libyan Dinar).

### 5.2.2 Indirect taxes:

The indirect taxes in Libya included: Customs taxes; Production and Consumption Tax; Stamp tax; Tax on Entertainment; Tax for the Blind. The details of Libyan indirect tax structure are shown below:

**5.2.2.1 Customs taxes:** during the study period, several customs laws were issued, including Act 67/1972 which was amended by Act No. 10 in 1981; Act No. 13 in 1999 and tax amendments in 2005.

The Libyan customs tax structure consists of import tax; export taxes; charitable tax; municipality tax; tax of the man-made river project; stamp tax for customs purposes; quay returns. These taxes can be shown as the following:

**5.2.2.1.a** Import tax: Most import taxes were ad valorem taxes that were levied as a percentage of the imported product's value. This tax varied with the change of prices of imported products ranging between 2% to 300% of the value of item in accordance with the customs tariff for the year of 1981. There were many customs exemptions for essential consumer goods and personal luggage as well as some capital goods and goods of Arab origin. The previous tariff of 1981 was replaced by the coordinated customs tariff from the beginning of 1998.

Libya applies the common market for Eastern and Southern Africa's common external tariff of 0% for capital goods and raw materials, 10% for intermediate products, and 25% for finished products (Foreign Affairs and International Trade Canada, 2009).

As of 1996, the average weighted tariff was 21.3%. Import controls remained extremely tight, even by regional standards, which made Libya a difficult place to do trade. UN sanctions exacerbated the matter, and in 1977, 13 industries were exempt from taxation and customs to encourage domestic production, including plastics, footwear, and metal goods.

Before 2005 Libya used a single-column tariff schedule of Customs Co-operation Council Nomenclature (CCCN). According to CCCN tariff

schedule, imported goods from all countries were subject to the same duties. Also levied were customs surcharges totaling 15% of the application customs duties, and 16.7% royalty on petroleum production, (Gale, 2007). Imports from all countries were subject to the same rate of tax except for goods originating in Arab countries, which were exempted from tax if the Arab content was in excess of 40%.

Imports of intermediate goods used in export industries were subject to duty and tax refund if the goods so produced were re-exported within one year from the date of the importation of the raw materials.

Generally, the kinds of applicable customs taxes and duties in Libya included:

**5.2.2.1.a.1** Specific taxes: tax was levied based on the gross weight of the goods.

**5.2.2.1.a.2** Ad valorem taxes: most import taxes were charged on an ad valorem basis. The taxable value was the value of the goods delivered to the port of entry including costs of freight, insurance, commissions, landing charges, and other expenses.

**5.2.2.1.a.3** Preferential duties: there were preferential agreements between Libya and the following countries: Egypt, Iraq, Jordan, Kuwait, Mauritania, The State of Palestine, Somalia, Sudan, Syria, the United Arab Emirates and Yemen.

Libya was a member of the Arab Common Market, which provides in principle for the removal of all customs duties on agricultural, animal, and natural resources commodities.

**5.2.2.1.a.4** Customs surcharges and indirect taxes: imports are subject to customs surcharges totaling 10% of the applicable customs tax. According to Libyan customs law, a countervailing tax had to be imposed on imported

goods subsidised by the exporting country and on any goods that competed with Libyan products.

Private individuals were allowed to import goods duty free on the commodity budget list up to a maximum value of LYD3,000 from Arab countries with the exception of medicine, milk, meat, insecticides, petroleum products, tobacco, gold and nine other essential food items imported by either public or private entities within the provisions of the annual commodity budget, (Muslim Countries Trade Network, 2009).

According to the previous tariff, personal effects were exempt from customs tax within certain limits, whilst others were restricted, also other goods were not allowed to be imported, as in the following list : -

#### Customs tax & duty free allowances and restrictions

- Tobacco.....200 cigarettes or 250g of tobacco
- Liquor.....Prohibited
- Perfume.....Reasonable for personal use
- Cameras.....Should be declared on arrival
- Film.....Reasonable for personal use
- Gifts.....No restrictions
- Currency.....Must be declared on arrival

(Travel Document system, 2009).

Since January 1998 the Libyan Customs tariff has used a simplified harmonized system. The Government adopted this tariff as a prior condition to its application for World Trade Organization (WTO) membership

(Emporiki Bank, 2009). Indirect taxes in 2002 were mainly sales taxes at various rates (Gale, 2007).

Since 2003, importing goods into Libya is no longer subject to import license but all imports must be accompanied by a certificate of origin. (Emporiki Bank, 2009). In other words the taxation and customs formalities evolved, with licenses being abolished in 2003 (ANIMA investment network, 2009).

In 2004 the United States lifted its restrictions and eased economic sanctions against Libya, the sanctions were later removed. Soon after this the U.S released Libyan assets frozen (Country Commercial Guide, 2009). Since 2004, Libya has been an observer at the WTO prior to becoming a member (Emporiki Bank, 2009).

In summer 2005, substantial modifications to Libyan customs taxes were conducted. Customs taxes on more than 3500 imported product categories were abolished by the Libyan Customs Administration on 1 August 2005. The import tax was replaced by a port services tax at a flat 4% rate which was levied on most imported products, except for approximately 85 items which remained subject to consumption taxes of between 25 and 50 %, and a 2% production tax for domestically produced goods.

Briefly, the new tariff schedule for the year of 2005 had only two rates (10 percent for tobacco products and 0 percent for all other products). The higher customs taxes were reserved for luxury items such as furs and very high-end furnishings; taxes on cigarettes and tobacco products remained unchanged. While customs taxes were drastically abated, additional “consumption” and “production” taxes were applied to some imported goods (at rates of 25-50% and about 2%, respectively), often as a form of

protection for local goods and companies. These taxes were borne by the importing agent and frequently passed to the consumer, (Country Commercial Guide, 2009).

Moreover, decree number 139 of 25 August 2005 divided 84 products into two lists:

- First list: those that, as well as the port tax of 4%, were subject to a production tax of 2% and a consumption tax of 25%.
- Second list: those that, as well as the port tax of 4%, were subject to a production tax of 2% and a consumption tax of 50%. This last category included 13 luxury products, such as works of art, vehicles of more than 3000cc, and similar luxury items (Emporiki Bank, 2009; Heritage Foundation, 2009; Al-Baddawy, 2009; Egyptian Export Promotion Center, 2009).

In addition, Libya does not impose value-added tax (VAT). Equipment imported into Libya for use in the oil sector has traditionally been exempt from customs duties, under Article 16 of Law No. 25/1955 “Petroleum Law” (Libya Tax Resources, 2009; Country Commercial Guide, 2009).

**5.2.2.1 .a.5** Customs tax exemptions: Some products are exonerated from customs duties, for example, equipment necessary for the completion of a project in Libya. Tax rebates are available to foreign investors importing merchandise under the terms of law No. 5 of 1997. In addition, the government has created an investment fund to handle a portion of the government’s oil revenues, (Emporiki Bank, 2009; ANIMA, 2009).

As previously mentioned, products of at least 40% Arab origin content were exempt from customs duties. The authorities implemented other important

measures, including the elimination of the Great Man-Made River exchange tax, which was levied on private foreign exchange transactions, and the devaluation of the exchange rate by 15%, (Country Commercial Guide, 2009; Arabic Hellenic chamber of commerce & development, 2009).

The Libyan Tax System table can be seen in summary in the appendices.

**5.2.2.1.b** Export tax: All domestic exports were exempted from customs duties in accordance with customs resolution No. 20 of 1990.

**5.2.2.1 .c** Charitable Tax: which was a tax imposed for charitable purposes for the benefit of Social Security Fund. In 1985, the price of this tax was (5%) of the value of customs duties on imports and this rate was increased to (7.5%) in 1986.

**5.2.2.1 . d** Municipality Tax: this tax was imposed from 1968 at a rate of 5% of the customs duties on exports and imports in favor of municipalities and hwasimposed in virtue of applicable Act No. 39 of 1975.

**5.2.2.1. e** Tax of the Man-Made river project: Act No. 19 for the year of 1991 levied such a tax at a fixed price to be imposed on the production or import of tobacco and certain petroleum products, as well as on the purchase of currency from the banks and documentary credits, as well as selling travel air-tickets for the benefit of *the Man-Made river project*.

**5.2.2.1. f** Stamp tax for customs purposes: stamp tax for customs purposes was imposed by Act No. 65 of 1973 and Act No.12 of 2004. This tax in was developed in favor of the Tax Authority.

**5.2.2.1. g** Quayages (Quay returns) : which were paid in favour of harbour Company, as well as storage fees.

**5.2.2.2 Production & Consumption Tax:** This was one of the indirect taxes imposed on any item due to its production or consumption. It was imposed initially on local products of carbonated water at a fixed rate according to Act No. 16 of 1964, then it was also applied to petroleum products, and then the base of this tax was widened under Act No. 19 for the year of 1992 under the name of production or consumption taxes. Production tax was the tax imposed owing to the production of goods locally. When imposing such a tax on similar goods imported from abroad, it was known as the consumption tax, which was imposed on all natural or legal persons to be charged to pay it. The resolution of the Ministry of Economy No. 942 for the year of 1993 referred to clarifying the categories of goods subject to this tax together with the tax of production rates, ranging between 5%-50% of the cost of production and consumption tax, with rates ranging between 10%-100%. This means that tax on domestic production was less than or equal to the consumption tax. Meanwhile this tax was imposed at constant rates on oil products and carbonated drinks.

**5.2.2.3 Stamp tax:** This tax is levied for circulation on all documents and transactions. It was imposed under Act No. 35 for the year of 1968 and Act No. 65 for the year 1973. During the period of 2004-2009, the stamp tax was regulated by Act 12 for the year 2004. It is an indirect tax imposed for non-periodic acts (non-recurrent), such as circulation or consumption, and is imposed on the occasion of a particular incident. It is also an in-kind tax imposed without taking into account the taxpayer's ability to pay.

The stamp tax is divided into two types: stamp tax on documents/writs and stamp tax on dispositions/transactions. The details are shown below:

**5.2.2.3.1 Stamp Tax on Documents/Writs:** In accordance with Act No. 12 of 2004, such a tax is imposed on official documents at a steady rate (a specific value) in most cases and can be often low-priced, ranging from 10-2000 dirham for the document subject to this tax with the exception of some licenses that impose a tax between LYD10-500. In rare cases, it was subject to a relative price ranging between 0.002% - 5% of the value of tax base, such as financial receipts and invoices, bills of exchange and promissory notes, securities and advertisements.

**5.2.2.3.2 Stamp tax on dispositions/transactions:** It was an indirect tax imposed as a specific tax base, under its (the value of transaction), rates ranged between 0.001% -10%. Sometimes this tax was imposed at a fixed rate ranging from 1000 dirham – LYD20 for each transaction; this tax was often paid by buying stamps, or paid in cash if the value of the tax exceeded 5 LYD.

**5.2.2.3.3 Stamp Tax Law No. 12 of 2004:**

This law was issued by the Libyan General people's congress on 06 of March 2004 to replace the previous stamp tax law Number 65 of 1973; "The stamp tax law issued by law No. 65 of 1973 shall be repealed " (Article 49, law 12 of 2004 ). It came into force from the date of its issue. The new law contained 50 articles divided into 5 parts as follow:

**5.2.2.3.3.a General provisions (Articles 1–7):**

Under this part, stamp tax is defined as a fixed or relative tax, and shall be imposed on the papers, documents, publications, advertisements, registers and other writs, as well as acts, transactions, and facts in the manner and the

rates/prices indicated in the annexed table. It also shows some of other General provisions related to the stamp tax.

**5.2.2.3.3.b** Payment of the tax (Articles 8–20):

This part explains the following: how to pay the stamp tax; determines the forms and categories of duty stamps and papers by the executive regulation; penalty of delayed payments; complaining against the imposed tax; and determining who bears the burden of this tax.

**5.2.2.3.3. c** Exemption from Tax (Articles 21–22):

The following bodies and cases were exempted from the stamp tax: public bodies; syndicates ; private bodies of public interest and official societies with social, cultural, charity or sport purposes; the foreign diplomatic and consular corps; the international bodies; procedures of Pilgrimage rituals; procedures of study; persons receiving basic incomes; work seekers; procedures subjected to judicial fees.

**5.2.2.3.3.d** The Penalties (Articles 23–31): to determine the taxpayer's responsibility for tax payment, and clarify some financial penalties resulting from contravention to this law.

**5.2.2.3.3.e** Final provisions (Articles 32 50): to identify some of the organisational procedures for collection of this tax.

According to the mentioned new tax law, the Libyan Government created a new Stamp Tax. This tax specified the following tax rates on important items procured in Libya by a foreign firm:

### Taxable Item Rate

No.	Details	Rate	Item no.
1	Auditors Certificate & Reports to be paid by the company	100LYD	2A
2	Accounting Books (Registered) on each page	0.250LYD	4A
3	Invoices (sales, purchase of cars to be paid by the buyer)	3%	24A
4	Invoices (sales, purchase of material) over 100 LYD to be paid by the buyer.	2%	24B
5	Rental Contractors to be paid by the tenant Contracts for supplies, services.	1%	27
6	Contracting, Public works ... etc. to be paid by the contractor	2%	28A
7	Sub-contractor.	0.1%	28B
8	Opening of Letters of credit.	0.2%	33A
9	Guarantee , Insurance ... etc. of Value	0.5%	35
10	Receipts	0.5%	36
11	Amounts paid by any public body to others to be paid by the receivers	0.5%	43

Sources: Sultan, Abdussalam, 2009, How to do business in Libya. Country Commercial Guide,, 2009).

Any contract signed in Libya for anything other than a direct supply was subject to stamp tax and had to be registered with the tax department within 60 days of the effective date of the contract (usually the date of signature). A tax of 2% of the total contract value and a further 0.1% on any proportion that is sub-contracted was payable on registration. All invoices were required to bear the tax department stamp to show that stamp tax had been paid. Any delays result in a penalty of 2% of the tax per month up to a maximum of 50% of the tax. The contractor was liable for the payment of tax and a company could not accept an invoice from a contractor that had

not been registered - if the contractor had not paid the registration duty then the company became liable.

Government bodies withheld a stamp tax of 0.5% from all payments made by them (Libyan British Business Council, 2009).

There is a 5% sales stamp tax on all local sales, which was added to the invoice at the time of sale, (UK Trade & Investment, 2009).

In the appendices can be see a schedule of 45 items showing the details and tax stamp rate of each item according to the mentioned new law (No.12 of 2004).

**5.2.2.4 Tax on Entertainment:** It was one of the indirect taxes on consumption, under Act No. (39) for the year of 1968, and was imposed on a percentage 10% of the entry fees to theaters and entertainment concerts as well as parties, and on a percentage of 15% for entry tickets to movies.

**5.2.2.5 Tax for the Blind:** A tax imposed on cinema tickets for supporting the Blind Association under Libyan Act No. (4), adopted in 1972, a surcharge tax imposed for amusement on all tickets to the movies only at 10 dirham per ticket.

And so on, through the review of tax base and tax rates as well as tax exemptions, the objective of the tax target in Libya could be set out as follows:-

(1) *Fundamental objective:* which was designed to achieve social purposes such as reducing income inequality. There were certain indicators inclusive of imposing specific taxes (general income tax), the rise of tax price for the tax rate due to increasing income of taxpayers as well as granting certain tax exemptions.

(2) *Financial objective*: for funding the expenses of administrative budget by fiscal resources and reducing dependence on oil revenues.

### **5.3 Tax revenue in Libya during the period 1970-2005 .**

In this part, the development of direct and indirect tax revenue during the period under this investigation will be discussed.

#### **5.3.1 Revenue from direct taxes during the period 1970-2005:**

This section includes the development tax revenue from: real estate tax, business incomes tax, individual incomes tax, agricultural income tax, total income tax, other direct tax revenue, and tax penalties.

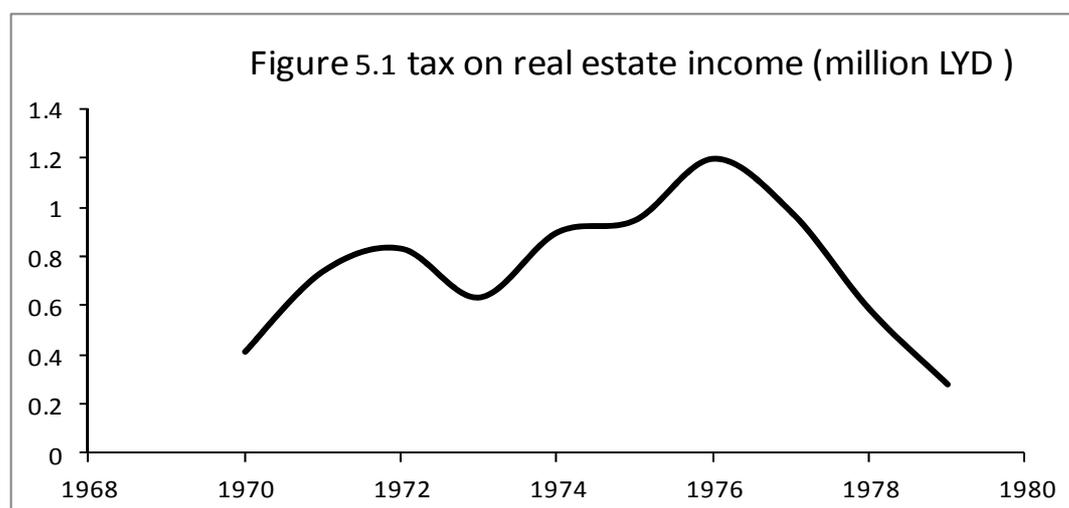
**5.3.1.1 Revenue from real estate tax:** According to current prices, the value of real estate tax revenues by 92% from LYD410.1 thousand in 1970 to LYD1.196 million in 1976, then decreased by 32% to LYD277.3 thousand in 1979, see Figure 5.1 and Table 24 of the Statistical Annex - annual growth rate for this tax reached (- 4.3%) during the period 1970-1979.

As for the contribution of real estate tax in the income tax, it reached the highest rate amounting to 6.3% in 1971, while the lowest rate was at 0.2% in the year 1979.

In practice, this tax was stopped during the period from 1980-1993 and then began working out again in 1994 until it reached LYD16.2 million in the year 2005.

*Table 5.5 Tax on real estate during the period 1970 - 1979 (millions LYD at current prices)*

years	Tax on real estate income	Annual change		% of income tax
		value	%	
1970	0.41	-	-	3.0%
1971	0.738	0.328	80.0%	6.3%
1972	0.83	0.092	12.5%	6.0%
1973	0.631	-0.199	-24.0%	4.0%
1974	0.896	0.265	42.0%	2.0%
1975	0.946	0.05	5.6%	2.0%
1976	1.196	0.25	26.4%	2.0%
1977	0.978	-0.218	-18.2%	1.0%
1978	0.583	-0.395	-40.4%	0.5%
1979	0.277	-0.306	-52.5%	0.2%
Total	7.485	-	-	1.0%
Average	0.749	-0.015	3.0%	2.7%
CAGR	-4.30%	-	-	



### 5.3.1.2 Revenue from tax on business incomes:

Table 5.6 shows that the compound annual growth rate of income tax on Trade, Industry and Crafts during the period 1970-2005 reached approximately 4.8% and that the value of this tax developed more than five times compared to the beginning of the study period.

Table 5.6 Compound annual growth rate of businesses income during the period 1970-2005 (values: LYD Million)

tax	years		Average of annual increase	CAGR
	1970	2005		
Tax on the incomes of Trade & Industry and crafts	4.771	24.407	16%	4.8%
Tax on corporate incomes	0.373	323.28	25%	21.3%
Tax on business incomes	5.145	347.687	25%	12.8%

In the meantime, the annual average tax revenue for business incomes was LYD12 million for the entire period between 1970-2005. In 1998, the tax revenues amounted to LYD33.1 million, which was the highest value during the period.

The corporate income tax grew from LYD373 thousand in 1970 to LYD323.3 million in 2005 (see statistical appendix, table 24). This increase was at a compound annual growth rate “CAGR” of 21.3%. Total revenue of this tax during the period 1970-2005 reached about LYD4.8809 million at an average annual rate of LYD135.6 million per annum. The maximum value of these revenues reached LYD403 million and this tax was significantly decreased in 1990 (see figure 5.3).

In general, the tax on business has been developed from LYD5.145 million in 1970 to LYD347.7 million in 2005 (i.e. it multiplied by 67 times compared to what it was in the beginning of the period). This increase in tax revenues on business income tax was at a compound annual growth rate of 12.8%.

In view of the above, we can say that the trend on Total Income Tax on business income was annually at a height ranging between 3% and 347%, although this trend witnessed a remarkable decline in some years of the study period between 1984 and 1997.

*Table (5.7) Income Tax on business during the period from 1970 to 2005 (current prices)*

**Tax on income of trade, industry and crafts:**

period	value*	A	B
1970-79	39.611	9%	16%
1980-89	56.241	13%	4%
1990-05	336.442	78%	10%
1970-05	432.294	100%	8%

**Tax on the corporate incomes:**

period	value*	A	B
1970-79	204.461	4%	84%
1980-89	1494.204	31%	96%
1990-05	3182.245	65%	90%
1970-05	4880.91	100%	92%

**Total of tax on Business incomes:**

period	value*	A	B
1970-79	244.074	5%	100%
1980-89	1550.446	29%	100%
1990-05	3518.685	66%	100%
1970-05	5313.205	100%	100%

A: As ratio of the total of each tax during 1970-2005

B: As ratio of total tax on Business incomes for each period.

(\*) in current million LYD.

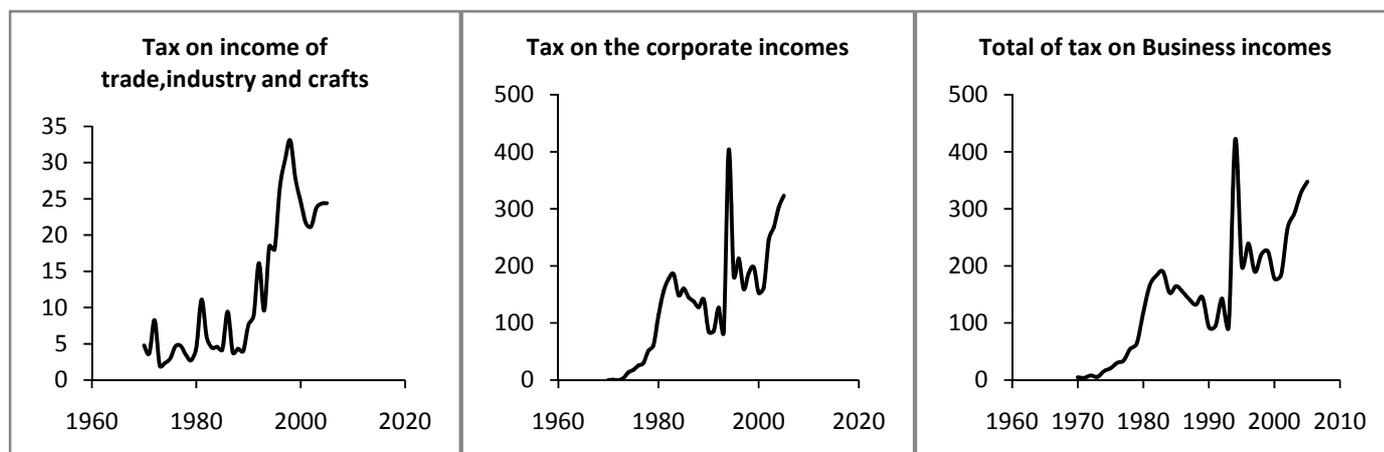


Figure ( 5.2 )

Figure ( 5.3 )

Figure ( 5.4 )

### 5.3.1.3 Revenue from tax on the individual incomes:

This tax included tax on salaries, wages and income tax free professions as well as tax on the interest banks and savings accounts, and tax on foreign income and general income tax. In respect of taxes on salaries and wages, the data indicate that it reached during the period 1970-2005 about LYD3.7 billion, as described on table 25 in the statistical appendix. The tax list of the components of the tax on individual incomes in all years of study ranged between 51% and 100% of the Income Tax on individuals; there was an annual growth rate of the payroll tax of about 8.9% during the period 1970 (See table 5.8.).

On the other hand, total tax on the income of independent professions reached LYD46.63 million during the period from 1970 to 2005 with a complex annual growth rate of 29.8%. As for the total tax on the interests of banks and savings accounts, it amounted to about LYD2.481 million during the study period. This tax is a very small proportion of the components of tax on income of individuals (see table 5.9).

*Table (5.8) Income Tax on individuals (Million Libyan dinars)*

years	tax on salaries & wages	tax on the free professions incomes	General tax on the income	tax on the banks deposit benefits and saving accounts	tax on external incomes	total of tax on the individuals incomes
1970	7.114	0.001	0.142	0	0	7.257
1975	30.305	0.082	4.145	0.027	0	34.559
1980	75.668	0.471	6.628	0.013	0	82.78
1985	126.697	0.099	11.721	0.064	0	138.581
1990	136.081	0.203	21.119	0.225	0.001	157.629
1995	128.905	0.769	23.497	0.116	0.006	153.293
2000	133.038	5.04	20.839	0.036	0.074	159.027
2005	141.144	9.12	10.559	0.084	0.054	160.961
CAGR	8.9%	29.8%	13.1%	5.7%	28.3%	9.3%

Starting from 1989, the tax was applied on foreign income in practice, but their relative importance in tax revenue was still very low.

With regard to general income, its tax was ranked second in the structure of tax on individual incomes during the period 1970-2005, bringing total general income tax during this period of about LYD654.3 and an annual average of LYD18.2 million with a compound annual growth rate of 13.1% per annum. This general tax was canceled in 2004 with continued collection of revenues for previous years.

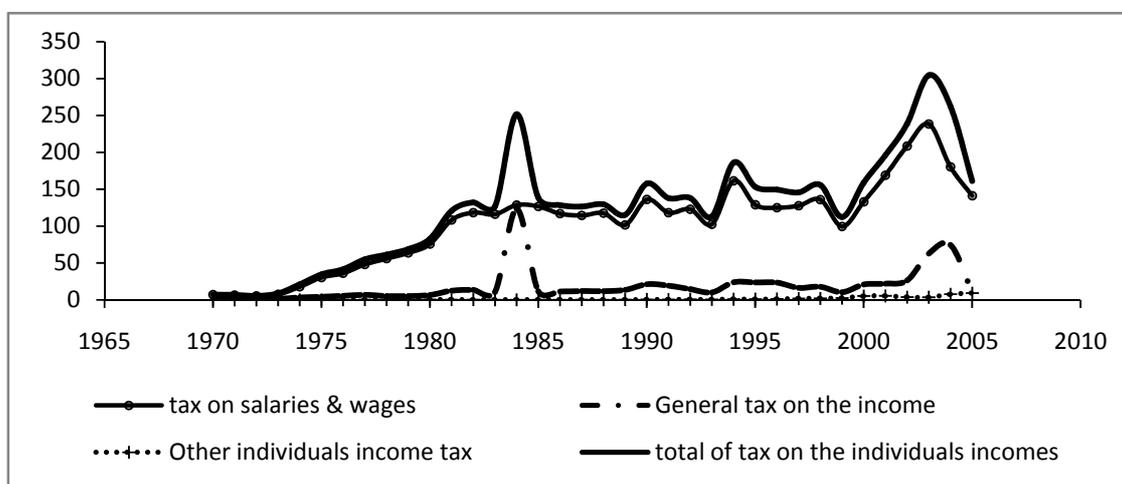
In general, during the period 1970-2005 the total tax on individual incomes reached about LYD4.4 billion, the annual average was LYD123.2 million and the compound annual growth rate was 9.3%.

*Table (5.9) Income Tax on individuals' income during the period 1970-2005  
(Million LYD)*

period	tax on salaries & wages	tax on the free professions incomes	General tax on the income	tax on the banks deposit benefits and saving accounts	tax on external incomes	total of tax on the individuals incomes
values ( Million LYD )						
1970-79	277.943	0.856	31.379	0.199	0	310.377
1980-89	1123.993	1.884	226.093	0.564	0.001	1352.535
1990-2005	2328.79	43.89	396.809	1.718	0.398	2771.605
1970-2005	3730.726	46.63	654.281	2.481	0.399	4434.517
As % of total of tax on the individuals incomes						
1970-79	90%	0%	10%	0%	0%	100%
1980-89	83%	0%	17%	0%	0%	100%
1990-2005	84%	2%	14%	0%	0%	100%
1970-2005	84%	1%	15%	0%	0%	100%
As % of the whole study period						
1970-79	7%	2%	5%	8%	0%	7%
1980-89	30%	4%	35%	23%	0%	31%
1990-2005	62%	94%	61%	69%	100%	63%
1970-2005	100%	100%	100%	100%	100%	100%

Source : Table 25, statistical appendix

Figure 5.5 Individual income tax



**5.3.1.4** Tax revenue from agricultural income & livestock: practically, a tax was imposed on agricultural income on a regular basis in 1983, with a total revenue about LYD4.32 million during the period 1983 to 2005, and an average LYD120 thousand per annum; this tax had a maximum value of LYD0.653 million in 1987. The tax on livestock entered into force starting from 1994, whereby the total income tax during this period reached in 1994-2005 about LYD0.029 million only, which meant that the tax did not constitute any importance.

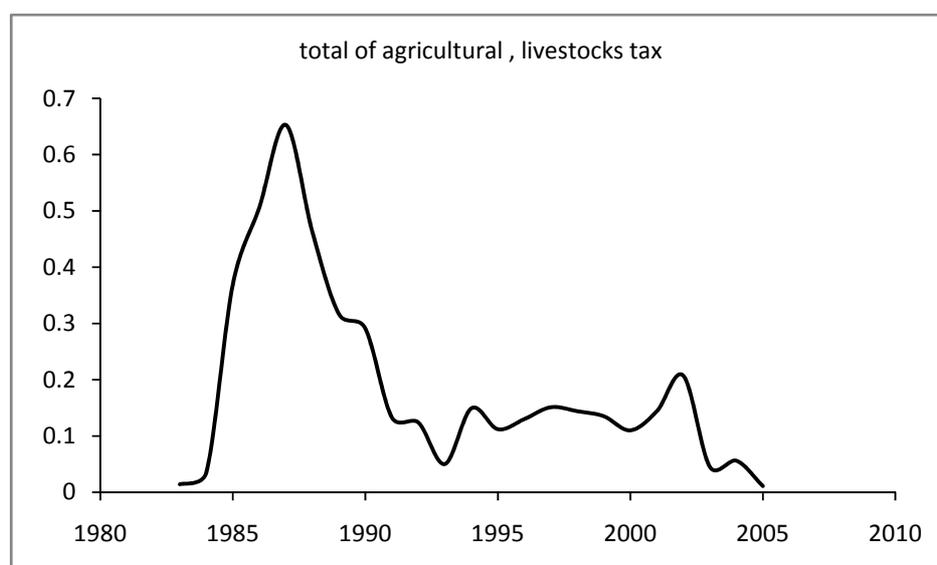
In general, the rate of annual increase (average) of the total taxes of Agriculture and Livestock reached 50% annually during the period 1983-2005. As can be seen, these two taxes (agriculture and livestock) increased from LYD14 thousand in 1983 to LYD56 thousand in 2004, and then declined to LYD11 thousand in 2005, (see Table 5.10).

*Table 5.10 Tax on the income of Agriculture & Livestock (Million LYD)*

years	tax on agricultural income	tax on the ownership of livestock	total of agricultural , livestock tax	years	tax on agricultural income	tax on the ownership of livestock	total of agricultural , livestock tax
1983	0.014	0	0.014	1996	0.129	0.001	0.13
1984	0.035	0	0.035	1997	0.148	0.003	0.151
1985	0.369	0	0.369	1998	0.143	0.001	0.144
1986	0.506	0	0.506	1999	0.134	0.001	0.135
1987	0.653	0	0.653	2000	0.109	0.001	0.11
1988	0.463	0	0.463	2001	0.144	0	0.144
1989	0.317	0	0.317	2002	0.197	0.01	0.207
1990	0.291	0	0.291	2003	0.045	0	0.045
1991	0.133	0	0.133	2004	0.056	0	0.056
1992	0.124	0	0.124	2005	0.011	0	0.011
1993	0.05	0	0.05	TOTAL	4.32	0.029	4.349
1994	0.148	0.001	0.149	Average	0.12	0.001	0.121
1995	0.101	0.011	0.112	CAGR	-1.1%	-	-1.1%

source : the Libyan tax authority , Tripoli .

*Figure 5.6 Agricultural & Livestock Tax*



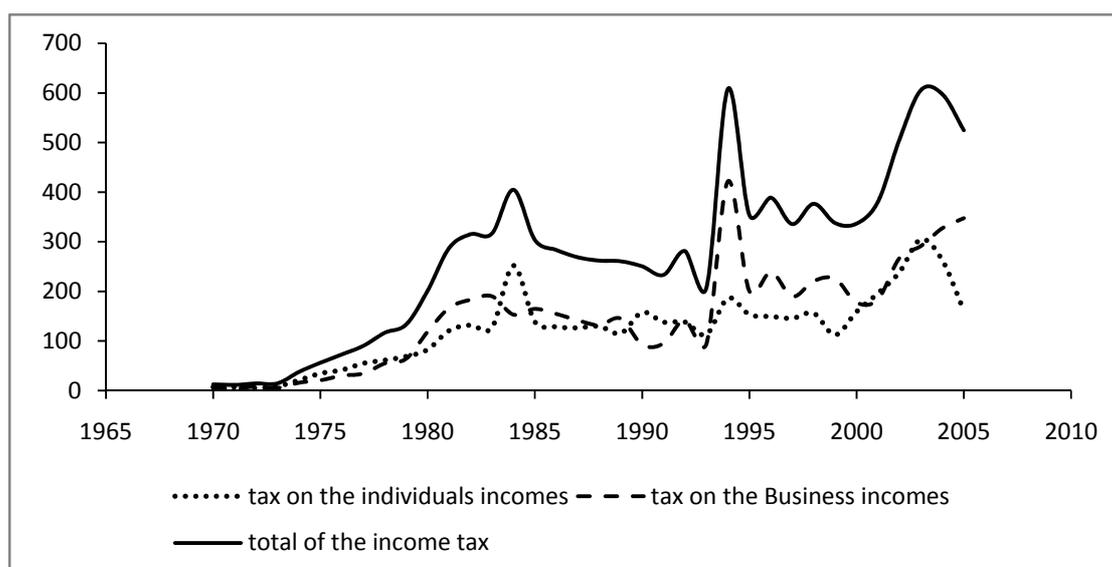
### 5.3.1.5 Total income tax revenue:

Data in Table 26 in the statistical appendix indicate that the outcome of income tax has increased from LYD12.8 million in 1970 to LYD524.9 million by the end of 2005. The total for such tax during the period 1970-2005 was about LYD9.8 billion.

*Table 5.11 Total income tax during the period 1970 - 2005 (Million LYD)*

years	tax on the real estate incomes	tax on the Business incomes	tax on the individuals incomes	tax on the agricultural incomes	tax on the livestock	other items	total of the income tax
1970	0.41	5.145	7.257	0	0	0.004	12.816
1975	0.946	20.832	34.559	0	0	0	56.337
1980	0	119.035	82.78	0	0	0	201.815
1985	0	164.751	138.581	0.369	0	0	303.701
1990	0	92.654	157.629	0.291	0	0	250.574
1995	0	200.57	153.293	0.101	0.011	0	353.975
2000	0.033	177.547	159.027	0.109	0.001	0	336.717
2005	16.243	347.687	160.961	0.011	0	0	524.902
CAGR	11.1%	12.8%	9.3%	-1.1%	-	-	11.2%

*Figure 5.7 Totals for income tax*



In an overview of the components of income tax during the period from 1970-2005 (as in Table 5.12), it is found that income tax of commerce, industry and crafts amounted to about LYD4.8 million in 1970 and increased fivefold, to reach LYD24.4 million in 2005, whereas the compound annual growth rate reached 4.8%. The tax on corporate income increased at a compound annual growth rate of 21.3% until it reached LYD323.3 million in 2005.

Total tax on business incomes doubled to reach about 68 times rose from LYD5.1 million and reached about LYD347.7 million between 1970 and 2005, respectively. During the period 1970-2005 an increase in the tax on salaries and wages of LYD7.1 million reached LYD141.1 million, as well as an increase in the tax on income of independent professions from LYD1000 to LYD9.12 million, an increase of general tax on income from LYD0.142 million to LYD10.6 million. This led to a rise in income tax on individual incomes of about 22 times, whereby the LYD7.3 million raised in 1970, reached nearly LYD161 million in 2005.

The total income tax revenue increased at a compound annual growth rate of 11.2% to reach LYD525 million in 2005.

*Table 5.12 The development of income tax during the period from 1970 to 2005*

Tax		1970 *	2005 *	No. of times	CAGR
tax on the real estate incomes		0.41	16.243	40	11.1%
tax on the Business incomes	Tax on income of trade, industry and crafts	4.771	24.407	5	4.8%
	Tax on the corporate incomes	0.373	323.28	867	21.3%
	Total tax on the Business incomes	5.145	347.687	68	12.8%
Tax on the individuals incomes	Tax on salaries & wages	7.114	141.144	20	8.9%
	Tax on the free professions incomes	0.001	9.12	9120	29.8%
	Tax on the banks deposit benefits and saving accounts	0.015 †	0.084	6	5.7%
	Tax on external incomes	0.001 ††	0.054	54	28.3%
	General tax on the income	0.142	10.559	74	13.1%
	Total of tax on the individuals incomes	7.257	160.961	22	9.3%
Agricultural , livestock tax	Tax on agricultural income	0.014 †††	0.011	-	-1.1%
	Tax on the ownership of livestock	-	0	-	-
	Total agricultural , livestock tax	-	0.011	-	-1.1%
Total of incomes tax		12.816	524.902	41	11.2%

(\*) in current Million LYD.; (†) in 1974; (††) in 1989; (†††) in 1983 .

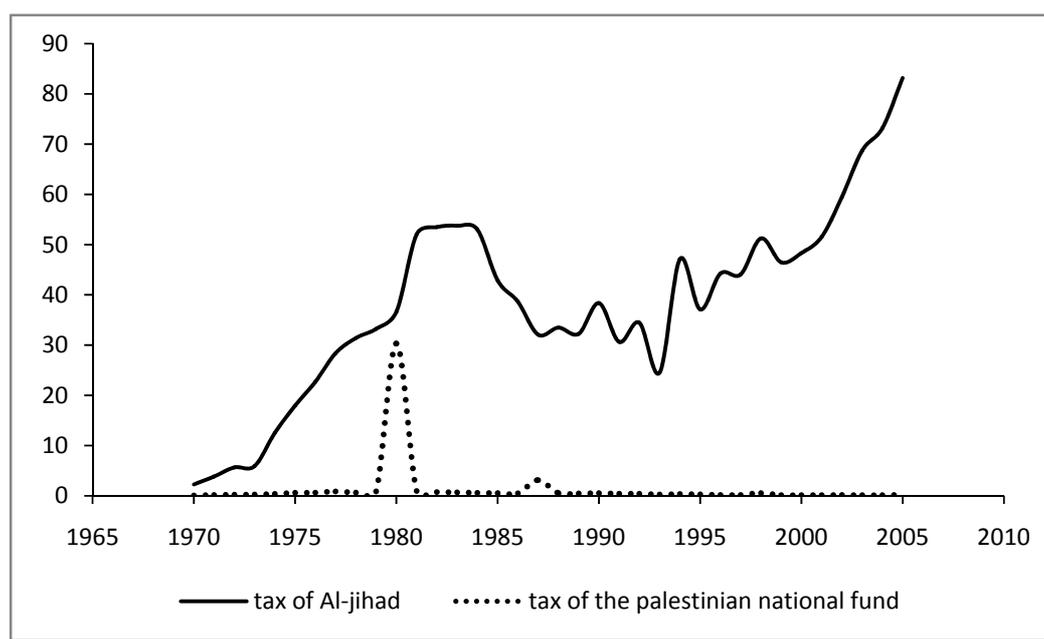
**5.3.1.6 Other direct tax revenue:** There were two main other types of direct taxation in Libya: Jihad tax and the Palestinian National Fund Tax.

**5.3.1.6. a Jihad tax revenue:** Table 27 in the statistical annex indicates that the outcome of the Jihad Tax increased from LYD2.3 million in 1970 to LYD83.2 million in 2005 (which was the highest value during the study period) and this means that they increased at a compound annual growth rate of 10.9%, and that the total income of this tax was LYD1.3746 billion during the period 1970-2005.

**5.3.1.6. b Revenue from the Palestinian national fund tax:** During the period 1970-2005, these tax revenues rose at a compound annual growth rate of

2.9%, and increased from LYD72 thousand in 1970 to LYD198 million in 2005, which was of little value compared to other taxes.

*Figure 5-8 Tax of Al-jihad & Palestinian fund*



**5.3.1.7 Tax penalties:** According to the applicable administrative division in the Taxation Authority, fiscal fines were usually included in part six (section VI). Such fines were imposed in cases of tax evasion, delay in the payment of tax and violation of tax legislation.

Through the data in Table 28 in the Statistical Appendix, it can be seen that the value of fiscal fines and forfeitures during the period 1970-2005 increased from LYD231 thousand in 1970 to LYD11.4 million in 1997

(which was the highest value during the study period) and then declined to LYD6.5 million in 2002, while the total of such fines during the period 1970-2005 was LYD126.8 million.

### **5.3.2 Revenues from indirect taxes during the period 1970-2005:**

This section includes the development tax revenue from: import tax, other customs duties and production taxes, stamp tax, entertainment tax, tax for the blind.

#### **5.3.2.1 Import tax revenue:**

Table 29 in the Statistical Annex, indicates that import taxes amounted to LYD36 million in 1970, and reached its highest value (LYD623 million) in 2003, then declined to LYD350.1 million in 2005, which means that compound annual growth rate of the import tax was 6.8% during the period 1970-2005. On the other hand, the level of import tax was as much as the customs duties, which was about 76% in 1970 and gradually increased until it reached its highest level of 94% in 1975. It then declined to 40% in 2005. The available data suggest that the contribution of import tax to total indirect taxes fell from 70% in 1970 to 29% in 2005 (see table 5.13).

*Table 5.13 Import tax 1970 - 2005 (Million LYD)*

years	( A ) import tax	( B ) customs & production tax	( C ) Indirect taxes	( A ) : ( B ) %	( A ) : ( C ) %
1970	35.5	46.634	50.5	76%	70%
1975	172.7	184.377	220.029	94%	78%
1980	291.762	419.172	509.483	70%	57%
1985	194.624	232.66	413.946	84%	47%
1990	143.61	188.915	334.577	76%	43%
1995	316.905	557.696	640.09	57%	50%
2000	299.831	465.111	598.026	64%	50%
2005	350.392	874.408	1206.952	40%	29%

Source: The Statistical Appendix, table 29.

### **5.3.2.2 Revenue** from other customs duties and production taxes:

Other customs duties included some miscellaneous duties and taxes on petroleum products as well as taxes on carbonated water, production and consumption taxes, and some supplementary tariffs collected by the Customs Department in favor of other third parties such as municipal revenue and earnings on charity as well as quayages, and some other safeguards and warrants. Table 29 in the Statistical Appendix indicates that the total customs duties and production taxes reached about LYD46.6 million in 1970, representing 92.3% of indirect taxes and totaled LYD874.4 million in 2005, accounting for 72% of indirect taxes, which means that the compound annual growth rate of taxes and customs production was 8.7% during the period 1970-2005. During the period 1994-2005 production tax revenue declined by 19%, while consumption tax rose by 15.3%. Table 5.14 shows the changes of customs taxes between 1970 and 2005.

*Table 5.14 Growth rate in customs taxes for various periods*

customs tax	period	value ( Million LYD )		overall increasing rate	CAGR
		first year	last year		
Import tax	1970-2005	35.5	350.4	887%	6.8%
Other customs& production	1970-2005	11.1	524	4606%	11.6%
Total customs & production	1970-2005	46.6	874.4	1775%	8.7%
Miscellaneous customs tax	1983-2005	2.3	7.4	222%	5.5%
Tax on oil products	1983-2004	20.2	12.5	-38%	-2.3%
Tax on carbonated water	1983-2005	0.7	0.015	-98%	-16.0%
Production tax	1994-2005	71.4	6.9	-90%	-19.1%
Consumption tax	1994-2005	40.9	195.9	379%	15.3%
Customs stamp tax	1991-2005	0.57	4.6	707%	16.1%
Customs fines & recaptures	1983-2005	3.1	4.3	39%	1.5%
Other customs tax	1991-2005	24.4	266.5	992%	18.6%
Collected tax for public	1983-2005	243.	793.3	226%	5.5%
Municipality returns	1985-2001	12.2	23.9	96%	4.3%
Charitable returns	1991-2005	17.9	42.6	138%	6.4%
Quayages(Quay returns)	1991-2005	8	0.018	-100%	-35.3%
Collected tax for other bodies	1985-2005	12.2	85.4	600%	10.2%

Source: Records of the Libyan customs authority, Tripoli. (for various years).

### **5.3.2.3 Stamp tax revenue:**

This tax was inclusive of:

- Stamp tax on official edited documents
- Stamp tax on the actions & disposes (transactions and facts)
- Sale of stamped papers & official document

With regard to stamp tax on official edited documents, this reached nearly LYD517 thousand (14% of the total stamp tax) in 1970, then increased with

a growth rate of 8.2% to LYD8 million in 2005. The stamp tax on the actions and disposals increased considerably, with a growth rate of 14.5% as it increased from LYD2.7 million (72% of the total stamp tax) to LYD312.4 million (94% of the total stamp tax) between 1970 and 2005.

In general, the total stamp tax on the actions and disposals during the period 1970-2005 was about LYD2886 million, with an average of LYD80.15 million a year, but their relative, which means that stamp tax on actions and disposals was a significant proportion of stamp tax.

With regard to the total stamp tax, it increased from LYD3.8 million in 1970 to LYD332.5 million in 2005, with a compound annual growth rate of 13.7% (see Table 30 in the statistical appendix).

**5.3.2.4 Entertainment tax revenue:** According to the Taxation Authority's classifications, entertainment tax, as well as the medicine rationalisation tax, were usually included under section III.

With regard to the outcome of the entertainment tax, it amounted to LYD96 thousand in 1970 and about LYD288 thousand in 1997, and constantly decreased until it reached LYD5 thousand in 2005, a decline at a rate of 8.1%. It is worth mentioning that the entertainment tax did not represent any relative importance in total indirect taxes during the study period due to its small absolute amounts.

With regard to medicine rationalisation charges, it was imposed as of 1984, whereafter the value of these fees increased from LYD457 thousand in 1984

to LYD5.18 million in 1986, and started to decline gradually until it reached LYD1.075 million in 1993; it continued to decline in subsequent years.

### 5.3.2.5 Revenue from tax for the blind:

Tax for the blind amounted to LYD93 thousand in 1972 and reached the greatest value (LYD144 thousand) in 1987, then declined until revenues reached one thousand dinar only in 2004. This means that the tax did not represent any relative importance in the structure of indirect taxes during the study period.

*Table 5.15 Indirect taxes during the period 1970-2005 (Million LYD)*

years	customs & production tax	stamp tax	tax of the entertainments	tax of the blind	other indirect taxes	total indirect taxes
1970	46.634	3.77	0.096	0	0	50.5
1975	184.377	35.351	0.172	0.129	0	220.029
1980	419.172	89.952	0.276	0.083	0	509.483
1985	232.66	46.618	0.285	0.046	139.381	413.946
1990	188.915	78.597	0.322	0.077	69.691	334.577
1995	557.696	82.232	0.307	0.062	0	640.09
2000	465.111	132.782	0.124	0.009	0	598.026
2005	874.408	332.539	0.005	0	0	1206.952

Source: The Statistical Appendix, table 29.

## 5.4 The relative importance of direct and indirect tax revenue during the period 1970-2005:

Data in table 31 of the statistical appendix indicate that direct tax revenues were LYD16.2 million (24% of total taxes) in 1970, and rose to LYD618.8

million (34% of the total taxes) by 2005, and that the compound annual growth rate of direct taxes was 11% during the period of 1970-2005. Therefore, the total direct tax revenues during that period were LYD11.5 billion, the highest value of direct tax revenue was LYD682.7 million in 2003, and that the rate of annual increase in these taxes ranged between 1% and 180%.

With regard to the contribution of direct taxes to the tax structure, it was 40% on average for the period 1970-2005.

On the other hand, indirect taxes reached the highest rate of annual increase (77.2%) in 1988, and the highest value of the outcome of indirect taxes was LYD1.2069 billion in 2005 from LYD50.0 million in 1970. The data also indicate that the rate of compound annual growth was 9.5% of such taxes during the period 1970-2005. This means that despite the domination of indirect taxes on the tax structure (60% of the total taxes on average), it was indirect taxes that were growing at a rate higher than the growth of direct taxes during the study period.

In general, the total tax revenues (direct and indirect) were about LYD66.7 million in 1970, to LYD1.8257 billion in 2005, at a compound annual growth rate of 9.9%, and varied in the rate of annual increase in tax revenues between 0.3% (in 1982) and 88.5% (in 1994). It is worth mentioning that the total tax revenues during the period 1970-2005 were almost LYD30 billion.

Figure 5.9 The Libyan tax structure

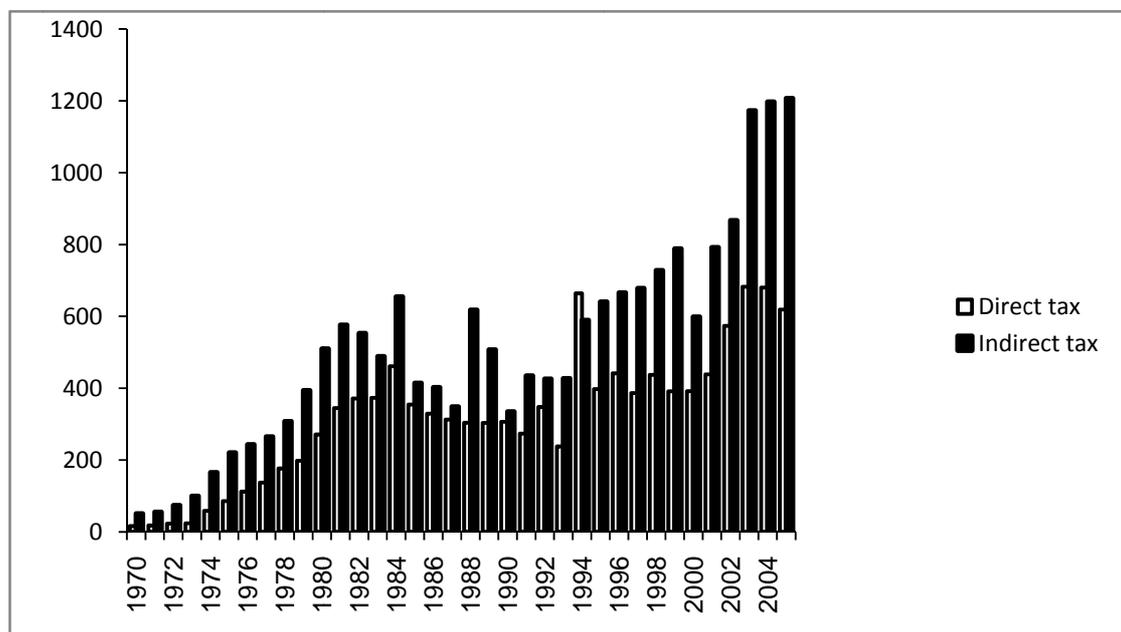
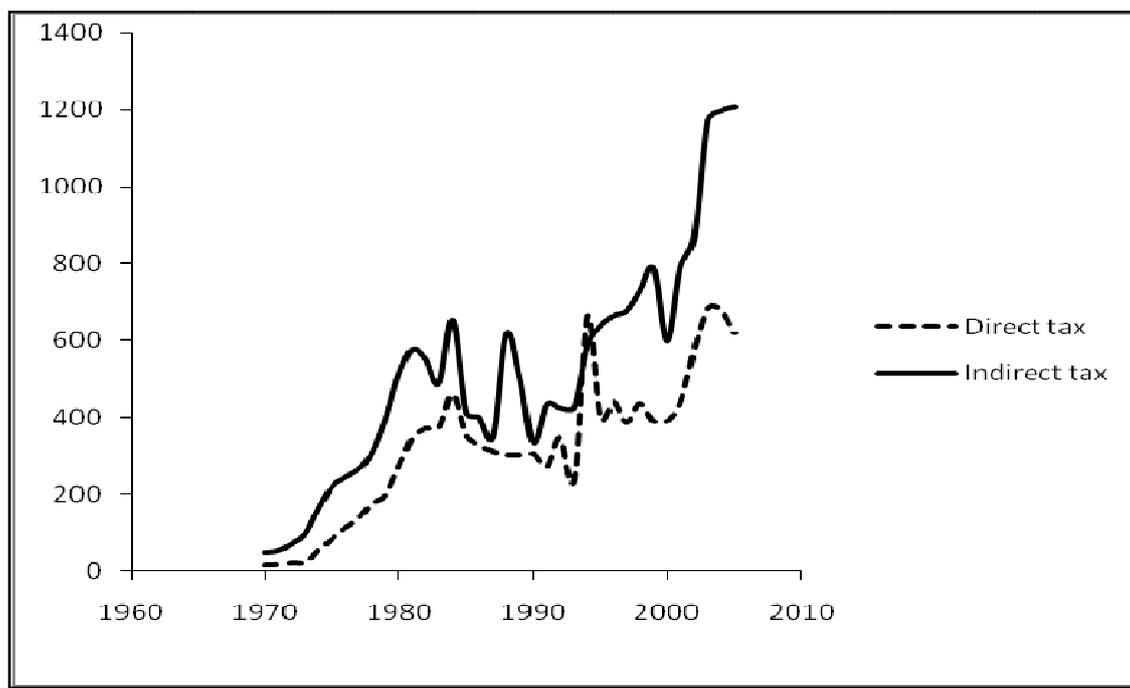


Figure 5.10 Direct and Indirect tax



### 5.5 Marginal propensity to tax in Libyan economy:

The usual method of assessing Public Finance is to assume a linear relationship between taxes and Gross National Product (GNP).

$$T = a + b Y$$

Where T = direct taxes + indirect taxes.

Y = gross national product.

$a$ ,  $b$  = constants (parameters), and coefficient ( $b$ ) is a measure of marginal propensity to tax.

The marginal propensity to tax can be defined as the increase in taxes due to increased GDP of a single monetary unit.

In order to find the marginal propensity to tax, Ordinary Least Squares (OLS) can be used to estimate the linear regression equation between the tax (dependent variable) and total GDP (independent variable), as follows:

*Where:*

$$T = \alpha_0 + \alpha_1 GDP$$

$$T_D = \beta_0 + \beta_1 GDP$$

$$T_I = \gamma_0 + \gamma_1 GDP$$

T = Total taxes at current prices (Million LYD)

$T_D = TD$  at current prices (Million LYD)

$T_I = TI$  at current prices (Million LYD)

$\alpha_0, \beta_0, \gamma_0 =$  Constants

$\alpha_1, \beta_1, \gamma_1 =$  Marginal Propensity to Tax

### **5.6 Income elasticity of tax in Libya for the period 1970-2005:**

While measuring the income elasticity of tax theoretically, the impact of tax rate is ignored if small, and years characterised by relative stability in tax rate are selected with different average income levels, assuming that income is the only variable with the constancy of other factors influencing tax outcome. However, this assumption is unrealistic in practice because there are other factors that affect the tax outcome, among those factors are:

- 1- The disappearance of many of the tax bases in Libya because of the dominance of the public sector over economic activities in the early 1980s.
- 2- Instability of tax policy because of emergency amendments from time to time, on all of the tax base and rate of tax.
- 3- Instability of economic conditions.

Moreover, the increase of income levels may not have resulted in an increase in the outcome of some types of tax during the same period. Such a case can be seen in the expansion in granted tax exemptions or the imposition of downward tax rates.

Therefore, income was not the only factor affecting tax outcome, but there were other factors. These factors may either have been the result of

temporary changes in political or social conditions, or alternatively, they may have stemmed from tax policy decisions.

Therefore, tax revenues were affected by many other factors, such as: tax rate, the nature of the tax base, sources of tax base (work or capital or both), cyclical economic changes (recovery/contraction), level of economic activity, the sensitivity of tax base towards economic changes, the prevailing tax structure, tax legislation as well as the degree of stability of fiscal policy.

In addition to all that, gross domestic product (GDP) did not accurately reflect the real tax base, as it contributed to production activities that may enjoy tax exemption (partial or total exemptions or temporary). This means that such activities that are exempted from taxes do not contribute directly in the development of tax outcome.

However, because of the difficulty in isolating the impact of such factors on the tax outcome in view of available data, it is necessary to use the indicator of income elasticity of various taxes, which relies on changes in income assuming the constancy of other factors.

Therefore, the coefficient of income elasticity of tax herein refers to the responsiveness of tax changes in national income (overall tax base). Income elasticity of tax can be measured in the national economy by dividing the percentage of change in tax outcomes by the percentage of change in national income. If the result of this process is greater than one (1), the tax can be regarded as an elastic tax which is responsive to changes in income, and this means that the tax structure is more responsive to changes in GNP, as an indication that the tax is imposed at upward rates. But if it is less than the one (1), it may be admitted that taxes are not flexible to changes in

income. In the case that it is equal to one (1), this indicates that the marginal propensity to tax  $mpt$  is equal to tax ratio.

Hereinafter the mathematical derivation of the income elasticity coefficient of taxes:

$$\begin{aligned}
 E &= (\Delta\% \text{ in Tax Revenues}) \div (\Delta\% \text{ in GNP}) \\
 &= (\Delta T/T) \div (\Delta GNP/GNP) \\
 &= (\Delta T/T) \cdot (GNP/ \Delta GNP) \\
 &= (\Delta T/ \Delta GNP) \cdot (GNP/T) \\
 &= (\Delta T/ \Delta GNP) \div (T/GNP)
 \end{aligned}$$

Where (E) represents the income elasticity coefficient of taxes

The symbol ( $\Delta$ ) represents the absolute change.

The last mathematical result shows that the income elasticity of tax (E) equals the marginal propensity to tax divided by the tax rate (tax burden) expressed as (T/GNP). To measure the coefficient of income elasticity of taxes in Libya during the study period (1970-2005), we assume the following exponential relationship ( Okech & Mburu, 2011; Hiti, Khalaf & Altai, 2008):

$$T = \alpha \text{ GDP}^\beta$$

T = Total taxes (direct and indirect):

GDP = Gross Domestic Product with the cost of income factors

$\alpha$  = Constant

$\beta$  = Income elasticity coefficient

This equation can be converted into a linear double logarithmic equation (in which the logarithm may be taken for the values of all variables on both sides), as follows:-

$$\text{Ln (T)} = \text{Ln } (\alpha) + \beta \text{ Ln (GDP)}$$

In addition, by deriving the income taxes, income elasticity of tax is equal to the coefficient ( $\beta$ )

$$E (T/GDP) = \frac{dT/T}{d(GDP)/GDP}$$

Using the formula of marginal propensity to tax which shown in section 5.5, the results of assessment of the marginal propensity to tax in Libya during the period 1970-2005 are as follows:-

Dependent Variable : T*						
	Coefficient	Std. Error	t	R <sup>2</sup>	F	D.W
Constant	259	40.5	6.4			
				48%	31.3	1.56
GDP	0.022	0.004	5.6			

Dependent Variable : TD*						
	Coefficient	Std. Error	t	R <sup>2</sup>	F	D.W
Constant	129.05	22.6	5.7			
				36%	19.2	1.62
GDP	0.008	0.002	4.4			

Dependent Variable : TI*						
	Coefficient	Std. Error	t	R <sup>2</sup>	F	D.W
Constant	167.4	25.4	6.6			
				58%	46.96	1.55
GDP	0.015	0.002	6.9			

Where GDP: Gross domestic product; T: total tax; TD: direct tax; TI: indirect tax.

( \* ) Estimates after treatment for autocorrelation.

Taking the non-oil sector output (GPa) as an independent variable, the results of the assessment of marginal propensity to tax for tax deduction in Libya during the period 1970-2005 is as follows:

Dependent Variable : T*						
	Coefficient	Std. Error	t	R <sup>2</sup>	F	D.W
Constant	180.75	41.1	4.4			
				69%	74.9	1.81
GPa	0.07	0.008	8.7			

Dependent Variable : TD*						
Constant	91.71	23.5	3.9			
				55%	41.4	1.92
GPa	0.026	0.004	6.4			

Dependent Variable : TI*						
Constant	111.25	24.2	4.6			
				76%	110.2	1.79
GPa	0.048	0.005	10.5			

Where GPa: Output of non-oil sector; T: total tax; TD: direct tax; TI: indirect tax.

( \* ) Estimates after treatment for autocorrelation.

It is clear from the estimates (output of non-oil sector as an independent variable, Gpa), that the value of the marginal propensity to tax in Libya on the level of the national economy during the study period were equal to 0.07 annually, and this means that the increase in the output of non-oil sector by one Dinar led to increase in total taxes by 0.07 unit of the Libyan Dinar (LYD ), while the value of the marginal propensity to direct taxes, indicating that the increase in non-oil sector output value of one Dinar lead to an increase of direct taxes by 0.026 per unit of the LYD and to increase indirect taxes, the value 0.048 per unit of the LYD. As such, it is clear that the marginal propensity to indirect taxes was greater than marginal propensity to direct taxes during the study period. Moreover, it is indicated in statistical tests that the designation of model is correct and auto correlated, Table 5.16 shows the results of estimates.

*Table 5.16 The marginal propensity to tax in Libya*

period	Tax	Independent variable	Constant term	Marginal propensity to tax	$t_0$	$t_1$	$R^2$	F	D.W
1970-2005	Direct tax	GDP*	129.05	0.008	5.7	4.4	36%	19.2	1.62
		Gpa*	91.71	0.026	3.9	6.4	55%	41.4	1.92
		GPb*	94.16	0.028	3.99	6.5	55%	41.99	1.87
	Indirect tax	GDP*	167.4	0.015	6.6	6.9	58%	46.96	1.55
		Gpa*	111.25	0.048	4.6	10.5	76%	110.2	1.79
		GPb*	115.3	0.052	4.7	10.5	77%	110.7	1.74
	Total tax	GDP*	259.8	0.022	6.4	5.6	48%	31.3	1.56
		Gpa*	180.75	0.07	4.4	8.7	69%	74.9	1.81
		GPb*	187.4	0.078	4.6	8.7	69%	75.7	1.76

Where ; GDP: Gross domestic product ; Gpa : non-oil sector product ; Gpb: non-oil sector product minus agricultural product;and ( $b^{\wedge}_0$ ;  $b^{\wedge}_1$ )are estimated parameters;( $t_0$ ;  $t_1$ ) calculated t test results(Gujarati,2004 );  $R^2$ : coefficient of determination ; F calculated F test results; and DW: calculated Durban Watson test result ( \* ) Estimates after treatment of the autocorrelation.

For explanation of Durbin Watson test and autocorrelation treatment, see the appendix.

Accordingly, the present study has estimated the logarithmic equation of income elasticity of tax which shown in section 5.6 , and using Ordinary Least Squares (OLS) to total taxes firstly for direct taxes and secondly for indirect taxes separately, and the results are as listed in table 5.17 below:

*Table 5.17 Coefficient of income elasticity of taxes during the period from 1970 to 2005 (absolute values)*

period	direct tax	indirect tax	total tax
1970-2005	0.28 *	0.50 *	0.47 *

( \* ) Estimates after treatment of the autocorrelation.

According to this indicator, it is noted that taxes are not elastic to changes in national income during the study period (1970-2005) as the coefficient of elasticity to direct taxes was 0.28, and 0.50 to indirect taxes, while it is 0.47 for total taxes. There is also a decrease in the coefficient of elasticity to indirect taxes (and total taxes) during the same period. Replacing the non-oil sector output (GPa) with gross domestic product (GDP) (an independent variable in the foregoing relationship), the results (listed in table 5.18) were revealed as follows:

*Table 5.18 Coefficient of income elasticity of taxes during the period 1970 - 2005 (absolute values)*

period	direct tax		indirect tax		total tax	
	A	B	A	B	A	B
1970-2005	0.49 *	0.63 *	0.62 *	0.65 *	0.62 *	0.56 *

(A) Using the following linear algorithm function :  $\ln (Ti) = f \ln (Gpa)$  .

(B) Using the following linear function :  $Ti = b^0 + b^1 Gpa$  , and the average elasticity calculated according to :  $\eta = b^1 \left( \frac{GPa'}{Ti'} \right)$  , where (I) : kind of the tax ; Gpa : non-oil product ; Gpa' : average

of non-oil product ; Ti' : average of the tax revenue . ( \* ) Estimates after treatment for autocorrelation.

From table 5.18, and in accordance with average elasticity indicator, it is possible to conclude that taxes in Libya were not flexible to changes in the output of the non-oil sector, and that the change in the output of the non-oil sector during the study period led to less change in tax. This means that the Libyan Tax System does not respond well to any increase in the output of non-oil sector significantly (there is rigidity within the tax system).

The coefficient of income elasticity of tax can be used for tax predictions in the future planning as shown in the following : The non-oil product in Libya in 2004 was LYD 19566 million grew to LYD 23101.6 million in 2005 ( see Table 1 in the statistical appendix ) . The coefficient of the income elasticity of tax in Libya during 1970-2005 was 0.56. Since

$$e = \frac{\Delta T / T}{\Delta GPa / GPa}$$

Where,

e: the coefficient of the income elasticity ; T : tax revenue ; GPa : non-oil product .

Then

$$\frac{\Delta T}{T} = e \left( \frac{\Delta GPa}{GPa} \right) = 0.56 \left( \frac{3535.6}{19566} \right) = 0.101193$$

Thus, Libyan tax revenue would go up 0.101193 or 10 percent .For example , the tax revenue in Libya was LYD 1825.724 million in 2005( see Table 31 in the statistical appendix ) , thus tax revenue would increase  $0.101193 \times 1825.724 = LYD 184.7499 \text{ million}$  .

Upon calculating the coefficient of income elasticity of each type of direct taxation, we find that such specific taxes are not flexible to changes in GDP (independent variable) during the study period, as seen from the following Table (5.19):

*Table 5.19 Coefficient of income elasticity of direct taxes in Libya during the period 1970-2005 (independent variable is GDP /absolute values<sup>1</sup>)*

TAX	Coefficient of income elasticity
Tax on real estate incomes	--
tax on income of trade,industry and crafts	0.38 *
tax on the corporate incomes	0.38 *
tax on Business incomes.	0.34 *
tax on salaries & wages	0.16 *
tax on the free professions incomes	1.95
General tax on the income	0.53 *
tax on the banks deposit benefits and saving accounts	0.05 *
tax on external incomes	0.50 *
total of tax on the individuals incomes	0.15 *
tax on the agricultural incomes and the ownership of livestock.	0.81 *
total of the income tax	0.27 *
tax of Al-jihad	0.04 *
tax of the Palestinian national fund	0.58 *

( 1 ) Using the following linear algorithm function :  $\ln ( T_i ) = f \ln ( GDP )$ ,

where  $T_i$  : revenue of the specific tax;GDP : Gross domestic product

( \* ) Estimates after treatment the autocorrelation.

Wherein measurement of the coefficient of income elasticity of direct taxes for the qualitative changes in the output of non-oil sector (GPa) has been obtained for the estimates in table 5.20.

*Table 5.20 Coefficient of income elasticity to direct taxes 1970-2005  
(independent variable is Gpa / absolute values)*

TAX	Coefficient of income elasticity	
	A	B
Tax on real estate incomes	--	0.59 *
Tax on income of trade, industry and crafts	0.74 *	0.56 *
Tax on the corporate incomes	0.51 *	0.69 *
tax on Business incomes.	0.99 *	0.68 *
tax on salaries & wages	0.23 *	0.26 *
tax on the free professions incomes	1.8	2.07 *
General tax on the income	1.2 *	0.63
tax on the banks deposit benefits and saving accounts	0.12 *	0.19 *
tax on external incomes	1.2 *	1.81
total of tax on the individuals incomes	0.38 *	0.43 *
tax on the agricultural incomes and the ownership of livestock.	1.12 *	0.55 *
total of the income tax	0.58 *	0.59 *
tax of Al-jihad	0.02 *	0.53 *
tax of the palestinian national fund	0.70 *	0.51

(A) Using the following linear algorithm function :  $\ln (Ti) = f \ln (Gpa)$  .

(B) Using the following linear function :  $Ti = b^0 + b^1 Gpa$  , and the average elasticity calculated according to :  $\eta = b^1 \left( \frac{GPa'}{Ti'} \right)$  , where (I) : kind of the tax ; Gpa : non-oil product ; Gpa' : average

of non-oil product ; Ti' : average of the tax revenue . ( \* ) Estimates after treatment of the autocorrelation .

*Table 5.21 Coefficient of income elasticity of indirect taxes 1970-2005  
(absolute value)*

Tax	( A )	( B )	( C )
Import tax	0.46 *	0.39 *	0.36 *
Other customs tax**	1.11 *	1.24 *	0.53 *
Customs & production tax	0.65 *	0.64 *	0.50 *
Stamp tax	0.36 *	1.01 *	0.65 *
Tax of the entertainments	0.66 *	0.36 *	0.59 *
Tax of the blind	1.1 *	1.27 *	0.98 *
Other indirect taxes	0.37 *	0.46 *	0.30 *
Total indirect taxes	0.62 *	0.63 *	0.50 *

( A ) Using the following linear algorithm function :  $\ln ( T_i ) = f \ln ( Gpa )$  .

( B ) Using the following linear function :  $T_i = b^0 + b^1 Gpa$  , and the average elasticity calculated according to :  $\eta = b^1 \left( \frac{GPa'}{T_i'} \right)$  .

( C ) Using the following linear algorithm function :  $\ln ( T_i ) = f \ln ( GDP )$  .

, where ( I ) : kind of the tax ; Gpa : non-oil product ; Gpa' : average of non-oil product ; T\_i' : average of the tax revenue ; GDP: Gross domestic product . ( \* ) Estimates after treatment the autocorrelation .

( \*\* ) includes : Oil products; Carbonated water; Other products; and consumption tax; Medicine consumption fees).

The tax outcome may be affected by a number of other factors, such as: change in tax rates, the amendment of tax legislation, and the nature of the prevailing economic and social system. Therefore, a dummy variable has been included in this model. This dummy variable represents changes in the Libyan economy during the study period; among such changes are: public sector domination of economic activities and a reduced role for the private sector during the period 1980-1989, as well as some modifications. On these grounds, the result shown in table 5.22 has been reached.

*Table 5.22 Coefficient of income elasticity of direct & indirect taxes during the period 1970-2005.*

Tax	$\hat{b}_0$	$\hat{b}_1$	$\hat{b}_2$	$t_0$	$t_1$	$t_2$	$R^2$	F	DW
Total tax *	0.07	0.74	0.3	0.22	10.5	2.7	77%	56.5	1.69
Direct tax *	-1.02	0.84	0.45	-1.8	7.2	2.4	62%	26.9	1.31
Indirect tax *	-0.12	0.73	0.29	-0.31	11.2	2.8	80%	64.4	1.69
Tax on income of trade, industry and crafts*	-2.7	0.81	-0.45	-3.7	5.6	-1.88	54%	19.1	2.1
Tax on the corporate incomes *	2.1	-0.26	0.51	2.85	-0.98	1.25	7%	1.36	0.93
Tax on Business incomes *	-5.9	1.3	0.77	-10.8	18.3	5.7	92%	179.5	1.55
Tax on salaries & wages *	0.58	0.29	0.03	1.76	2.3	0.18	14%	2.6	0.98
Tax on the free professions incomes	-16.1	1.8	-0.91	-11.1	10.6	-2.59	79%	60.7	2.04
General tax on the income	-8.4	1.24	0.6	-7.98	10.1	2.36	76%	53	1.46
Total of tax on the individuals incomes *	-0.24	0.58	0.26	-0.4	3.8	1.07	31%	7.3	0.98
Total of the income tax *	-2.59	1.07	0.6	-4.2	9.7	3.3	75%	49.7	1.26
Tax of Al-jihad *	1.05	-0.02	-0.03	4.2	-0.17	-0.18	0.2%	0.03	1.72
Tax of the Palestinian national fund *	1.08	-0.33	1.4	0.76	-1.5	3.5	32%	7.6	1.78
Import tax *	0.56	0.46	0.1	1.81	4.96	0.69	43%	12.3	2.08
Other customs tax *	-3.75	1.32	-0.3	-4.6	7.5	-1.07	64%	30	1.27
Customs & production tax *	-0	0.68	0.016	-0.01	7.81	0.12	65%	31	1.75
stamp tax *	0.54	0.34	-0.08	0.98	2.1	-0.31	12%	2.3	1.31
Tax of the blind *	6.3	-1.1	0.05	3.7	-5.6	0.12	49%	15.9	1.49

( 1 ) Using the following linear algorithm function :  $\ln(T_i) = \ln(\hat{b}_0) + \hat{b}_1 \ln(Gpa) + \hat{b}_2 Db$  .

Where  $T_i$  : revenue of each specific tax .;  $Gpa$  : non-oil product .;  $Db$  : dummy variable (  $Db=0$  during 1970-79 and 1990-2005 ;  $Db=1$  during 1980-89 to indicate the extent of the public sector contribution in the economic activity and some tax adjustments have occurred ) and (  $\hat{b}_0$  ;  $\hat{b}_1$  ;  $\hat{b}_2$  ) are estimated parameters; (  $t_0$  ;  $t_1$  ;  $t_2$  ) calculated t test results;  $R^2$  : coefficient of determination ; F calculated F test results; and DW: calculated Durban Watson test result.; ( \* ) Estimates after treatment of the autocorrelation .

The overall conclusion regarding calculations of the income elasticity of tax is that system in Libya were not enough flexible to changes in the tax base (see section 7.2.1 chapter seven).

## **5.7. Evaluation of Libyan Income Tax system**

Any attempt to develop and reform tax policy in Libya must start from the assessment of the tax system and measurement of certain tax indicators such as tax burden, taxable capacity and tax effort, and in light of the results of these indicators, the process of tax reform can begin. In order to clarify the problems of this system, this study must end with an assessment of the tax system assessment in Libya.

### **5.7.1. Introduction.**

The evaluation process of any tax system, or one of its basic elements, involves a determination of its degree of validity, and a judgment as to whether it is successful or not is not an easy matter. Therefore, it is a difficult task requiring knowledge, experience and a special capability. This process needs broad, profound acquaintance with an important number of branches of economic knowledge, full cognisance of the effects of tax on individuals, sectors and different economic activities. It also needs a special capability to use economic analysis instruments for analysing the microeconomic and macroeconomic effects (qualitative, quantitative) brought about by taxes on the whole of a society, because the assessment of a tax system is an official act of great significance (Crockett, 1955, p. 178). The difficulty of evaluation is because the canons used in this process – although they are important and necessary to be found in any good taxation system – are difficult to be verified in practice. Since some of them are qualitative, not quantitative, that is, some of these canons are connected to issues and aspects that are difficult to measure and identify, and for which

the laboratory is human society with its complex interaction of innumerable and often unmeasurable variables (Clark, 1998, p. xi).

Though the other canons are measurable, their application needs access to a wide database about many important variables in economics, such as income and its distribution (vertically and horizontally), consumption and its types, continuous time chains of prices and wages, and other related variables. It is generally known that developing countries, especially Libya, suffer from a lack of accurate economic information, and there is often a complete absence of information about many economic variables.

Nevertheless, in the scientific method in evaluation of tax legislation under these conditions; two matters are the most important to consider. The first is to clarify what the economic, financial, and social objectives are that the state desires to achieve using tax policy, by engaging with quantitative methods, where and whenever the necessary data are available. The second matter is to verify the accordance of national tax legislation to the rules and principles accepted in the most recent thinking on tax.

#### **5.7.1.1. Role of Tax Policy in Economics.**

Unlike the ancient and Middle Ages, the role of tax is no longer limited to financing public expenditure (neutral role of tax). Instead, it has become an effective instrument of economic, social and financial policy, which all countries in the world use. For example, tax is used as a basic instrument to reduce undesirable economic activities or to prevent them, and to direct investments to certain areas and activities. Tax is an instrument to treat the problem of unemployment and to fight inflation. It is also a means to re-distribute incomes and wealth to realise justice among a society's individuals.

Although there is a very weak tax effort in the developing countries, their systems of taxation have objectives that needed to be realised. These objectives differ in each developing country, in accordance with: the economic system applied; the development phase the economy is in; and the abundance of economic resources. Tax systems reflect a broad and competing range of goals pursued by the state. Through its system of taxation the modern state not only raises revenues and redistributes income, but also encourages or discourages secondary goals: it stimulates and channels economic growth into certain sectors, and it may penalise consumption and channel investment into economic activities it considers important to its overall economic and social objectives (Vandewalle, 1998, p. 19).

Generally, although systems of taxation have many objectives and purposes, the most important of their objectives in developing countries can be summarised as follows:

1. To provide financial resources for the treasury to expend on infrastructure projects,
2. To redistribute income to realise the principles of social justice.
3. To limit consumption and encourage savings and investments, whereby the role of taxation in the development process is through its linkage with savings (Kumar, 1994, p. 52).
4. To direct a state's foreign trade in a way that accomplishes external equilibrium. In this regard, tax policy can be an important instrument to reduce a country's foreign exchange gap through import tariffs, free

trade zones, and incentives for export diversification (Kumar, 1994, p. 53).

### **5.7.1.2 General conditions for any good tax system**

To be appropriate and reasonable, the tax system must be based on a group of canons, of which the most important are:

1. Canon of tax justice: Fairness is the equal treatment of persons in equal circumstances. If this condition is violated, people will be treated inequitably, and incentives will be created to base economic decisions on tax considerations rather than on true economic gain (Aaron & Galper, 1985, p. 20).

This means that the optimum tax system is the one that leads to distribution of financial burdens of taxes equally among the society's individuals, and eradicates differences in the distribution of incomes.

2. Canon of clarity: clear specification of tax elements in terms of their base, rate, and time of payment requires the tax legislations to be characterised by simplicity and not complexity, so that the individual can know the tax amount he/she must pay, and the method and time of payment. Where tax complexity leads to noncompliance with the tax system, this causes both confusion and a desire to evade taxes (Crane & Boaz, 2003, p. 244).
3. Preserving the efficiency of the market system (tax neutrality): under full competition, economic efficiency is realised in aspects of production, consumption and allocation of resources through a price-mechanism. Therefore, types of taxes not affecting the economic decisions of individuals and projects must be selected, rather than

objective that affect these decisions when the market system fails. A neutral tax is a tax which does not lead to a change in relative prices. Neutral taxes therefore do not distort the market and are considered to be efficient. For example, VAT is a neutral tax, because it raises the absolute level of prices rather than relative prices. On the other hand, an excise tax on a commodity raises the price of the taxed commodity, and distorts consumer choices. Therefore, an excise tax is non-neutral. Policy makers may sometimes impose non-neutral taxes to raise revenue, for equity considerations, or to achieve other goals besides efficient resource allocation (Howard, 2001, p. 160).

4. Non-conflict within objectives of the tax system: this means that accomplishing a certain objective by levying a certain tax must not affect negatively the other objectives of society. For example, use of tax exemptions and incentives to increase investments must not lead to inequitable distribution of income in society; in addition, it must not lead to a decline in tax revenues.
5. Effectiveness of the taxation system in mobilising possible economic surplus: the tax system must be able to increase and consolidate tax capacity in the national economy, and guarantee its expansion in order to involve incomes and revenues escaped from tax. The government should be able to collect enough revenue to carry out its welfare and development programmes, without significantly disturbing the efficiency of the market system (Howard, 2001, p. 159).
6. To enable the state to meet its internal and external liabilities without causing internal or external pressures. This is very important in small

open economies which suffer from cyclical instability as a result of crop failures and falling export prices (Howard, 2001, p. 161).

These are the most important principles and rules on which the design of a tax system should be based. Moreover, these canons of those which some or all of the tax structure in any country can be evaluated, and by which the quality and validity of this system can be judged. Here, it should be noted that some of these principles might not harmonise with others; indeed, they may contrast with each other. For example, to accomplish justice in the distribution of tax burden might require the imposition of several taxes, at progressive rates and complex brackets. However, this may lead to an increase in tax collection expenses and opposition to principles of neutrality and efficiency. Thus, the importance of selection of these taxes appears which accomplish the greatest possible number of objectives at the least amount of social costs.

### **5.7.2. Aims of the Libyan Tax System**

Tax legislation is founded on a philosophy that justifies its existence, the importance of its implementations and the range of needs it seeks to accomplish; the chief of which is usually to treat the social and economic problems that appear in a society.

In Libya, tax law No. 64/1973 was promulgated in accordance with a certain philosophy. This philosophy identified the importance of tax law and the range of its validity in solving some of the problems (whether economic or social) expected to appear in the Libyan society and under the economic, social and political relations prevailing in the 1970s. Among the aims declared by the constitutional proclamation promulgated in 1969 included

the implementation of socialism and its principles, including the accomplishment of justice among citizens, justice of income distribution, in addition to offering basic services to the citizens, such as health and education services, and the other social and economic objectives supposed to be reflected in the tax law promulgated in 1973.

At the time of this law's promulgation, the economic system in Libya was characterised by the existence of only two sectors, which were the private and the public. The private sector played a main role in the management of economic activity at this period (1970's); that is, the economic system was distinguished by freedom of economic activity and the sovereignty of market mechanisms at that period.

That period was also characterised by an economic boom due to the increase of public expenditure on successive economic development plans. However, this led to the appearance of some undesirable economic and social phenomena, such as the phenomenon of excessive differences in income levels.

Under the economic system prevailing at that period, the instrument of taxation was adopted to achieve many purposes, such as reform of undesirable economic and social phenomena, and financing the administrative budget by non-oil revenues.

It is possible to conclude therefore, that the limitation of inequality of income distribution and seeking to realise social justice (horizontal and vertical) among society's individuals were a basic objective of the fiscal policy objectives of the state.

### **5.7.2.1. Libyan Tax Law Structure**

Prior to the harmonisation of tax law in Libya, different items of tax legislation were applied simultaneously. In the west of Libya, a law promulgated in 1923 was applied, whereas in the east of Libya, a law promulgated in 1952 was applied. For the south of Libya, a tax law promulgated in 1953 was applied. Then, tax law No. 21 of the year 1968 was promulgated, which was considered the first unified (common) tax legislation in Libya.

In the first half of 1970s, many items of tax legislation were promulgated. The most important one of them was Law No. 64/1973 relating to tax on income. This law was one of the reform policies the government carried out to treat the inequality phenomenon in incomes. Re-distribution of incomes was the main aim of this law. Law No. 64/1973 is considered an extension of the previous tax law No. 21/1968. Some of the structural characteristics of Law No. 64/1973 are mentioned as follows:

1. Consistency of tax structure: Law No. 64/1973 did not change the tax structure that prevailed pursuant to the previous tax law No. 21/1968, where the said law has differentiated between types of economic activities and different income resources. It levied specific taxes according to type of activity or income realised. This law subjected each type of incomes to an independent tax taking into account the nature and resource of income gained. It also levied another tax, which was a general tax on income; its base consisted of a combination of different specific tax bases.
2. Articles of Law No. 64/1973 were similar to the articles of previous tax law No. 21/1968, excluding four articles (cancelled), along with

the addition of new eight articles, and the amendment of thirty-six (36) articles of the same. Tax on bank deposits was also levied, which was a new tax not included in the previous law No. 21/1968.

3. Law No. 64/1973 depended on progression in specific tax rates, excluding tax on external incomes, tax on bank deposit benefits, and tax on agricultural income.
4. For exemption of minimisation of living costs, Law No. 64/1973 included the same exemptions determined in the cancelled Law No. 21/1968. Nevertheless, the new law increased the exemption limit to LYD900 annually per married person who did not support children.

#### **5.7.2.2 Principles and Canons of the Evaluation of Taxes on Income System.**

The evaluation of taxes on income will be based on the following two canons:

a) Canon of realisation of law objectives will be based on the following two aims:

- Tax justice.
- Increase of tax yield (financing).

b) Canon of tax law; to be subject to the rules and principles of modern tax thought, the following will be discussed:

- Tax generality.
- Double taxation.
- Problem of inflation.
- Problem of incentives.

### **5.7.2.3 Tax system and accomplishment of objectives**

1- Tax justice: here, two issues should be distinguished:

- The first is tax justice itself in terms of its financial burden on taxpayers (individuals). Here, justice is to be achieved horizontally and vertically.
- The second is justice of income distribution as an aim the state seeks to achieve, using taxation as an instrument of general economic policy.

In both cases, it is thought that there was a deficiency in the Libyan tax system, even if it was difficult to prove the second issue and verify it since the necessary data and information are not available.

#### **5.7.2.3.1 Justice of Distribution of Financial Burdens.**

Justice is a relative concept that varies with a difference of time and place, and changes when economic, political and social positions alter. However, ultimately, it means distribution of tax burdens among society's individuals fairly, so that everyone's contribution to the public financial burdens can be compatible with his/her ability of payment (ability-to-pay principle of taxation); the most common notion of tax equity is the "ability to pay" which prescribes that the tax burden should vary directly with an individual's wealth or income (Mattoon & Testa, 2007).

Generally, tax justice imposes certain conditions the a tax should have, including tax generality, distribution among individuals of sacrifice due to tax, consideration of the financial ability and personal circumstances of the

taxpayer.

To attain tax justice in modern financial thinking, there are many common methods, such as:

- Distinction in tax rates according to income sources of individuals,
- Implementation of progression method in tax rates, and,
- Grant of some tax exemptions and reductions in consideration of personal and social estimations of taxpayers.

Theoretically, the Libyan tax system aimed to achieve the realisation of tax justice. Evidence for that is as follows:

- Imposition of a system of specific taxes,
- Distinction among tax rates according to income sources of individuals,
- Most tax rates being progressive rates, and,
- Grant of tax exemptions considering the minimisation of living costs.

Yet, was the objective of tax justice actually realised?

This question can be answered through reviewing two basic indicators: actual tax rates, and tax exemptions.

#### **5.7.2.3.1.1 Actual Tax Rates:**

Based on what has been previously mentioned, the order of tax rates must be progressive for the types of taxes according to tax rate and income source, as follows:

Table 5.23 Tax type according to tax rate and income sources

Type of Tax	Source of Income	Order According to Tax Rate
- Tax on real estate incomes - Tax on bank deposit	Only capital	4
- Tax on the income of trade, industry and crafts	Capital and work	3
- Tax on the free professions income	Capital and work	2
- Tax on salaries and wages	Work only	1

The table was prepared by the researcher.

In other words, tax rates on real estate incomes and tax on bank deposits should be the highest rates of specific taxes, followed by tax rates on the income of trade, industry and crafts, followed by tax rates on the free professions' incomes, and at the bottom of the list come tax on salaries and wages.

Although marginal tax rates indicate the realisation of vertical justice, horizontal justice was not achieved under this law. To underline this fact, the following notes are provided from table 5.2:

- a. Although the tax system attempted to distinguish between work income and the other incomes by imposing low marginal rates of tax on salaries and wages, these rates increased until the tax rate of salaries and wages became greater than the rest of the other tax types.
- b. Differences among the actual rates of different taxes were often slight.
- c. Beginning with the fifth bracket of income, it is seen that actual rates of tax on real estate income (its income source is only capital) were less than tax rate on the income of trade and industry and crafts and tax on the free professions income (their income source is work and capital together).
- d. According to the Tax Law No. 23 of 1996, tax rates were increased, and the number of income brackets of some specific taxes was

decreased. However, it did not amend any of taxes on work incomes like tax on wages and salaries.

Table 5.24 Actual rates of income taxes according to tax law 64/1973

*Adjusted income brackets before exemption	Tax on salaries & wages		Tax on the free professions income		Tax on the income of trade & industry and crafts		Tax on real estate incomes	
	rate %	*yield	rate %	*yield	rate %	*yield	rate %	*yield
1000	0.8	8	1.5	15	1.5	15	1.5	15
2000	4.4	88	8.5	165	8.5	165	8.5	165
3000	5.8	174	10.5	315	10.5	315	10.5	315
4000	7	279	11.6	465	11.6	465	11.6	465
5000	10.3	514.7	13.5	675.3	14.3	715.3	13.5	672.8
6000	13.4	804.9	16.3	978.3	17.3	1035.3	15.8	950.3
7000	16.1	1124.9	18.3	1281.3	19.4	1355.3	18.1	1270.3
8000	18.3	1466.2	19.8	1584.3	20.9	1675.3	19.9	1590.3
9000	21.1	1901.8	21.9	1968.5	23.2	2086.3	21.9	1973.8
10000	23.9	2391.8	23.7	2368.5	25.2	2523.8	23.7	2373.8
11000	26.4	2904.3	25.2	2768.5	26.9	2961.3	25.2	2773.8
12000	28.5	3416.8	26.4	3168.5	28.3	3398.8	26.8	3211.3
13000	30.2	3929.3	27.7	3606	29.8	3873.8	28.1	3648.8
14000	31.7	4441.8	28.9	4043.5	31.1	4348.8	29.2	4086.3
15000	33	4954.3	30.1	4510.2	32.2	4823.8	30.3	4547.3
16000	34.4	5497.9	31.7	5022.7	33.5	5352.3	32.8	5254.8
17000	35.7	6075.4	32.9	5600.2	34.7	5897.3	33.9	5767.3
18000	36.9	6649.6	34.3	6177.7	35.8	6442.3	34.9	6279.8
19000	38.1	7230.4	35.6	6755.2	36.8	6987.3	35.7	6792.3
20000	39	7807.9	36.7	7332.7	37.7	7532.3	36.5	7304.8

(\* ) in Libyan dinars .

Estimated numbers

Adjusted income values are taxable income.

The tax rates are rates of the specific tax before the adjustment, also rates of the general tax on income.

Source: Elfatori, Atia; tax system in Libya – Part one ; Academy of Graduate studies, Tripoli , 2003.

Table 5.24 Actual rates of specific income taxes according to tax laws 64/1973 and 23/1996

* Income brackets	Tax on salaries&wages		Tax on the free professions income		Tax on the income of trade&industry and crafts		Tax on real estate incomes	
	rate %	*yield	rate %	*yield	rate %	*yield	rate %	*yield
2000	4.4	88	11	220	11	220	8.5	165
4000	7	279	15.5	620	15.5	620	11.6	465
6000	9.9	594	17	1020	17	1020	12.8	765
8000	14.6	1166.2	18.8	1507	18.8	1507	15.7	1252
10000	19.5	1950.7	23.9	2865	21.5	2147	18.9	1892
12000	24.3	2916.8	23.9	2885	23.9	2885	22.3	2681.3
14000	28.2	3941.8	26.2	3685	27.1	3788.8	25.4	3556.3
16000	31	4966.8	27.9	4465	30.1	4813.8	27.7	4431.3
18000	33.3	5991.8	30.2	5430.3	32.4	5838.8	29.8	5358.8
20000	35.5	7107.9	32.9	6585.3	34.9	6975.3	31.9	6383.8

(\* ) in Libyan dinars .

Estimated numbers

Adjusted income values are taxable income.

The tax rates are rates of the specific tax according to tax laws 64/1973 and 23/1996

Source: Elfatori, Atia; tax system in Libya – Part one; Academy of Graduate studies, Tripoli , 2003.

Reviewing the figures of table 5.25 and beginning with income bracket of LYD12000, it is clearly seen that the actual tax rate on work income (24.3%) is greater than the rate other specific taxes (23.9% for free professions income; 23.9% for income of trade & industry and crafts; 22.3% for real estate incomes) indicating injustice among income sources. So a solution to this problem should be found, especially in periods of inflation, due to the following causes:

1. It is difficult to evade tax from work on income or avoid it, since it is deducted at source; that is, payment of this tax is at or before receiving income. Therefore, the taxpayer bears the complete burden of this tax.

2. As for other types of income, tax is often collected by taxpayers' returns, which means the following:
  - Possibility of tax evasion or avoidance,
  - Taxpayer does not pay tax except after receiving their income, whereby taxpayers pay their tax in the year following receipt of their income, and,
  - Possibility of negotiation with tax authority to pay tax by instalments convenient to taxpayer.

In brief, it can be said that the most important conclusion in this stage is that although, theoretically, the tax system targeted the realisation of horizontal justice, this objective was not accomplished in practice.

#### **5.7.2.3.1.2 Tax Exemptions:**

As for tax exemptions for living costs, the tax system includes the following:

1. Deduction of exemption limits from the first bracket of income results in an indirect increase in the actual tax rate,
2. The objective of exemption is not achieved completely because tax exemption limits are subjected to additional taxes such as tax on jihad, general tax on income and contribution (sharing) in companies ... etc., in other words, though exemption limits are tax income exempt, they are not exempt from other additional taxes.
3. In the case of a multiplicity of income sources, there is complexity in the calculation of the tax exemption amount, as the exemption is

deducted from the lowest tax rate. This procedure is complex due to the difficulty of determining the lowest tax rate under a progressive tax system.

4. Tax exemption did not accurately distinguish among social dependency support-levels (such as number of children, support of minors, support of parents, etc), which are important aspects in the Libyan society.
5. The exemption limits have been constant or quasi-constant since 1962, and they have not been linked to inflation rates, and therefore they have not changed according to the economic and social development.

#### **5.7.2.3.2 Tax System and the Objective of Income Re-distribution:**

Taxation can enable government to stabilise the economy and adjust income distribution (Howard, 2001, p. 166). Furthermore, the state was not able to find an instrument to amend income distribution other than tax policy for the following reasons:

First: The dominant situation of income distribution indicates clear, remarkable difference in levels of incomes. This breaks the principle of social justice.

Second: this difference in levels of incomes was the result of free interaction of demand and supply powers in goods and services markets and markets of production elements.

During the 1970s, business economics was dominant. The private sector dominated economic activity. There was a worry that the upturn and then boom in the Libyan economy was passing because the public expenditure

programmes on successive development plans were expected to bring about a vast difference in distribution of incomes among society's individuals. A justification of this worry was that the expenditure on development was tremendous and the economy was growing rapidly. Therefore, the state could not affect that economy except by taxes.

In the beginning of the 1980s and implementation of an economic system based on socialism (Kamoche et al., 2003), the economic conditions and social system changed. Roles carried out by both public and private sectors were exchanged. The role of the private sector receded, and it had no longer a dominant part in driving economic activity. The public sector totally dominated most economic activities, having the principal role in bringing about production and generating income. . The public sector has always been the main source of investment in Libya (Abidar & Laytimi, 2005). Thus, the economy depended on planning and orientation.

Accordingly, the economic position in Libya indicated a set of important facts to be considered with regard to using the tax system as an instrument to redistribute income. Some facts important to note are as follows:

1. No studies about distribution of national income are available that base their distribution of income on an evaluation of how tax can be amended to orientate it to achieve the state's objectives.
2. As long as the public sector has dominated the greatest part of the national income, it is responsible for distribution of this income according to the requirements of economic and social development, and investment policies.

3. Through expenditure programmes, the state alone can directly orientate the income and distribute it in the way realising the principle of social justice. This is due to the practice of the private sector of economic activities (services or goods) by the administrative budget or the transfer budget.
4. At the end of the 1980s, although the private sector was encouraged to resume its main role in economic activity (some laws were promulgated in that concern), the public sector still in practice dominated economic life, and the state still depended on the method of direct interference in economic affairs. Since the socialist government took over, private sector investments decreased from about 30% in 1970 to 10 % in 1990 , and State investments increased from about 70% to 90% by 1990 (Abidar & Laytimi, 2005).

Therefore, it can be said that there was no justification for using tax policy as an instrument to redistribute income under these conditions: the greatest part of economic activity and income were continuously dominated by the public sector. The income redistribution achieved in the Libyan economy did not result from this tax system. In fact it resulted from a policy of socialist implementation started from the end of the 1970s and the beginning of the 1980s, whereby income and wealth were redistributed by the direct interference of the state represented in nationalisation and the conveyance of ownership to the public sector, for example.

#### **5.7.2.3.3 Tax System and Financing Objective (Financial):**

Although tax policy is an important and necessary ingredient for development finance (Kumar, 1994, p. 53), the objectives of tax systems in

developing countries are different from developed countries, which apply a market mechanism in their economic administration. The objectives of tax systems in developed countries is to accomplish short-term economic goals such as limitation to trade cycles, achievement of economic stability and elimination of unemployment, whereas the objective of a tax system in developing countries is to accomplish long-term objectives, such as development and economic growth.

In addition to that, objectives of systems of taxation differ among developing countries according to economic systems and situations, and the financial resources available in each country. In general, the objective of a tax system in most developing countries is to realise as many financial outcomes as possible, because of the scarcity of capital and the shortage of financial resources in most developing countries (especially non-oil producing ones).

The financing (financial) objective of the systems of taxation in the oil states was not important, especially in the 1970s, because these countries had huge financial surpluses due to high oil prices at that period, so their systems of taxation focused on economic and social objectives. However, these countries, including Libya, witnessed a sharp deterioration in their oil revenue during the 1980s, so they resorted to taxes to solve some of their financial problems and the financing (financial) objective became important in their systems of taxation.

Regarding the role of the tax system in achieving tax revenues in Libya, the following points can be noted:

1. In general, taxes on income represent a relative importance in terms of the yield (revenues) in the tax system in Libya. Despite the fluctuation of such percentage (up and down) from year to year during the period of

study, the percentage increased from 19% of the total tax revenues in 1973 to 53% in 1994, and then declined to 34% in 2005 (see table 24). It should also be noted that most taxes on income were the tax on incomes of individuals and tax on income of companies (see table 21).

2. The base of tax on income became narrower and declined in Libya for the following reasons:

a) The role of the private sector in economic activity was reduced (declined) and some tax bases disappeared, because of the application of the socialist system in the 1980s. The activities practiced by the private sector were the main base for the application of taxation. Therefore, in the absence of the private sector, tax becomes merely a deduction of public funds and to transfer (convey) to other public funds.

Table 21 assures the validity of this observation. Specific tax on the income of trade, industry and crafts, tax on real estate, tax on agriculture, tax on bank deposits, and tax on external incomes contributed small amounts compared to the revenues of taxes on income, due to the disappearance of their bases. It is also thought that the most important two taxes were tax on wages and salaries, and tax on companies. Here, it should be noted that the source of wages and salaries was the public sector. As for corporate tax, it could be argued that there were no private companies during the 1980s, and then their presence grew though remained very limited in the 1990s.

b) The phenomenon of tax evasion in Libya spread for several reasons, such as lack of awareness of taxation, lack of conviction to pay a tax,

failure to regulate economic activity, lack of efficiency of tax administration, multiple types of taxes and their high rates.

c) Non-generality of tax: many economic activities are not subject to tax, such as commercial transactions in the informal markets, as well as economic activities of the workers and foreign businesspersons.

3. All types of taxes in Libya are progressive in terms of their bases; their yield depends on the rate and on the base. In the case of taxes with fixed tax rates, the increase in their yield is due to the growth of their tax base.
4. Because there is an inverse relationship between a tax rate and its yield, there is overestimation (excess) in increasing tax rates in Libya, which negatively affects tax yield, especially under the implementation of the progressive tax system.
5. The nature of the tax system, the diversity of its taxes, its multiple and progressive tax rates all lead to many difficulties in application. Therefore, greater simplicity of tax systems in terms of selecting the appropriate type and the appropriate rate would lead to an increase in tax productivity.

#### **5.7.2.4 Extent that the Tax system is Subject to General Principles and Rules of Tax Imposition.**

##### **5.7.2.4.1 Tax Generality.**

Theoretically, tax generality means its imposition on all individuals, wealth, and incomes realised in society, without exception. The justification of this principle is that for the state to be able to carry out its commitments and offer its services to all individuals of society, it uses taxation as an instrument to distribute the financial burdens of these commitments among all individuals equitably.

Accordingly, tax as per this principle should be general, to which all individuals, income sources and wealth are to be subjected. That is, tax should not be imposed on certain people or classes, with other people and classes being exempt. Similarly, it should not be imposed on certain types of income, while excluding others, since this breaks the principle of tax generality.

In practice, the principle of tax generality is not an absolute one in modern systems of taxation. Nevertheless, there are some tax exemptions for some individuals and classes, or some income sources, for economic, social and human reasons or regulatory ones (such as prevention of double taxation). In theory, the Libyan tax system considers the principle of tax generality as other countries do. However, the evidence is that taxes are diverse and numerous in the Libyan tax structure, and this has allowed some exceptions provided there has been the promulgation of a legal provision.

In practice a clear breach of the principle of tax generality is found where many economic activities are not subject to taxation, though they realise high revenues, examples of that are as follows:

- a) Most commercial activities practiced by citizens are unorganised and difficult to subject to taxation (to be taxable) for many reasons: these projects are hidden, and conducted without licenses, or these projects do not keep registers or accounting books.
- b) Commercial activities practiced by non-Libyan individuals from Arab countries. These activities evade taxes in two stages:
  1. Tax on imports is not paid, because the goods this class trades in do not pay tax on entering the state.

2. Tax on commercial profits realised in Libya is not paid.

- c) Brokering activities, speculation in real estate and second-hand goods are not subject to tax, although these activities are not recognised. Nevertheless, they are widely practiced in practice, realising incomes for their respective owners. They are not taxable.
- d) Informal foreign workers entering Libya illegally, even though they earn high incomes, are not subject to tax.

All this suggest a conclusion that there is a deficiency in the Libyan tax system in terms of the principle of tax generality. The class most subject to tax is the class of employees in the public sector, where tax is deducted at source of income, while there are other sources of income not subject to tax.

#### **5.7.2.4.2 Double Taxation:**

Double taxation means imposition of the same tax more than once on the same taxpayer, and on the same tax base during the same period.

Conditions of double taxation can be explained from the previous definition as follows:

- a) Taxes levied are of the same type or at least similar,
- b) Repeated taxes are imposed on the same tax base (money),
- c) Repeated taxes are imposed on the same taxpayer, and
- d) Taxes are imposed within the same period.

In this sense, double taxation is an undesirable phenomenon because it leads to deterioration of the financial capacity of the taxpayer, because of recurring (double) payment of tax. This is a breach of the principles of tax

justice, so double taxation must be avoided in order to achieve equality of tax sacrifice among taxpayers. The Libyan tax system suffers from the problem of double taxation.

#### **5.7.2.4.3 Tax System and Inflation Problem.**

Most countries do not adjust their tax systems for inflation, or do so only partially. When inflation reaches significant levels, however, its effects on the tax system cannot be ignored. The best remedy is to bring inflation under control; when this is not possible, it is often desirable to adjust the tax system to inflation in some manner (Thuronyi, 1996, p .1).

Therefore, the tax systems in general and progressive income taxes in particular need to be periodically reviewed, in order to cope with inflation rates. Inflation affects the financial situations of the taxpayer through two elements of tax: the tax rate and tax base.

Briefly, the most important problems resulting from inflation are explained through their effect on tax rate and tax base:

##### **5.7.2.4.3.1 Tax Rates.**

If a system of progressive taxation is applied in times of inflation, the rise in prices is found to lead to rise in nominal (monetary) income of the taxpayer. In addition, if a system of progressive taxation is applied, this leads to a high tax rate imposed on the taxpayer (although their real income did not rise) and because the tax rate rises with the rise in nominal income, every time a tax law contains an amount expressed in national currency, the value of this amount is eroded by inflation (Thuronyi, 1996, p. 2). If the tax system deals with the actual value of the tax base (real income), the effects of inflation are controlled.

#### **5.7.2.4.3.2 Tax Base.**

Inflation has its effects on the tax base or so-called taxable income through a variety of aspects, such as: the limits of tax exemption, the impact on amortization instalments, real assets, and the impact on debt. That is briefly explained as follows:

##### **a. Effect on Limits of Tax Exemption:**

In the tax system, when the tax exemptions are of a fixed amount or with fixed maximum limits, such exemptions are effectively meaningless in terms of both economic and social aspects in the case of inflation, because the rise in prices leads to a rise in costs of living.

Therefore, the limits of tax exemption must be linked to the prevailing costs of living, and it is necessary to modify the limits of tax exemptions in times of inflation to suit the economic and social situations. Moreover, such amendments cannot be carried out only if the tax system is characterised by sufficient flexibility.

##### **b. Effect on Amortization Instalments:**

This effect is found clearly in the case of income tax, especially in the tax on company income. Inflation results in a rise of amortization instalments (market prices), which negatively affects the exemption of amortization instalments.

### **c. Effect on Real Assets :**

An increase in prices leads to an increase in the nominal value of the fixed real assets. In this case, there will be capital gains, nominal and not real. Moreover, as long as the taxable capacity should be measured in real value, not in a monetary one, so taxes should not be imposed on these profits, because the inflation tax causes a reduction in real money balances and penalises fixed income groups (Howard, 2001, p.126).

### **d. Effect on Indebtedness:**

A rise in prices leads to a decline of the real value of debts, and this means achieving real profits for the debtor and real losses for the creditor.

-The above-mentioned problems have not been taken into account by the tax system in Libya, so it is necessary to focus on them when conducting any programme of tax reform.

#### **5.7.2.2.4 Tax System and Tax Incentives.**

Tax is one of the most important instruments many countries use (especially capitalist countries) to increase the rate of economic growth. Tax may lead to a slow-down of economic growth if it is levied at very high rates. On the other hand, it may lead to increases in economic growth by encouraging saving, investment and production. Briefly, this can be explained as follows:

##### **a) Investment Incentives**

Income tax plays an important role in determining the supply of liquid money required by economic projects of various sizes. For example, the net income of companies will be reduced if the corporate tax burden is high, and

this leads to weakness in the ability of these companies to invest. Therefore, most countries seek to mitigate the negative effects of income taxes on economic growth, by providing some tax incentives that encourages investment.

Of the most important types of tax incentives are credit deduction of tax for investment, the ability to carry losses forward and back, tax exemptions for a certain period (tax holiday), the tax treatment of small industries, and the tax treatment of depreciation allowances, as well as others.

Regarding Libya, although economic growth has always been one of the main objectives of the state for its successive development plans, the tax system is totally devoid of any kind of exemptions that encourage investment, except for carrying losses forward.

As long as there is a call for encouraging the private sector in the economic aspect, the best way is tax incentives. This is a strong justification to amend the system of tax on income, and provide some incentives to both encourage the Libyan investor, and attract foreign investors.

#### **b) Saving Incentives:**

Taxation constitutes an involuntary saving by taxpayers, which is diverted to the government for use in resource allocation (Howard, 1992, p.109).

For that reason, tax can be used to encourage saving through exempting individual with savings earnings in the form of interest from taxes (or reducing tax rates on them), in addition to the encouragement of establishing private savings organisations and exemption of their interest from taxes.

By reviewing the tax legislations applied in Libya, it can be concluded that tax policy has targeted the encouragement of saving, since it levies a fixed tax rate on the savings of individuals in banks.

### **c) Production Incentives**

The tax system in Libya does not include actual incentives for work and production since it is a progressive tax, which does not encourage an increase of work hours. Thus, this tax has led to a downsizing of additional income earned.

Based on what mentioned above, it can be said that although tax incentives in any tax system allow it to have flexibility, making tax an effective instrument to direct economic activity towards desirable goals, the Libyan tax law No. 64 of 1973 often lacks incentives to encourage saving, investment and production.

#### **5.7.3 Conclusion.**

The tax system in Libya was subjected to the law of tax on income No. 64/1973 for a long time (1973 – 2005), over a period in which many economic and social changes occurred; it is therefore a suitable period to evaluate this law through practical application. The following point can be explained based on what was previously mentioned:

1. The tax law did not realise the objectives for which it was promulgated. It has been shown that it is unjust in equalising its financial burdens, through which equitable distribution of income cannot be achieved. Moreover, it did not bring about a remarkable increase in tax yield.
2. The tax law does not agree with the basic principles of tax imposition in that it lacks neutrality and efficiency.

3. This law has some drawbacks and problems, such as the problem of non-generality, double taxation, problem of inflation and lack of tax incentives.

---

The success of any tax system depends on the possibility of its application. The tax system can only be applied if it is convenient and appropriate for the economy.

To adhere to the principle of convenience of the tax system, a group of important factors should be taken into account when designing and determining the structure of the tax system. The success of any state in choosing the appropriate tax system depends on it having full knowledge of the following aspects: the ideology of society, the reality of the prevailing economic system, its institutions and laws, the nature of economic relations, the method of managing the economy, the economic, social and political situation in the society, the stage of development in the country and the degree of its growth, in addition to the objectives of the tax system.

In addition, the choice of a good tax system requires a deep understanding of scientific foundations and technical methods of tax system design, and conscious knowledge of the practical possibilities available, which reflects the quality and efficiency of the legislative power, the judicial power, taxpayer, and tax administration.

Despite the similarity of economic objectives among developed countries and developing countries, such as the objective of the satisfaction of public needs, achievement of development and stability, equitable distribution, this does not mean that there is a similarity of the tax systems among these countries, since there are differences in ideologies, regimes, economic and

social systems, economic structures and situations, culture, customs and traditions, levels of awareness and education, and levels of economic progress.

In order to design the optimal tax system for a society, such a system must reflect the economic, political and social prevailing conditions in this society.

Most of the tax laws constituting the current structure of the Libyan tax system were promulgated in the early 1970s, and the establishment of the Libyan tax system was completed by the promulgation of two of the most important tax laws, namely the Income Tax Law No. 64 of 1973, and the Stamp Tax Law No. 65 of 1973.

Some major justifications for the tax system at that time were as follows:

1. The Libyan economy was based on a business economics system, which allows the private sector to engage in various economic activities.
2. Wealth was accumulated and there was a great disparity in incomes among segments of society, due to rises in oil prices and an increase in the volume of public expenditure.
3. There was a desire to adopt socialism.

Tax Law No. 64/1973 was prevalent for a long time (more than three decades), during which the Libyan society witnessed many fundamental changes in economic, social, political and administrative structure.

Therefore, all the financial legislation that makes up the tax structure of the state must be reviewed and evaluated in order to recognise the convenience of such legislations for developments that have taken place in society.

#### **5.7.4 Resources of Financing the Public Budget.**

Resources of financing the public budget in the Libyan economy are formed as follows:

##### **5.7.4.1 Revenues of Natural Resources Owned by Society.**

In accordance with current legislation, the society has two types of natural resources:

- a. Renewable resources, such as: agriculture, marine resources, and real estate leased.
- b. Exhaustible (depletable) resources: such as oil, iron, and cement.

##### **5.7.4.2 Return on Capital Invested in Society.**

In the 1980s, the state intervened in all branches of economic activity. The state had the sole right to practice economic activity (with some exceptions). The state nationalised the economic activity of the private sector, and directly invested in all areas of production and service (in addition to its traditional tasks).

Since the public sector now carried out the roles performed previously by the private sector, it had a key role in the production process. So the public sector became the main financier of the public budget. State intervention in this way replaced the two basic elements in the production process (capital, organisation). The state was the owner of the capital employed, and at the same time, the state acted as an organiser in the production process.

Therefore, the public sector was chiefly responsible for financing the public budget, so this sector had to provide three types of resources:

It can be said that public sector projects were supposed to provide the public treasury with important resources, which were the following:

1. Return (share) on capital in the production process,
2. Profit (return on organisation), only if the principle of profit-realisation in these institutions (or not to sell at cost) were applied, and
3. Income tax, if imposed on this sector.

Therefore, the Libyan society relied heavily on the public sector in providing the funds necessary to finance public expenditures, because the private sector role was reduced in the size and scope of its economic activity, and its taxable capacity became insufficient to finance the increased expenditures of the state.

#### **5.7.4.3 Tax Revenues.**

Under the new reforms (after 1988), the private sector was allowed to play a greater role in economic activity, and taxes (direct or indirect) and fees became a significant source of financing the public budget. However, when taxes are used to achieve the financial (financing) targets, the terms and rules of the good tax system must be taken into account.

#### **5.7.5 Economic Policy**

When tracing the developments in the economic environment in Libya over the past years, no economic policy, declared with clearly defined objectives and means, is found: This is due to the ambiguity of many important issues and matters concerning the Libyan economy. They are, for example, the

nature of the economic system in force over the study period (or intended to be applied), the extent and limits of the state's role in economic activity, prevailing legislation, the basic features of economic activities allowed to be practiced, the movement of production elements, and other important aspects, which contribute towards the whole form structure of the system. Since these issues are important in determining the economic policy and its methods, they must be clearly disclosed and declared without hesitation. The ambiguity and hesitation on these issues had serious negative impacts on the economic situation, and its economic cost was high.

The economic reform that emerged after 1988 was accepted, which gave a greater and more distinct role to the private sector in investment and production, this meant the need to reduce the activity of the state and reduce its monopoly over the means of production. However, the exodus of the state from economic activity quickly and suddenly without an orderly arrangement had a serious and negative impact on many economic aspects of the lives of Libyan citizens. It was wrong for the state, which had been everything in the economy, suddenly to give up everything. Therefore, in the medium term, the state should remain responsible for achieving a set of main, public objectives in the economic aspect, including:

1. To ensure the optimal use of economic resources,
2. To ensure equity in income distribution,
3. To create an appropriate economic environment, which encourages individuals and private institutions, especially in production and investment,

4. To achieve balanced, sustainable economic development to ensure the individual an advanced level of economic welfare, and
5. To fill the economic gap that appears because of the failure of the private sector to perform certain basic services to satisfy the public needs.

For the economic role of the state, the change was in how to access general economic objectives, and in the means to manage the economy in order to achieve these goals. It was intended that such objectives be achieved through oversight rather than direct ownership of the means of production and production units, and the monopoly of some important economic activities such as trade, banks, and following the method of direct intervention in the exercise of economic policy. Libya showed all characteristics of a centrally guided, distributive economy. The government's intervention in the economy was extensive, both in a direct and an indirect way. The state dominated all manufacturing, agriculture, foreign and domestic retail trade, and owned all banking, insurance, and other major services (Layachi, 1998).

It may be a necessity of the next phase that the state uses a method of indicative planning in setting up its economic policy. This method relies on the traditional instruments of economic policy and its impact on market indicators to direct economic activity. Therefore, the economic policy during the coming period should target achieving the following objectives:

1. To encourage individual initiative and support of various private sector institutions in the field of productive investment, supporting the rates of growth and development,
2. To broaden the base of private property,

3. To rationalise costs and increase operational efficiency in productive units,
4. To protect domestic industries in a manner ensuring their development, and then enabling them to compete,
5. To help the rule of competition in domestic markets and price stability,
6. To mobilise national savings, and
7. To rationalise public expenditure and improve the methods of collection of the state's revenues.

The success of the new economic reforms in achieving the above objectives requires that the state adopts economic policies (fiscal, monetary, commercial) that are based on business economics and market indicators, along with the need to integrate these policies in directing the economic activities.

Concerning the application of fiscal policy, its instruments (public expenditure and taxation) must be used in directing economic activities.

#### **5.7.5.1 Openness of Libyan Economy.**

The Libyan economy is characterised by a high degree of openness to the outside world, and this is illustrated by the data contained in tables 1 and 45. The percentage of total foreign trade to GDP varied between 41% - 87% during the period 1970-2005, while the percentage of imports to GDP ranged between 15% - 36 during the same period. These rates are very high when compared with those in many developing countries. It should be noted that the degree of openness of the Libyan economy to the outside world is

primarily concentrated on the flow of commodity foreign trade and not on the side of the flow of capitals. Some characteristics of Libyan foreign trade are as follows:

- 1) Crude oil forms a high proportion of total Libyan exports,
- 2) A large proportion of Libyan imports are either food or raw materials (production requirements), or equipment and machinery required by development plans and their various programmes. A large proportion of these goods and requirements enjoy customs exemptions.
- 3) Other materials or industrial goods were subject to customs duties ranging between 32% - 38% during the 1980s and early 1990s.
- 4) Most Libyan trade is with Western Europe, South Asia, and most of these countries are members of the world trade organization (WTO). Commercial exchange with them may require reduction of restrictions and customs duties according to the rules and procedures of the WTO.

#### **5.7.5.2 Structure of the Tax System.**

The Libyan tax structure depends on a system of manifold taxes. It comprises several types of tax imposed in different locations of the flow of monetary income. There are taxes levied upon receipt of income and others levied on expenditure of this income. The Libyan tax system is based on both direct and indirect taxes. The direct taxes consist of taxes on income and taxes on capital. Income taxes are divided into taxes on income of natural persons and taxes on company income.

Taxes on income of natural persons include several specific taxes and general tax on income, in addition to additional taxes such as Jihad tax, tax of the Palestinian national fund, stamp tax, support for national companies

tax, and central bank tax. For the taxes on capital, they include the tax on vacant (unused) lands, and tax on properties of real estate.

The Income Tax Law No. 64/1973 is considered the most important tax law at all. It represents the main pillar on which the structure of the Libyan tax system is based.

This law was promulgated based on the principle of distinction or differentiation among different sources of income. Therefore, the structure of income taxes has focused on the imposition of specific taxes according to a source of income, in addition to imposing another tax (general tax) on gross income realised by an individual from different sources of income (after deduction of specific taxes).

The tax law had allocated provisions relating to each type of specific tax quality. It took into account the source of income, whether this source was from capital, work or both elements together (work and capital). For example, it reduced the tax rate on incomes from sources of work (wages and salaries and the like), while it raised the tax rate on incomes from sources of capital (real estate and the interests of banks). Since the person who receives income from work is often a low-income worker, it is difficult to evade tax, or transfer its burden to others. Moreover, such a worker is exposed to risks that may outweigh such risks of an investor of capital. For the tax rates according to law 64/1973, the following can be noted:

- a) Based on the principle of tax personality, the tax system imposed progressive tax rates in most specific income taxes, and in the general income tax.

- b) The tax system attempted to distinguish between sources of income in its tax treatment, especially when determining nominal (marginal) tax rates on specific incomes.
- c) Tax exemptions allowed (cost of living and personal insurance premiums) were withheld (deducted) from the first bracket of income, then imposed on the amount of income remained after the exemption.

With regard to indirect taxes, they were divided into:

- 1) Taxes on goods, including customs duties, taxes on production and consumption, entertainment tax,
- 2) Taxes on trading represented in the stamp tax.

For taxes on commodities, they were subject to a method of price differentiation according to the nature of the item, and its importance to the consumer. Customs tariff distinguished between essential goods and luxury goods, whereby essential commodities were tax exempt, while luxury goods were subject to progressive tax rates.

#### **5.7.5.2.1 Tax System and Economic System.**

The prevailing economic system in any country is one of the most important factors affecting the tax system in that country. Under a market system (capitalism), countries take the philosophy of free enterprise in economic terms. They believe in freedom of work, freedom of production, freedom of ownership, freedom of choice and the free interaction of demand and supply in the market for final products, and services market of production elements, in order to resolve economic problem. Here, the private sector practices most economic activities, with varying degrees of competition, price mechanisms,

and consumer sovereignty. The state neither holds resources nor practices an activity to bring returns.

Under this tax system, taxes occupy a prominent place as an instrument of economic policy. In order for the state to perform its functions and achieve the objectives of society, it should design a tax system that enables it to do so. Its tax structure must contain taxes that provide sufficient revenues, achieve the principle of justice, stimulate production and growth, maintain a level of decent living for members of society, and maintain the productive capacity of its economy.

In socialist countries, the state owns most elements of production, and adopts the method of comprehensive planning to practice economic activities efficiently, and achieve the objectives of society. Here, the state owns and manages public projects, so it identifies by itself what to produce, how to produce, and for whom to produce. The state also pursues a policy of income distribution through direct intervention, in order to determine wages and the prices of goods and services produced in the public sector. By setting a public price, the state can change the volume of the surplus of the public sector to finance its public expenditures.

Theoretically, in the light of this economic system there may be no need to use taxes either to finance public expenditure, or to direct the economy or to redistribute income. This is because most people's incomes become one of the types of public expenditure, while the costs of individuals are a source of public revenues. In this case, the state can achieve its objectives without the use of tax.

From this simple comparison between the forms of economic systems and their impact on the role of tax, some observations can be made about the role of taxation in the Libyan economic system.

The Libyan socialist economic system has been in force since the 1980s. The state imposed the implementation of socialism, whereby it took control of all elements of production in society (except for human effort). In addition, it abolished all forms of private property (with some minor exceptions such as the ownership of private housing and means of transportation). The state practiced all areas of productive activity without exception, leaving no significant role to the individual organiser of economic activity. Moreover, it closed down all private enterprises, allowing for individual projects that relied on human effort, while the vast majority of individuals worked in a public capacity in the public sector. As a result, the state adopted the method of direct intervention to solve its economic problem. The government took certain steps and performed functions such as the task of creating production and its distribution through the public project, adopting a policy of incomes to determine the salaries and wages in the public sector in accordance with Law No. 15 of 1981. It also determined the prices of goods and services provided by the public sector, with the obligation to provide all basic services free of charge, determined by the size of individual savings. This situation continued until 1988.

This application resulted in a set of situations, which were reflected in the tax system, and the most important of them were:

- a) Disappearance of all bases of specific taxes except work income (wages and salaries), with multiple sources of income not allowed
- b) Income from work realised through the public sector, and determined according to a public policy of income
- c) Restriction and limitation of individual property so as not to become a source of individual income

- d) The most important source of financing the budget, in light of the economic system, was supposed to be the operating surplus of the public sector
- e) Lack of opportunities for accumulation of wealth by individuals, so there was no disparity (difference) in income among individuals, and
- f) The state's reliance on the method of direct intervention in the management of the economy, intervening directly in order to direct economic activity and income distribution.

This change in the economic system was supposed to lead to changes in the tax system in line with the new economic application. Despite the disappearance of most sources of individual income such as real estate, commercial, industrial, professional activity and the disappearance of individual savings (like bases of specific taxes); the state did not adjust the tax system.

The state continued to introduce general income tax (at their progressive rates). It was a personal income tax, imposed if there were multiple sources of individual income, also imposed to achieve vertical justice in the distribution of income. However, this tax (in this case) was not appropriate to the economic situation because multiple sources of income were not allowed. Therefore, there was no justification for the imposition of this tax. Personal income tax revenues constituted a large proportion of the total income for income taxes, and this was due to a narrowing of the base of income tax for several reasons, including:

1. Disappearance of bases of other specific income taxes,
2. Decline in company income tax revenues because of:

- a. Large tax exemptions granted to firms (especially foreign companies),
  - b. Low profits in most public sector companies, and
3. Spread of tax evasion among taxpayers, and lack of willingness to pay tax.

After 1988, there was a gradual transition towards market economics; the country took several measures in order to allow the private sector to practice economic activity, but those actions were not sufficient. This meant that the state's policy in this regard was not clear.

Therefore, if the state wanted to restructure its economy and give a significant role for individuals to practice the economic activity, the state had to provide the appropriate atmosphere for achieving these objectives.

This required the state to take a series of practical steps such as:

1. Clear disclosure of the new (target) economic reforms and confirmed compliance with them through promulgation of clear, non-conflicting legislation,
2. Putting this legislation into actual application and taking the actions required for its success. Such a move enhances the credibility of the state.
3. The state's obligation to be transparent in its methods when practicing economic policy.

In terms of the requirements for the next phase of economic development, it may be that the state has to abandon the method of direct intervention in its management of the economy, and use economic policy tools that suit the nature of the economic system targeted.

If these new economic reforms were to be successful, and if the prevailing tax system were re-considered, tax (in any of its forms) would have a crucial and effective role (as an instrument of fiscal policy), in achieving the objectives of the economic system.

#### **5.7.5.2.2 Tax system and economic situation.**

In any country, the tax structure reflects the true picture of its economic structure. The tax structure (quantitatively and qualitatively) is associated with the size, structure, and method of distribution of national income. Increases in the size of income, a high diversity of its sources and the high degree of disparity (difference) in income levels lead to the following, increase of importance of direct taxes imposed on the incomes, and multiple types of taxes and increase of importance of progressive tax rates in the tax structure. If the incomes are low and close, the tax imposed will be less progressive, and it may be a flat rate.

Through the study of economic characteristics and the structure of national income in the Libyan economy, the inadequacy of the prevailing tax structure can be seen, for several reasons, including:

1. Under the current conditions of the Libyan economy, there is a weakness in the role of income tax. This is demonstrated by the current structure of factors of domestic income; the most two important bases of income tax are found to be remunerations of employees (wages and salaries) and operating surpluses. These two bases are incomes from the public sector.

Therefore, income tax in the Libyan economy cannot be relied upon either for financing or for redistributing income. All individual incomes result from

work. These incomes are from the public sector and identified by the state.

Consequently, its base is very narrow and growth is weak.

With regard to the operating surplus, most of this surplus is the result of the public sector; its growth depends on revenues.

By calculating the ratio of total tax revenue to the remunerations of employees (for the representation of tax burden of individual income), it is found that this ratio averaged about 28% during the 1980s (see table 8, statistical appendix). This means that despite the state, having assumed responsibility for setting and paying individual incomes according to law No. 15 of 1981, deducted 28% of these incomes.

2. The proportion of Libyan imports from the other countries of the world is high; it was found that a large proportion of imports were either foodstuff, raw materials (production requirements), or equipment and machinery. Most of these goods and supplies enjoy customs exemptions.

#### **5.7.5.2.3 Tax system and financing objective.**

Like other oil-producing countries, Libya witnessed a significant decline in oil revenues during the 1980s due to the sharp decline in crude oil prices during that period. As a result, it began to focus on the role of tax to cover public expenditure.

The financing objective of tax has become one of the most important objectives of the tax system. Some practical steps were taken, which confirm the financing objective of tax. Some of these steps were as follows:

1. The promulgation of a tax law on real estate in 1986,
2. Amendment of the stamp tax law and increase of its rates,

3. Amendment of the Income Tax Law No. 64/1973, and the abolition of Article 103 (it was the only article of incentives in the tax on the company income),
4. Increase in the rates of tax on the income of trade, industry and crafts, and amendment of its brackets.

Despite the decline of the rate of contribution of tax revenues to cover current public expenditure (administrative), the proportion fluctuated between 55% -70% during the 1980s, and then decreased to 26% in 1996. However, if the nature of the economic system and economic situations are taken into account, will there be a reduction in income tax? If the income tax revenues are already low, will the reason be a shortage of the number of taxes levied or decline in tax rates? These questions can be answered by comparing actual tax revenues and potential tax revenues.

Although there is a difference between the actual tax revenues and the potential tax revenues, the number of taxes imposed and tax rate are not the two main reasons for the reduction in the actual tax revenues, rather there are other reasons, the most important of which to be mentioned are as follows:

1. Small size of income tax base,
2. Low rate of growth of individual incomes,
3. Excessive increases in tax rates, and
4. Manifold taxes and the complexity of the tax system.

### **5.7.6 Problems and difficulties the tax system faces.**

The tax system includes: tax legislation (laws) and tax administration (tax authority). Tax problems resulting from tax legislation and tax problems resulting from tax administration will be addressed.

#### **First: Problems of Tax Policy (Tax Legislation).**

The Libyan tax system suffers from the problem of double taxation, as follows:

- a. Income realised from the practice of any economic activity in Libya is subject to two main taxes: specific tax, and general tax on income, in addition to other taxes such as: Jihad tax; Palestine tax; tax for support the national companies; the central bank tax; and stamp tax. All these taxes are similar and imposed on the same income, and this is proof that the tax system suffers from the problem of double taxation.
- b. Income of partners and shareholders in companies is subject to two taxes: corporate tax on income and general tax on income.
- c. Despite the imposition of income taxes, an additional tax was imposed in favour of the Jihad Fund under Law No. 18 of the year 1971. The tax was imposed on entry and exit visas, and on driving licenses of motor vehicles.
- d. Despite the imposition of customs duties, additional taxes were imposed, which were production and consumption tax, and tax of the man-made river project, which were imposed on commercial transactions.

- e. Foreign exchange tax (dollar tax): imposed on the difference between the official price and the commercial price of foreign exchange, which has become a source of financing the budget.

**Second: difficulties and problems of tax administration.**

Tax administration plays a key and important role in determining the real, effective tax system. That is, it is the tool which transfers the tax system under its legal framework to its practical framework. In other words, tax administration can turn the provisions of tax legislation into a real, effective tax system.

No objectives of any tax reform can be achieved without making change in tax administration. This means that change and reform of tax administration is essential to ensure the effectiveness of changes in tax policy.

Here, it should be noted that the canon of tax collection alone is not enough to evaluate a tax administration. In other words, collecting as many tax revenues as possible does not mean that the tax administration is a successful one. In fact, many issues must be taken into account such as how to obtain these revenues, and tax justice and level of economic welfare. For example, there may be a tax administration that is a failure, but it can collect high yield of taxes, because of its focus on the taxpayers who fall into easily taxable sectors, such as those who earn wages and salaries, even though this administration is unable to apply tax efficiently to companies, large enterprises and owners of private professions.

Accordingly, the volume of tax revenue is not evidence of the effectiveness of a tax administration. Even so, the exact criterion is the extent of application of tax law correctly. In other words, the exact criterion would be the size of the gap between the actual tax revenue and potential tax revenue,

if the tax law were applied to all tax bases correctly. Whenever the tax administration can narrow this gap, or fully close it, it is evidence of its efficiency.

To try to achieve this objective, however, the tax administration faces many problems and difficulties, some of which are mentioned as follows:

- Problems arising from the provisions of tax legislation.
- Problems arising from the surrounding environment.
- Problems arising from the same tax system (tax administration).

Some of these problems and difficulties faced by the Libyan tax authority will briefly be mentioned:

#### **5.7.6.1 Problems of legislative provisions.**

This kind of problem can be explained through the following points:

##### **1- Manifold Taxes:**

The Libyan tax system includes (especially income taxes) a set of specific taxes, which are subject to several tax laws to regulate issues relating to the collection of such taxes. Income is subject to several taxes, such as numerous specific taxes and general tax on income, and other additional taxes such as Jihad tax, Palestine tax, defence tax, stamp tax, support of national company tax and the central bank tax. Therefore, manifold taxes are a major source of the problems the tax administration faces on carrying out its functions, such as the difficulty it faces determining certain tax bases, difficulty of tax assessment and tax collection, and issues of tax complaint and other problems.

## 2 - Complexity of the Tax System:

The use of progressive tax rates (such as some specific taxes on income, as well as general income tax) has increased the complexity of the tax system, which means a waste of time, effort and the tax administration due to the difficulty of doing its tasks well.

## 3 - Ambiguity and Contradiction:

There is some ambiguity and contradiction (sometimes failure) in some provisions of tax laws in force, which leads to a confusion of tax administration work. This problem is evidenced by the large number of explanatory generalisations issued by the commissioner of the (central) tax authority to the tax officials in tax sub-circuits. As a clear example of this problem, the following is stated:

- a) Contradiction between paragraphs of Article 36 governing the tax exemption compared to the minimum cost of living: the first paragraph refers to levying a tax on income in excess of the limits of the exemption, while another paragraph refers to the deduction of limits of exemption from the first bracket of income.
- b) In the case of multiple sources of income, there are difficulties arising from the application of Article No. 36, insofar as this article refers to the deduction of the amount of exemptions from the tax base with the lowest rate. Nevertheless, in practice there is a real difficulty in determining tax with the lowest rate under the progressive tax rates.
- c) In accordance with Article 36 of the tax law, there is ambiguity in determining the exemption of personal insurance premiums. This ambiguity could be clarified in the following points:

- In cases of a multiplicity of the income of taxpayers, the tax law is found to be not specific as to the type of income from which the amount of the exemption must be deducted.
- Is the amount of this exemption (relating to be personal insurance premiums) deducted from the net income before exemptions, or after other exemptions (such as exemptions relating to costs of living)?
- There are practical difficulties in applying this exemption to taxpayers of the tax on salaries and wages.

4- Tax legislation have a lack and shortage of and many procedures and technical regulations that help the application of the tax system such as registration systems, follow-up, review and clear explanations.

#### **5.7.6.2 Problems resulting from the application environment.**

A good surrounding environment is one of the most important constituents that helps in the application of the tax system, regardless of the degree of complexity of this system.

In any country, the environment surrounding the tax system consists of a group of important elements such as the economic system, economic conditions, the phase of economic progress, the availability of information, laws governing economic activities, awareness of taxation, and political will; and other issues that affect the application of the tax system.

The following points can illustrate this kind of tax problem:

1. The applied economic system made many changes in the legal forms of business enterprises, whereby new forms have emerged such as: participatory, productive families, in addition to the ambiguity of the

system of joint stock companies and obliging enterprises to apply the dictum of partners, not wage-earners. Some results of these changes include an increase in the degree of complexity of the tax system, the difficulty of choosing the appropriate tax, the difficulty of determining the tax base and tax collection method.

2. There is a very large sector of the Libyan economy working outside the scope of the law. This sector is sometimes called the informal economy (informal sector, or black economy), which includes the activities of popular markets in most cities, street vendors and informal foreign employment.
3. The constant change in the administrative structure of the state, and transition to the administrative decentralisation has led to a failure in regulation and follow-up of economic activities. Therefore, projects without permits have appeared, and some projects have been awarded certificates for stoppage of production, even though they continue to engage in activity (evading tax).
4. The tax authority lacks the effective cooperation of relevant authorities such as municipal guard, police, bodies of the ministry of economy and customs.
5. Effective laws to regulate economic activities are not promulgated. Laws promulgated are not enforceable; this leads to the chaos within activities, and the avoidance and evasion of payment of tax.

The existence of this legislation ensures the documentation of economic activities and makes them subject to laws, which helps the tax authority to collect taxes on those activities, and follow-up. The commercial law, for

example, indicates that all economic activity with capital of more than LYD1000 should follow the method of regular accounting books and records on which the tax authority can depend when determining the tax base and tax assessment.

6. Although the efficient administration of taxation requires information about different income sources, such as agriculture, industry and services sector in addition to data on some economic indicators such as national income and prices, the tax authority (tax administration) suffers from a lack of data and information on many economic activities.
7. Most members of Libyan society have a lack of tax awareness and a feeling of the futility of taxes due to the shortage of basic services (infrastructure) provided by the state, such as education and health (housing for the low-income) and some public utilities. Where the livelihood of most Libyans became much more dependent on direct state support, through rationed subsidized goods (Niblock, 2001).
8. Means of communications between the tax authority (tax administration) and financiers are insufficient due to the inefficiency of the postal system and its unreliability as a means to contact taxpayers, in addition to the underdevelopment and low quality of the telecommunications network.

### **5.7.6.3 The problems resulting from the tax administration.**

These problems can be summarised as follows:

1. The human element: the tax authority suffers from a weakness in human resources in terms of number and level of efficiency.
2. Material capabilities: the tax authority suffers from a severe shortage of material capabilities such as buildings, furniture, means of transport and means of communications.
3. Serious IT deficiencies in the work of the tax authority.
4. Financial incentives for the employees of the tax authority are weak.

### **5.7.7 Conclusion.**

Through the review of the structure of the economic system given above, together with consideration of the prevailing tax system and the problems it faces, some of the important findings of this chapter can be summed up as follows:

1. The tax system does not correspond to the existing economic system.
2. The provisions of tax law are not consistent with the objectives of the tax system.
3. The tax system suffers from some ambiguity, contradiction, and complexity.
4. A priority must be given to tax reform in the programmes of economic policy. Since there are ample justifications for tax reform, such as the need to achieve convenience within the tax system, and thereby the economic system in order to cope with prevailing economic situations. It is also necessary to achieve social justice in the distribution of the

financial burdens of the state, and to address certain chronic problems such as inflation. All of these issues are basic demands and essential justifications for the process of tax reform in Libya.

### **5.7.8 Tax Reform.**

The tax system suffers from several distortions that can be observed through the following historical outline, which describes the most prominent features of this system, its defects, as well as giving suggestions for the most important reforms that are required.

During the 1970s, the Libyan tax system had the following characteristics:

1. Decline of the ratio of tax deduction to gross domestic product (tax burden).
2. Domination of indirect taxes- especially customs duties- on the tax structure.
3. A clear reduction of the proportion of direct taxes, especially taxes on income, and
4. Main reliance on private and specific taxes in relation to income taxes and taxes on expenditure.

For economic reform and restructuring of the Libyan economy after the 1990s, it was necessary for the tax system to achieve two main tasks:

- The first was to collect as much revenue as possible for the treasury in order to reduce the budget deficit.
- The second was to stimulate the private sector to invest.

In this context, the authorities concerned took a number of actions. In 1996, substantial amendments were made on each of the tax rates and the income brackets of some certain types of taxes, such as tax on the income of trade,

industry and crafts, and tax on free professions income, as well as increases in tax exemptions for the general tax on income.

These amendments can be summarised as follows:

- 1) Tax on income of trade, industry and crafts;
  - a. Reducing income brackets from four to two;
  - b. Expansion (increase) of the tax base of the first income bracket from LYD4000 to LYD12000 annually, and;
  - c. Increasing tax rate from 22.5% to 27.5% (average).
- 2) Tax on the income of free professions:
  - a. Reducing income brackets from five to two,
  - b. Expanding the tax base of the first income bracket from LYD4000 to LYD16000 annually, and
  - c. Increasing tax rate from 25% to 27.5% (average).
- 3) Increasing the tax rate for both tax on bank deposits and tax on external incomes from 15% to 20%.
- 4) Increasing tax exemptions for general tax on income from LYD4000 to LYD6000 annually.

In 2004, substantial changes were made to most types of income taxes, as follows:

- 1) Tax on the income of trade, industry and crafts:
  - a. Distinguishing between sources of income for this tax (commercial profits and industrial profits),
  - b. Increasing the number of brackets of taxable income from two to four, and

- c. Imposition of progressive tax rates ranging between 20% - 35% on income from commercial activities, and 15% - 30% on income from industrial activities.
- 2) Tax on corporate income:
    - a. Reducing tax rate from 40% to 27% (average), and
    - b. A significant and remarkable expansion of the tax base for each income bracket.
  - 3) Tax on wages and salaries:
    - a. Reducing the number of brackets of taxable income from six to three brackets only,
    - b. Increasing the tax base for each income bracket, and
    - c. Reduction in the average tax rate from 21.5% to 11.5%, while the range of a tax rate was reduced from 8% - 35% to 8% - 15%.
  - 4) Tax on the income of free professions:
    - a. Increasing the number of income brackets from two to four,
    - b. Reducing the taxable base for each income bracket compared with amendments made in 1996, and
    - c. Tax rate range changes from between 15% - 30% to 20% - 35%.
  - 5) The imposition of a new income tax, which is a tax on partnership income; its rates range between 10% - 20%.
  - 6) An important and significant reduction in the rate of tax on bank deposits from 20% to 5%.
  - 7) The abolition of general income tax in order to avoid double taxation.
  - 8) Increasing the limits of tax exemptions by almost more than twice, taking into account all the possible marital statuses of individuals.

With regard to indirect taxes, the production and consumption tax was imposed in 1992. Many different amendments were conducted on the rate and base of the stamp tax in 1998 and 2004, in addition to some amendments to customs rates in 1981, granting some conditional customs exemptions in 1989, and finally the abolition of import tax in 2005, which was replaced with port services tax at a 4% flat rate.

Because of these amendments, tax revenues increased between 1997 and 2005, but most of that increase came from indirect taxes, which increased by 78%, while direct taxes increased by 60%.

It should be noted that the main characteristics of the tax system in the nineties (1990 - 1999) remained almost as it was in the seventies (1970-1979). The tax revenues represented 9% of gross domestic product, having been 7% in the earlier period. In addition, the share of indirect taxes was reduced as a proportion of total tax revenues from 69% to 60%. Moreover, the share of direct taxes rose from 31% to 40%. This means that the characteristics of the Libyan tax system are similar to the properties of tax systems in developing countries with low incomes.

On the other hand, it is noted that the actions taken in the fiscal area in the period of 1973 - 2004 were not able to achieve the objectives set for it. The budget deficit continued to rise. Income tax cuts did not have a significant impact on promoting investment in the productive sectors. The abolition of general income tax and tax cuts for the upper brackets of salaries and wages led to a reasonable increase in the real income of the owners, but this increase in income started to decline due to inflation.

Table 5.26 Changes in Libyan Income Tax Rate (range and average)

Tax		Act No.21 for 1968	Act No.64 for 1973	Act No.23 for 1996	Act No.11 for 2004	Act No.7 for 2010
Tax on real estate income		15%	15%-25% ( 20% )			
Tax on agricultural income		5%	5%		5%	
Tax on Commerce , industry and crafts	Commercial profits				20%-35% ( 27.5% )	15%
	Industrial profits				15%-30% ( 22.5% )	10%
	Total	13%	15%-30% ( 22.5% )	20%-35% ( 27.5% )	15%-35% ( 25% )	10%-15% ( 12.5% )
Tax on independent ( free ) professions income		10%	15%-35% ( 25% )	20%-35% ( 27.5% )	15%-30% ( 22.5% )	15%
Tax on wages and salaries		8%	8%-35% ( 21.5% )		8%-15% ( 11.5% )	5%-10% ( 7.5% )
Tax on corporate income		15%-25% ( 20% )	20%-60% ( 40% )		15%-40% ( 27% )	20%
Tax on partnership income					10%-20% (15% )	10%
Tax on banks deposits			15%	20%	5%	5%
Tax on external incomes			15%	20%	20%	
General income tax		0%-15 ( 7.5% )	0%-90% ( 45% )	0%-90% ( 45% )	0%	

Rates between brackets are averages.

Table 5.27 Changes in Exemptions from Libyan Income Tax ( annual Libyan dinar )

Marital status	Act No.21 for 1968	Act No.64 for 1973	Act No.11 for 2004	Act No.7 for 2010
For single person	480	480	1200	1800
For married person with no dependant children	720	720	1800	2400
For married person having dependant children	720	900		
For Married person, widowed or divorced, having dependant children			2400	2400 + 300 for each child

Table 5.28 Evolution of tax revenue in Libya during the period 1970-2005 (Values at current prices)

Period	Tax revenue (LYD million)			The rate of increase			Tax structure		GDP	TT/GDP
	TD	TI	TT	TD	TI	TT	TD	TI		
1970-1979	847.752	1871.337	2719.089	--	--	--	31%	69%	37760	7%
1980-1989	3423.59	5068.964	8492.554	304%	171%	212%	40%	60%	78419.5	11%
1990-1999	3882.483	5709.225	9591.708	13%	13%	13%	40%	60%	106092	9%
2000-2005	3385.154	5832.977	9218.131	-13%	2%	-4%	37%	63%	223483.8	4%

Derived from table 24, statistical appendix .

TD: direct tax; TI: indirect tax; TT: total tax; GDP: Gross domestic product.

In short, the tax system did not play the role required to push the process of economic growth and economic development, either in financial, economic, or social terms. Tax policy adopted (used) in recent years has remained a mere instrument of fiscal policy, which has attempted to reduce the budget deficit (unsuccessfully), without taking into account the economic and social damage of this policy. This has led to the ineffectiveness of tax policy at the economic level and its inequity at the social level.

#### **5.7.8.1 Economic Effectiveness of Tax System.**

In theory, one of the main justifications for reducing corporate income tax, tax on individual incomes and the abolition of import tax was to encourage domestic and foreign private investment, and advance the process of economic growth. Nevertheless, this was not achieved in practice.

Economic growth rates in Libya, in recent years, still remain low, yet tax policy has succeeded in increasing the distortions in resource allocation. It has created more obstacles to economic growth, especially to employment. This is because the abolition of import tax has led to excessive imports of consumer goods and lack of protection for domestic products, and a

significant decrease in domestic production, which has led to a significant increase in the rate of unemployment.

#### **5.7.8.2 Reform Required for the Tax System.**

The creation of a kind of balance in the tax system is simply required so that it can once again act to achieve the state's financial objective (realisation of revenues for the public budget), as well as aiming to achieve its economic and social objectives as well. In other words, the amendments required in terms of tax policy are very similar to the properties of tax systems in the group of developing countries with high income.

Finally, in order to alleviate the problem of the public budget deficit, the tax base could be expanded and additional sources of tax should be searched for, through the expansion of the privatisation programme and the transfer of ownership of many economic projects (non-strategic) to the private sector, under certain conditions. In its recent but slow process of economic reform, Libya had proceeded to privatize some public companies and allowed the creation of private banks (Abidar & Laytimi, 2005).

The general framework to make the Libyan tax system more equitable requires a restructure of tax revenues, so that the percentage of direct taxes increases in the tax structure, alongside the development of tax administration on the human level and on the level of equipment and collection techniques.

#### **5.7.8.3 Areas of tax reform.**

There are many issues related to tax reform, which need review in order to develop proposals for tax reform, and the most important of these issues are the following:

### **5.7.8.3.1 Expansion of tax base.**

The tax base should be expanded through two methods: the first one is to create tax bases, such as an environmental tax, and to impose taxes on certain activities of the informal economy. The second method is to increase the efficiency of the tax system by imposing a tax on tax bases, which were not subject to tax in the past.

This study has shown that expanding the tax base while reducing the tax rate is the best method to increase tax revenues (Boskin & McLure, 1990).

Tax base reform can be made through the following:

- 1) Shift from the narrow field of tax on foreign trade to taxes on consumption, spending and trading.
- 2) Value-added tax is an effective tax, as it leads to an increase in tax revenues, reduces the waste of economic resources, and raises the efficiency of tax administration.
- 3) Exemption of basic commodities consumed by the poor and low-income people from paying value-added tax and imposition of consumption tax on certain luxury items, or goods harmful to public health.
- 4) Reduction of tax exemptions granted to some productive sectors, because this policy leads to lower tax revenues.

### **5.7.8.3.2 Adjustment of tax rate.**

The phase of tax rate adjustment comes after the expansion of the tax base. It is well known that a high tax rate leads to tax evasion and tax avoidance, and this leads to lower tax revenues. Therefore, tax rate adjustment means the reduction of differences between tax rates in the tax structure at specific rates (World Bank, 1991).

Tax rate reform can be made by reducing the marginal rate of income tax, and limiting the inequality between all tax rates; all this can lead to an increase in tax revenues, reducing the degree of economic imbalances and encouraging taxpayers to pay tax.

### **5.7.8.3.3 Consistency between fiscal tools.**

This step is intended to avoid any conflict between the various types of tax in the tax structure, as the reform of one type of tax could adversely affect another type of tax. For example, import tax reform could have adverse effects on consumption tax.

### **5.7.8.3.4 Improvement of the performance of the tax administration.**

The tax administration's ability to achieve rapid adaptation helps the success of tax reform, as the tax administration is the executive tool of the tax reform process.

An improvement of the incentive system (salaries and wages) is an important tool for the reform of tax administration, for several reasons, including: the elimination of corruption, and attracting the best experts.

### **5.7.8.4 Conclusion.**

The Libyan economy is suffering from a deficiency (decrease) in tax revenues due to its weak tax structure, and these problems can be illustrated as follows:

- 1- Ineffectiveness of the current tax system, which has led to an imbalance in the macro-economic variables and in the structure of incentives.
- 2- Worsening of the fiscal deficit in the public budget.
- 3- Weak taxable capacity and imbalance of the financial system:

Libya's economy is suffering from weak taxable capacity (low tax revenues), for several reasons, including:

- 1) Low level of national income, and low per capita income, as the decline in per capita income leads to lower tax rates to the national income (Greenway & Sapsford, 1984).
  - 2) Control of the public sector over economic activity (state intervention). The nationalization of oil and land and the monopoly over imports and exports gave the state control over all sectors of the economy but kept economic regulation at a low level (Layachi,1998).
  - 3) Large size of the informal economy (black market).
  - 4) Lack of regular accounting/ bookkeeping in the business sector, this leads to difficulty in estimating the results of special projects.
  - 5) The large number of tax exemptions in tax policy.
  - 6) The spread of tax evasion and tax avoidance due to weak tax administration.
  - 7) Low tax awareness.
- 4- Imbalance of the tax structure:

High reliance on indirect tax as a proportion of the tax structure is noted, unlike the situation in developed countries that depend primarily on direct taxes. The percentage of indirect taxes reached about 60% of the tax structure during 1970-2005 in Libya.

Reliance on indirect taxes, especially import taxes, in Libya, is due to several reasons, including: undiversified production base, the large volume of foreign trade, and the ease of imposing and collecting such taxes (Zaki, 1984).

#### 5- Inadequate treatment of tax equity:

The tax system in Libya is characterised by inequity, as low-income people bear a high-tax burden because income tax is imposed on salaries and wages, but not imposed on the interest accrued on capital (absence of horizontal equity).

#### 6- Weakness of tax administration:

There is a significant lack of information and financial data, leading to administrative corruption, the spread of tax evasion and tax avoidance.

## Chapter Six

# **Measuring the tax burden and tax effort for the national economy in Libya**

### **6.1 Introduction.**

In this chapter, the study's empirical testing is carried out. This testing measures both the individual tax burden over the period 1970-2005 and tax effort in Libya for the period 1970-2000. It incorporates the most recently available data and relevant econometric techniques such as OLS Regression Model, Ordinary Ridge Regression Model (ORR), and Unbiased Ridge Regression Model (URR). In addition, it also measures the Libyan tax effort for the period 2001-2007 and makes a comparison with that of selected oil producing countries using both cross-sectional Analysis and Panel Data Analysis.

### **6.2 Measuring the individual tax burden in Libya, 1970-2005.**

The individual tax burden can be measured through the ratio of per capita personal taxes to the annual individual income.

The calculation of these two indices in Libya during the period 1970-2005 has been carried out, as shown in table 48 in the statistical appendix, and the following table 6.1:

Table 6.1. Individual tax burden in Libya, 1970-2005

US\$ / year\*

Years	Direct taxes per capita*	Indirect taxes per capita*	Total taxes per capita*	Per capita income *	Total taxes per capita as percentage of per capita income
1970	22.57	70.36	92.92	1794.7	0.052
2005	150.2	292.97	443.16	16274.8	0.027
Average	184.91	295.40	480.308	5969.91	0.082

Source: Calculated from tables 5 , 32 and 34 in the statistical appendix.

Through a review of the data in this table, it can be seen that total taxes per capita in Libya increased from US\$92.9 in 1970 to US\$443 in 2005, and the total tax per capita as a percentage of the individual income was 0.082 on average of the same period .

### 6.2.1 Direct taxes per capita:

From the data presented in table 48 of the statistical appendix, the average direct taxes per capita (in all classes and nationalities) was \$184.91 during the period 1970-2005. This means that the individual paid a direct tax of \$15.1 per month as an average. During 1970-2005, the direct tax per capita grew at a compound annual growth rate (CAGR) of 5.6%, so that the per capita quota of direct taxes in 2005 was about 6.7 times of that it was in 1970. Overall, the individual direct tax burden ranged between \$22.57 in 1970 and \$150.2 in 2005.

### **6.2.2 Indirect taxes per capita:**

During 1970-2005, the average indirect tax per capita was \$295. This meant that each individual paid an indirect tax of \$24.6 per month on average. On the other hand, the compound annual growth rate (CAGR) of per capita indirect taxes was about 4.2% during the same period, and this means that the per capita indirect taxes tended to increase.

It can be noted that the per capita direct tax was increasing at a rate greater than the per capita indirect tax during the period 1970-2005.

### **6.2.3 Total taxes per capita:**

From the data in table 48 in the appendix, it can be seen that the total tax per capita (direct and indirect) increased from \$92.92 in 1970 to \$443.16 in 2005, at a compound annual growth rate (CAGR) of 4.6%. In contrast, the annual per capita income increased from US\$1794.7 in 1970 to US \$16274.8 in 2005, at a compound annual growth rate (CAGR) of 6.5%, meaning that the rate of growth of per capita income was greater than the rate of growth of per capita tax burden.

The detailed changes of taxes per capita and income per capita are summarised in table 6.2 below:

Table 6.2 Total taxes per capita in Libya, 1970-2005

Item	1970	2005	Compound annual growth rate CAGR
	US\$/year	US\$/year	
Direct taxes per capita	22.57	150.2	5.6%
Indirect taxes per capita	70.36	292.97	4.2%
( A ) Total taxes per capita	92.92	443.16	4.6%
( B ) Per capita income	1794.7	16274.8	6.5%
Ratio ( A ) to ( B )	0.052	0.027	-1.9%

Source : Table 6.1

In table 6.3, it is notable that the average per capita tax reached \$230.5 over the years 1970-1976, and then increased to \$703 during 1977-1983, equal to 3 times what it was in the previous period. However, it decreased by 2%, 21%, and 51% during the periods 1984-1990, 1991-1997 and 1998-2005, respectively, while the average was \$480 per year for 1970-2005.

Table 6.3 Individual tax burden in Libya

Period	Average per capita tax	Average per capita income	Taxes per capita as percentage of per capita income
	US\$/year	US\$/year	
70-1976	230.5	3571.5	6%
77-1983	702.9	7959.1	9%
84-1990	689.2	6000.2	11%
91-1997	545.1	5967.6	9%
98-2005	264.7	6303.4	4%
70-2005	480.3	5969.9	8%

Source : Table 6.1 (Statistical appendix)

It can be also noted that tax per capita as a percentage of per capita income increased from 5% in 1970 to 9% in 1998, and then decreased until it reached 3% in 2005. Overall, the average figure was 8% for the whole period of 1970-2005 (see table 48 in the statistical appendix).

When compared with other oil producing countries, it can be seen that the tax burden per capita in Libya was slightly higher than its counterparts, with the exception of Qatar (see table 6.4).

Table 6.4 Individual tax burden in Libya and selected oil producing countries (2001-2007)

	2001	2002	2003	2004	2005	2006	2007
Libya	5.60%	4.70%	4.90%	3.80%	2.70%	2.20%	2.10%
Iraq	0.00%	0.00%	0.00%	0.40%	1.00%	0.70%	1.40%
Kuwait	0.90%	2.20%	1.90%	1.60%	1.40%	1.20%	1.30%
Liberia	0.20%	0.10%	0.10%	0.30%	0.20%	0.20%	0.30%
Qatar	3.30%	4.20%	3.40%	25.50%	21.30%	23.20%	24.20%
Sudan	0.10%	0.10%	0.10%	0.20%	0.20%	0.20%	17.20%
United Arab Emirates	2.10%	2.50%	3.10%	3.40%	2.40%	2.90%	2.90%

One explanation of Libyan relatively high tax burden (individual tax burden) may be because of the slow growth of its labour force.

The rate of percentage growth of the labour force population in Libya was 8% in 1981, which decreased to 4% in 1983 and then to 3.3 % in 2005, with an average growth rate of 1.04% for the period 1970-2005. This means that the labour force was growing at a CAGR of 2.6% only, while the CAGR of the population was 3% (see table 6.5).

Table 6.5 Employment and population in Libya, 1970-2005

	Population	Labour: population
Average rate of annual change	3.02 %	1.04 %
CAGR	3 %	2.6 %

Source: Calculated from tables 32 and 33 in the statistical appendix

This meant that the rate of population growth was greater than the rate of labour force growth (potential employment), leading to a higher tax burden per capita.

### **6.3 The Model description.**

#### **6.3.1 Measuring the Libyan tax effort, 1970-2000.**

This section measures the tax effort in Libya for the period 1970-2000, using the following three methods: OLS Regression Model, Ordinary Ridge Regression Model (ORR), and Unbiased Ridge Regression Model (URR).

#### **6.3.2 Identification of multicollinearity problem:**

The multicollinearity problem occurs due to the existence of some correlations among some or all explanatory variables of a regression model (Gujarati, 2004).

Multicollinearity can create inaccurate estimates of regression coefficients, and inflate the standard errors of the regression coefficients (Hintze, 2007).

##### **a. Sources of Multicollinearity.**

To deal with multicollinearity, it is necessary to be able to identify its source. The source of the multicollinearity impacts the analysis, the corrections, and the interpretation of the linear model. Outlined below are five sources of multicollinearity (Hintze, 2007):

1. *Data collection*. In this case, the data have been collected from a narrow subspace of the independent variables. The multicollinearity has been created by the sampling methodology, for example, sampling over a limited range of the values taken by the regressors in the population ( Gujarati, 2004). If the multicollinearity has been created by the data collection method employed, then it is necessary to collect additional data over a wider  $X$ -subspace that can resolve this multicollinearity problem.
2. *Physical constraints* of the linear model or population. This source of multicollinearity will exist no matter what sampling technique is used. Many manufacturing or service processes have constraints on independent variables (as to their range), physically, politically, or legally, which have the potential to create multicollinearity.
3. *Over-defined model*. In this case, there are more variables than observations. This situation should be avoided.
4. *Model choice or specification*. This source of multicollinearity comes from using independent variables that are powers or interactions of an original set of variables. It should be noted that if the sampling subspace of independent variables is narrow, then any combination of those variables will increase the multicollinearity problem even further.
5. *Outliers*. Extreme values or outliers in the  $X$ -space can cause multicollinearity as well as hide it. This is called outlier-induced multicollinearity. This should be corrected by removing the outliers before ridge regression is applied.

**b. Detection of Multicollinearity.**

There are several methods of detecting multicollinearity. These include:

1. Begin by studying pairwise scatter plots of pairs of independent variables, looking for near-perfect relationships. Also glance at the correlation matrix for high correlations. However, multicollinearity does not always show up when considering the variables two at a time.
2. Consider the variance inflation factors (VIF). VIFs over 10 indicate collinear variables.
3. In terms of the eigenvalues of the correlation matrix of the independent variables, a value close to zero indicates multicollinearity. Alternatively, it is possible to consider the numerical size of the eigenvalue, using the condition number. Large condition numbers indicate multicollinearity.
4. Investigate the signs of the regression coefficients. Variables whose regression coefficients are opposite in sign from what you would expect may indicate multicollinearity.

**6.3.3 Regression methods and treatment of multicollinearity problem.**

There are three methods which can be used, namely: Ordinary linear regression OLS, Ordinary ridge regression ORR, and Unbiased ridge regression URR. These three types of regression were selected for their advantages, as shown in the following:

OLS regression has several advantages, among which are:

- 1- the possibility of measuring multicollinearity using the Variance Inflation Factor (VIF) which indicates how strongly each explaining variable is correlated to the others (Kestens, 2004).

- 2- OLS has a well-developed theory, and has available a battery of diagnostic statistics that make interpretations easy and straightforward (Getis & Griffith, 2002).
- 3- OLS has a small number of used parameters, and low calculation cost. It estimates the regression coefficients by minimizing the sum of the squared errors between the estimated and the desired values (Mariolis & Dermatas, 2001).
- 4- the OLS procedure is the simplest type of estimation procedure used in statistical analyses (Burke, 2010).
- 5- It is known that an ordinary least square estimator (OLS) is the best linear unbiased estimator (BLUE) of the vector of unknown regression coefficients in a linear regression model (Xu & Yang, 2011).

But in the multicollinearity case the ordinary least squares (OLS) estimator for the regression coefficients or predictor based on these estimates may give very poor results. With multicollinearity, the estimated OLS coefficients may be statistically insignificant (too large, too small and even have the wrong sign) even though the R-Square may be high (Yeniay & Gaokta, 2002). Moreover, the estimators obtained from OLS are unbiased but have inflated variances under multicollinearity (Abd El-Salam, 2011).

Plenty of methods have been developed to overcome multicollinearity problem, such as ordinary ridge regression (ORR) and Unbiased ridge regression (URR).

In the presence of multicollinearity the OLS estimators could become unstable due to their large variance, which leads to poor prediction. One of the most used solutions of this problem is ordinary ridge regression (ORR) (Dorugade & Kashid, 2010). When multicollinearity exists, selection of

ridge parameter plays an important role, because the idea that adding a small constant to the diagonal elements of the matrix  $X'X$  will improve the conditioning of a matrix has been used numerical analysis, for the reason that this dramatically decreases its condition number (Dorugade & Kashid, 2010).

The following are some of ORR's advantages:

- 1- Ordinary ridge regression has a smaller mean squared error than ordinary least squares (Janakiraman, 1980).
- 2- Ordinary ridge regression may be a viable estimation procedure for mitigating the deleterious effects of multicollinearity (Burt, Frank & Beattie, 1987).
- 3- ORR takes advantage of the fact that under certain conditions it is possible to obtain biased estimates with small standard errors that are more useful than unbiased estimates with large standard errors (Myers & Well, 1995).

Ordinary ridge regression generates biased estimates but with smaller standard errors than those provided by ordinary least squares (OLS) regression in the presence of multicollinearity. On the basis of the Mean Square Error criterion, therefore, ridge regression estimators are sometimes preferred to those of OLS regression when there is multicollinearity among the explanatory variables (Crown, 1998). In other words, when multicollinearity is present, ridge regression techniques result in estimates of the coefficients that are biased, but have smaller variances than that of Ordinary Least Square (OLS) (Rahuma, 1978).

Meanwhile, the URR method is based on realistic empirical prior information that can be measured by taking the average of the regression

coefficients of OLS. URR regression achieves smaller mean squared error than ORR and is more stable than the OLS (Janakiraman, 1980; Jahufer & Jianbao, 2008). In addition, the ridge regression with empirical prior information leads to smaller mean square error MSE than does ORR procedure, and substantially smaller than OLS (Crouse, Jin & Hanumara, 1995 ). URR regression has consistently maintained less bias than ORR although at the expense of a slightly greater variance. Both of the ridge estimators have been able to achieve a smaller mean squared error than ordinary least squares for at least some values of k (Janakiraman, 1980). All models of ORR and URR are better than OLS when the multicollinearity problem exists in data (El-Dereny & Rashwan, 2011). In general URR is seen as having less bias than ORR although both estimators have significant bias relative to the zero bias of OLS (Janakiraman, 1980).

In general, researchers should consider using ridge regression when working with tax and regulatory variables because public policy variables tend to be highly correlated with each other (Doviak, 2010).

### **6.3.3.1 OLS Regression Model:**

Consider the ordinary linear regression model:

$$Y = X\beta + \varepsilon$$

where  $Y$  is an  $p \times 1$  vector of observations on dependent variable,  $X$  is a known independent variables  $n \times p$  matrix of rank  $p$ ;  $\beta$  is a  $p \times 1$  vector of unknown parameters; and  $\varepsilon$  is a random  $n \times 1$  vector the components of which are independent and follow a normal distribution with mean zero and

unknown variance  $\sigma^2$ . The ordinary estimator is found by solving for  $\hat{\beta}$  in the system of equations:

$$\hat{B}_{LS} = (X'X)^{-1}X'Y$$

### 6.3.3.2 Ordinary Ridge Regression Model (ORR):

Ordinary Ridge Regression is a technique for analysing multiple regression data that suffer from multicollinearity. When multicollinearity occurs, least squares estimates are unbiased, but their variances are large so they may be far from the actual value.

Ridge regression is a method by which one can systematically introduce a small amount of bias and obtain more precise estimates. Often, the resulting models make more sense intuitively (Polhemus, 2005).

By adding a degree of bias to the regression estimates (K), ridge regression reduces the standard errors. It is hoped that the net effect will be to give estimates that are more reliable. ORR can be expressed as (Hintze, 2007):

$$\hat{B}_{(K)} = (X'X + KI_p)^{-1}X'Y, \quad K \geq 0$$

where k is the shrinkage parameter (it is a positive constant). This study assumed that the X and Y matrix are standardized.

### 6.3.3.3 Unbiased Ridge Regression Model (URR):

As mentioned before, when preparing data for regression it is not always possible to design the data collection to avoid correlations between predictor variables. In such cases, ridge regression provides a way to obtain precise,

meaningful model coefficients. By allowing a small amount of bias in the coefficient estimates, the variability of those estimates can often be reduced dramatically. The resulting models may well give a better understanding of the true relationships in the data (Polhemus, 2005).

Furthermore, Crouse et al. (1995) defined the unbiased ridge regression (URR) estimator as follows:

$$\hat{\mathbf{B}}_{(KJ)} = (\hat{\mathbf{X}}\mathbf{X} + \mathbf{KIp})^{-1} (\hat{\mathbf{X}}\mathbf{Y} + \mathbf{KJ}), \quad \mathbf{K} \geq \mathbf{0}$$

In URR the data of the variables are transferred to the standardised form (Z-score):

$$z = \frac{\text{Score} - \text{mean}}{\text{std deviation}} \quad \rightarrow \quad y^* = \frac{Y - \bar{Y}}{S_y}, \quad x^* = \frac{X - \bar{X}}{S_x}$$

Where:

$$S_y = \sqrt{\frac{\sum y^2}{n-1}} \quad ; \quad S_x = \sqrt{\frac{\sum x^2}{n-1}}$$

And,

K = the shrinkage parameter ;

J is prior information, where: 
$$\mathbf{J} = \left[ \frac{\sum_{i=1}^{n^*} (\hat{\mathbf{B}}_{LS})}{n^*} \right]_{n^* \times 1}$$

And  $n^*$  is the number of OLS estimated parameters.

## **6.4 Estimating Libya's tax effort.**

As an economic indicator, tax effort reflects a country's ability to raise revenues for covering the expenses of infrastructure, social services, and other public expenditure. The estimation of tax effort can indicate how well Libya is doing in terms of tax collection, relative to what could be reasonably expected given its economic potential. Tax effort is calculated by dividing its actual tax share by an estimate of how much tax Libya should be able to collect, given the structural characteristics of its economy.

Tax effort is calculated in this section for the period 1970-2000, using OLS regression, Ordinary ridge regression (ORR), and Unbiased ridge regression (URR) respectively. Section 6.5 will compare Libya to selected oil producing countries during 2001-2007 due to several reasons, including: Firstly, the absence of data for these countries for the same variables covering the years 1970-2000. Secondly, to compare the domestic tax effort with the tax effort in the countries under study in recent years. Finally, lack of data for the same previous variables from local sources over the years 2001-2007.

### **6.4.1 Data description.**

The dependent variable is the contribution of tax revenue to gross domestic product ( $Ty$ ) (where  $Ty$  was calculated from tables 1, 31 in the statistical appendix). After estimation,  $\hat{T_y}$  becomes an indicator of the taxable capacity. The four explanatory variables are: non-oil exports ( $nox$ ); tax

penalties (vp); oil revenues (oilR); and money supply (Msp) (see table 22 in the statistical appendix ) .

$$\ln T_y = \beta_0 + \beta_1 \ln nox + \beta_2 \ln vp + \beta_3 \ln oilR + \beta_4 \ln Msp + u_i$$

The number of observations is 31 for the period of 1970-2000.

All the variables have been given logarithms in order to mitigate the scale problem. Table 6.6 describes the variables during the period of 1970-2000.

The study has selected these four related independent variables including oil revenue (OilR), non-oil exports (nox), money supply (Msp), and tax penalties (Vp) which received for analysis in the study. These variables were selected because of their considerable importance to tax system in Libya and they represented reasonable causes of change the tax effort, also data on these variables could be quantified and reliably obtained.

Oil revenue was chosen because it is the backbone of Libyan economy and the success of economic policies and plans in this economy depend on the timely and reliable test the impact of oil revenue on tax effort.

Non-oil exports were included because this variable refers to the degree of independence from the oil resources in Libyan economy. The money supply has been included in this relationship because the tax is a monetary phenomenon. The study selected the tax penalties as one of its independent variables because tax penalties contribute to reducing tax evasion.

Table 6.6 Descriptions of the Variables

( 1970-2000 )					
Variable	Count	Mean	Standard	Minimum	Maximum
			Deviation		
Lnnox	31	1.936736	2.410845	-1.609438	7.759486
Lnvp	31	1.101341	1.347665	-1.6874	3.174339
LnOilR	31	7.484972	0.6575881	6.115892	8.808653
LnMsp	31	7.854831	1.000366	5.48297	9.329181
LnTy	31	-2.470264	0.2899662	-3.079114	-1.903809

Where Ty: the contribution of tax revenue to gross domestic product; nox: non-oil exports; vp: tax penalties; oilR :oil revenues; and Msp : money supply.  
For see the completed table of values, see the appendix to Chapter six in the statistical appendix.

#### 6.4.2 Detecting multicollinearity for the variables used in this study.

A correlation matrix was used to detect any multicollinearity problem and the results are provided in table 6.7. Two independent variables, tax penalties (lnvp) and money supply (lnMsp) were found to be highly correlated; therefore the methods of ordinary ridge regression and unbiased ridge regression will be used to avoid the correlation between these variables.

Table 6.7 Correlation matrix

( 1970-2000)					
	Lnnox	Lnvp	LnOilR	LnMsp	LnTy
Lnnox	1.000000	0.566703	0.291712	0.433032	-0.235235
Lnvp	0.566703	1.000000	0.573246	0.888370	0.543761
LnOilR	0.291712	0.573246	1.000000	0.636981	0.224461
LnMsp	0.433032	0.888370	0.636981	1.000000	0.604152
LnTy	-0.235235	0.543761	0.224461	0.604152	1.000000

Where Ty: the contribution of tax revenue to gross domestic product; nox: non-oil exports; vp: tax penalties; oilR :oil revenues; and Msp : money supply.

Table 6.8 shows the variance inflation factor (VIF) and condition number.

Table 6.8 The variance inflation factor and condition number.

( 1970-2000 )				
Independent Variable	R <sup>2</sup> Versus Other I.V.'s	Variance Inflation Factor	Tolerance	Condition number
Lnnox	0.3448	1.5263	0.6552	1
LnvP	0.8300	5.8823	0.1700	3.72
LnOilR	0.4061	1.6839	0.5939	6.36
LnMsp	0.8196	5.5423	0.1804	29

From the literature, if any variable has a variance inflation factor (VIF) greater than 10 (greater than 5 to be very conservative), collinearity could be a problem (Hintze, 2007; Kutner, 2004; Ethington, 2011; Gujar, 1987). Condition numbers (C.N) between 100 and 1000 imply moderate to strong collinearity (Hintze, 2007; Carvalho & Cruz, 1996; Montgomery & Peck, 1981 ).

According to Table 6.8, since all VIF's are less than 10 and all condition numbers less than 100, indicating that multicollinearity is not a problem. For example, the condition number of money supply variable ( equal to 29 ) is less than 100. This means that multicollinearity is unlikely to be a major issue to interpreting the results of analysis.

The resulted coefficients were different between the OLS, ORR, and URR methods due to differences in the methodology between these methods. Whereas ORR method depends on adding a small ridge parameter, the URR method relies on realistic empirical prior information.

### 6.4.3 Regression results.

OLS, ORR, and URR regression approaches are applied to the data described above. The regression results are presented in table 6.9.

Table 6.9 Estimated coefficients using OLS; ORR, and URR methods (1970-2000).

	Coefficients and tests	OLS	ORR	URR
Independent variables*	$\hat{b}_0$	-2.690	-3.076	0.128
	$t_0$	(-5.7)	NA	(1.575)
	$sb^{\wedge}_0$	0.47	NA	-0.813
nox	$\hat{b}_1$	-0.092	-0.052	-0.737
	$t_1$	(-6.892)	(-4.166)	(-6.220)
	$sb^{\wedge}_1$	0.0133	0.0125	0.0118
	$VIF_1$	1.526	0.576	NA
vp	$\hat{b}_2$	0.151	0.079	0.502
	$t_2$	(3.226)	(3.964)	(2.988)
	$sb^{\wedge}_2$	0.0468	0.0199	0.1680
	$VIF_2$	5.882	0.453	NA
oilR	$\hat{b}_3$	-0.114	-0.033	-0.234
	$t_3$	(-2.218)	(-0.710)	(-1.844)
	$sb^{\wedge}_3$	0.0514	0.0465	0.1269
	$VIF_3$	1.684	0.590	NA
Msp	$\hat{b}_4$	0.138	0.110	0.394
	$t_4$	(2.253)	(4.089)	(2.337)
	$sb^{\wedge}_4$	0.0613	0.0269	0.1686
	$VIF_4$	5.542	0.463	NA
	$R^2$	0.7908	0.5133	0.8041
	$F$	24.571	6.86	23.788
	$dw$	2.026	1.51	2.016

Where the dependent variable:  $Ty$ ;  $sb^{\wedge}_i$ : the standard error;  $R^2$  was adjusted for number of variables; NA: not available in NCSS software.

To test for the statistical significance of true parameters  $b_0$ ,  $b_1$ ,  $b_2$ ,  $b_3$ , and  $b_4$  in the above regression model, the following null hypotheses were set:  $H_0$ , and alternative hypothesis,  $H_1$  (Salvatore & Reagle, 2002):

$$H_0: b_i = 0 \quad \text{versus} \quad H_1: b_i \neq 0 \quad ; \quad i = 0,1,2,3,4$$

The purpose of the null hypothesis is to answer the following question: do the explanatory variables have an effect on the dependent variable? the null hypothesis in words is: the true values of the parameters in the regression model are equal to zero. In other words, there will be no relationship between the explanatory variables (nox; vp; oilR; Msp) and the dependent variable (Ty).

The alternative hypothesis in words is: The explanatory variables (nox; vp; oilR; Msp) are related to the dependent variable (Ty). The alternative hypothesis means that  $b_0$ ,  $b_1$ ,  $b_2$ ,  $b_3$ , and  $b_4$  are significantly different from zero. In other words, each parameter is less than or greater than zero under the alternative hypothesis.

In terms of a linear relationship between variables, the null hypothesis means that each of the  $b_i$  parameters=0 (the slope coefficient is zero) and the explanatory variable does not appear in the regression model; that is, the explanatory variable fails to provide explanatory power for the dependent variable. The rejection of the null hypothesis implies that the explanatory variable to which this estimate relates does in fact correlate with the dependent variable (Ty).

The hope in regression analysis is to reject  $H_0$  and to accept  $H_1$ , that  $b_0$ ,  $b_1$ ,  $b_2$ ,  $b_3$ , and  $b_4 \neq 0$ , with a two-tail test.

In order to test for the statistical significance of the parameter estimates, Table 6.9 shows that the absolute values of computed (calculated ) t-values  $t_1$ ,  $t_2$  and  $t_4$  exceed the critical (tabular) value of  $t=2.056$  with  $n-k=31-5=26$  df at the 5% level of significance, using a two-tail test (from Koutsoyiannis, 1992). It can be concluded that  $b_1$ ,  $b_2$ , and  $b_4$  are statistically significant at the 5% level (i.e., the alternative hypothesis  $H_1$ , that  $b_1$ ,  $b_2$ , and  $b_4$  are different from zero cannot be rejected). Applying ORR and URR methods,  $b_3$  is not statistically significant at 5% level.

The difference in results between ORR and URR methods, as previously mentioned, are due to the different methodology. Whereas the ORR method relies on adding a small constant to the diagonal elements of the matrix  $X'X$ , the URR method relies on prior empirical information.

$\hat{T}_y$  was found to be positively related to tax penalties and money supply, while negatively related to non-oil exports and oil revenues. For example , between 1970-2000, by using URR model, the regression coefficient of the oil revenues -0.234 means that, holding all other variables constant, a 100 percent increase of Libyan oil revenue is accompanied by a decrease in taxable capacity of about 23 percent. Conversely, holding all other variables constant, the mean taxable capacity increased by about 39 percent when money supply increased by 100% during the same period. Similarly, 0.502 attached to  $vp$  means that, other things being equal, a 100 percent increase in tax penalties led on average to about a 50% increase in the taxable capacity. There was a negative relationship between the taxable capacity ( $T_y$ ) and the non-oil exports ( $nox$ ). If  $nox$  went up by 100 %, on average, taxable capacity decreased by about 70 %.

According to the ORR, there was a negative relationship between oil revenues and taxable capacity in Libya between 1970-2000. This means that an increase in oil revenues of 100% led to a reduction in tax effort of 3%. This negative relationship was due to a reduced reliance on tax revenues in the years when there was a rise in oil revenues. In other words, when oil revenues increased, there was no urgent need for tax revenues. As one of the measures of fiscal policy, the government also reduced taxes and increased public spending when oil revenues increased.

The relationship between tax penalties and taxable capacity was positive in Libya. Increasing the tax penalties led to an increase in tax capacity. This positive relationship is attributed to the fact that these penalties encouraged taxpayers to comply with tax payment on time; it was also a tool to combat tax evasion. According to the ORR, increases in tax penalties of 100% led to an increase in tax capacity of 8% during the period 1970-2000.

The money supply (in the narrow sense) was positively related to taxable capacity in Libya. This relationship was positive because the increase in the money supply led to an increase in the volume of transactions and trade exchanges that were subject to taxes. For example, increasing the money supply by 100% led to an increase in tax capacity of 11% in Libya between 1970-2000, using ORR analysis.

There was a negative relationship between non-oil exports and taxable capacity in Libya during the study period: increases in non-oil exports led to lower taxable capacity. This negative relationship may have been due to several reasons, including :that exports were exempt from taxes, and the size of non-oil exports was low.

When using OLS method, the  $R^2$  value was reasonably high, being 79% during the period 1970-2000, this means that about 79 percent of the

variance in taxable capacity in Libya was explained by the predictor variables, while  $R^2$  is reasonable using the ORR method, being 0.5133 over the 1970-2000 period. This shows that the explanatory variables nox, vp, oilR, and Msp accounted for over 51% of variation in the response variable (Ty) in Libya over the period 1970-2000.

Finally, although this study didn't conduct a unit root test, it used the Durbin-Watson test to detect autocorrelation problem, a cause of non-stationarity of the data. The Durbin-Watson test did not find any autocorrelation problem in the data.

The Durbin-Watson test was conducted. It found that for 31 observations and 4 explanatory variables, lower and upper d.w limits are  $dL = 1.2$  and  $du = 1.7$  at 5 percent level, while  $dL=0.96$  and  $du = 1.5$  at 1% level (Gujarati, 2004, pp. 970-972), (for more details about the conditions for the null hypothesis, see the appendix, pp. 408-409).

From the data given in table 6.9, the estimated Durbin-Watson statistic can be shown to be within the upper du, suggesting that there was low serial correlation in the residuals.

Using OLS for 1970-2000, d.w test value was equal to 2.03, and 2.016 using URR method, which is close to the crucial value of 2 (which corresponds to a zero autocorrelation). In the table with critical values for the Durbin-Watson test it was found that  $dL=1.16$  and  $du=1.74$  (Gujarati, 2004, pp. 970-972). Therefore, the computed d.w lies within upper du.

In general, by looking at the d.w value for  $dL$  and  $du$  and the estimated d.w values lying within upper du, we can reject the null hypothesis that there were serial correlations in the residuals; this mean Ty regression does not suffer from pure autocorrelation.

Applying OLS and URR models to the data, and using analysis of variance to test the overall significance of the fit, the computed F-value is obviously highly significant. This means that all the independent variables as a package have a relationship with the taxable capacity, so that it is possible to reject the null hypothesis, accepting the alternative that there is a significant relationship between taxable capacity and the explanatory variables, and that all the variables are important explanatory variables in the models.

The forecasting accuracy is tested using Theil's inequality coefficient TIC (Uhl , 2011):

$$TIC = \frac{\sqrt{\sum_{t=T+1}^{T+h} (\hat{y}_t - y_t)^2 / h}}{\sqrt{\sum_{t=T+1}^{T+h} \hat{y}_t^2 / h} + \sqrt{\sum_{t=T+1}^{T+h} y_t^2 / h}}$$

Where  $y_t$  and  $\hat{y}_t$  denoted the actual and forecasted values, respectively. This coefficient is always lies between zero and one, where zero indicates a perfect fit of the model (Basdas, 2009). Empirically,  $TIC = 0.026251$ , this means that the forecasting power of the model is quite high.

Applying OLS, ORR and URR models to the observations, the following tax effort index in Libya during the period of 1970 – 2000, is obtained.

Table 6.10 Tax effort in Libya, 1970-2000, using OLS, ORR and URR methods

Actual tax burden							
year	OLS*	ORR*	URR**	year	OLS*	ORR*	URR**
1970	-2.957	-2.9565	-1.0364	1986	-2.226	-2.2256	0.9089
1971	-3.079	-3.0791	-1.3627	1987	-2.198	-2.1982	0.9819
1972	-2.9	-2.9004	-0.8871	1988	-1.904	-1.9038	1.7655
1973	-2.882	-2.8824	-0.8392	1989	-2.172	-2.1716	1.0528
1974	-2.83	-2.8302	-0.7003	1990	-2.489	-2.4889	0.2081
1975	-2.489	-2.4889	0.2081	1991	-2.477	-2.4769	0.24
1976	-2.604	-2.6037	-0.0973	1992	-2.43	-2.4304	0.3638
1977	-2.645	-2.6451	-0.2075	1993	-2.631	-2.6311	-0.1703
1978	-2.43	-2.4304	0.3638	1994	-2.071	-2.0715	1.3192
1979	-2.551	-2.551	0.0428	1995	-2.323	-2.3228	0.6503
1980	-2.604	-2.6037	-0.0973	1996	-2.364	-2.3645	0.5394
1981	-2.254	-2.2538	0.8339	1997	-2.489	-2.4889	0.2081
1982	-2.273	-2.273	0.7828	1998	-2.386	-2.386	0.4822
1983	-2.293	-2.2926	0.7306	1999	-2.477	-2.4769	0.24
1984	-1.945	-1.9449	1.6561	2000	-2.882	-2.8824	-1.3921
1985	-2.323	-2.3228	0.6503	Average	-2.4703	-2.4703	0.24
predicted taxable capacity							
1970	-2.952	-2.8448	-1.0331	1986	-2.025	-2.2308	1.3598
1971	-2.918	-2.7988	-0.9238	1987	-2.084	-2.2574	1.2214
1972	-2.889	-2.7855	-0.8519	1988	-2.091	-2.2728	1.1935
1973	-2.853	-2.7603	-0.7558	1989	-2.155	-2.2929	1.0496
1974	-2.698	-2.6365	-0.3423	1990	-2.497	-2.4701	0.2196
1975	-2.677	-2.6247	-0.2886	1991	-2.43	-2.4278	0.3886
1976	-2.575	-2.5485	-0.0167	1992	-2.452	-2.453	0.3293
1977	-2.693	-2.5951	-0.2913	1993	-2.664	-2.5451	-0.1763
1978	-2.562	-2.5254	0.0306	1994	-2.217	-2.3412	0.896
1979	-2.589	-2.5143	-0.0122	1995	-2.27	-2.3313	0.7943
1980	-2.53	-2.4587	0.1534	1996	-2.112	-2.2316	1.1935
1981	-2.341	-2.367	0.6117	1997	-2.543	-2.4696	0.1381

Following Table 6.10

year	OLS	ORR	URR	year	OLS	ORR	URR
1982	-2.228	-2.2599	0.9401	1998	-2.495	-2.4548	0.2459
1983	-2.295	-2.3588	0.7119	1999	-2.525	-2.4597	0.1816
1984	-2.322	-2.3822	0.6381	2000	-2.619	-2.5269	-0.6143
1985	-2.277	-2.3528	0.7555	Average	-2.4703	-2.4703	0.2499
Tax effort index							
1970	1.002	1.039	1.003	1986	1.099	0.998	0.668
1971	1.055	1.1	1.475	1987	1.055	0.974	0.804
1972	1.004	1.041	1.041	1988	0.911	0.838	1.479
1973	1.01	1.044	1.11	1989	1.008	0.947	1.003
1974	1.049	1.073	2.046	1990	0.997	1.008	0.948
1975	0.93	0.948	0.721	1991	1.019	1.02	0.618
1976	1.011	1.022	5.823	1992	0.991	0.991	1.105
1977	0.982	1.019	0.712	1993	0.988	1.034	0.966
1978	0.948	0.962	11.877	1994	0.934	0.885	1.472
1979	0.985	1.015	3.51	1995	1.023	0.996	0.819
1980	1.029	1.059	0.634	1996	1.119	1.06	0.452
1981	0.963	0.952	1.363	1997	0.979	1.008	1.508
1982	1.02	1.006	0.833	1998	0.956	0.972	1.961
1983	0.999	0.972	1.026	1999	0.981	1.007	1.322
1984	0.838	0.816	2.595	2000	1.1	1.141	1.366
1985	1.02	0.987	0.861	Average	1.0002	0.9979	1.7136

\* logarithm values ; \*\* standardized values ; \*\*\* Predicted Values for  $k = 0.352658$

As already mentioned, the study used the OLS, ORR, and URR methods in order to improve the results of the estimation.

From tables 6.10, it can be seen that Libya's tax effort index tends to be above 1 in most of the years.

According to the ORR method, the country's tax effort increased from 1.039 in 1970 to 1.141 in 2000.

During the period 1970-2000, the OLS, ORR and URR results of the tax effort index in Libya were 1.0002, 0.9979 and 1.7136 on average. This means that the tax effort was high, because these indices were greater than one in most of the study years.

## **6.5 Comparing the Libyan tax capacity and tax effort with selected oil producing countries over the period 2001-2007.**

### **6.5 .1. Introduction.**

Many developing countries are continuously experiencing pressure to spend more on infrastructure, public amenities, education, health care services etc. This obviously puts pressure on the tax regime of these countries. However developing countries in general have difficulties in generating adequate revenues for public expenditure (Stotsky & WoldMariam, 1997). In many developing economies, an undesirable budget deficit and the inefficient use of public expenditure have limited many crucial investments in both basic infrastructure and human capital that are necessary for providing a foundation for sustainable economic growth. In recent years, many developing economies have undertaken economic and financial reform programmes. Some of these programme implementation exercises were supported by the International Monetary Fund. One of the critical components of these reform programmes has been measures to raise tax revenues and to restructure tax systems (Eltony, 2002). For a developing country, tax performance is of crucial importance since it is the prime source of domestic resource mobilisation (Begum, 2007). Many developing countries often face difficulty in augmenting tax revenue to the desired level and considerable attention is being devoted to formulating fiscal policy best suited for increasing revenue (Begum, 2007). Conventionally, tax effort has been used as an indicator of how much a country is utilising its taxable capacity. Tax effort is measured as the ratio of tax revenue to a simple tax base, such as GDP. However, this measure does not typically provide a proper measure of a country's tax potential, since there are several other factors which affect taxable capacity, such as a country's economic structure,

level of socio-economic development, administrative and political constraints, and the indices of business, economic, trade and fiscal freedom (these indices are explained in table 6.11). Therefore, a more complete and appropriate measure of tax effort index may be defined as the ratio of the actual tax share to the predicted (or potential) tax share (Stotsky, WoldMariam, 1997). If the ratio or the index is less than one, it means that the country is not utilising its full revenue potential. If the value of the index is greater than one, it implies that the country is collecting more taxes than predicted and the tax burden is high. Measuring the tax performance using tax effort based on the ratio of actual tax revenue to the potential or expected tax revenue is essentially a 'static' one in the sense that it gives the potential for tax increases in a country at a given point of time through comparisons with other countries (Begum, 2007). However, in order to ascertain whether a particular country has made efforts to increase tax revenue over a period of time or not, it is important to consider the tax performance in the dynamic sense. That is, the tax performance must be viewed longitudinally over a period of time to gauge the significance of the changes in this variable over time, to give an indication of the efforts made over this period to increase the tax revenue.

One of the main purposes of this study is to examine the determinants of tax effort and to construct indices of tax effort for Libya and compare them with some other oil producing countries. This study makes use of panel data regression and cross-sectional country data for the period 2001-2007 for a sample of countries. The index of tax effort is constructed as the ratio of actual tax share to the predicted (or potential) tax share, as defined and

estimated in the literature on this topic by Stotsky and WoldeMariam (1997); Leuthold (1991) and Tait and Eichengreen (1978) among others.

In general, tax shares in developing countries tend to be lower than in industrialised countries, (Tanzi, 1992).

In addition to inefficient tax structures, many developing countries are characterised by weak tax and customs administrations, which impair efforts to collect tax revenues. Tax and customs administrations in these countries typically have excessive numbers of poorly trained and supervised staff, weak management practices, low salaries, and inadequate equipment and supplies. Discretion in the application of the tax and customs law, owing to weak domestic legal and institutional structures, creates opportunities for corruption and tax and customs fraud (Eltony, 2002). In recent years though, some developing countries have made progress in improving their tax systems. An IMF study by WoldeMariam (1995) found that several countries such as Morocco, Tunisia, Lebanon, Jordan, Egypt, Sudan, Mauritania and Yemen had all have undertaken a comprehensive programme of reform of both tax policy and tax administration, resulting in a significant improvement in the structure of their tax systems and an increase in the tax share to GDP ratio in the year 2000.

In order to present this study of the tax performance of developing countries, section 6.5.2 summarises the methodology of the study; section 6.5.3 presents the data and variables used in the study; section 6.5.4 gives the analysis and discusses the empirical results; while section 6.5.5 provides a summary of the empirical results.

### **6.5.2. The methodology.**

This section shows the analysis objectives, statistical methods and analysis, and panel regression model and its different types.

#### **6.5.2.1 Analysis objectives.**

This section presents a description of the methodology adopted in estimating both taxable capacity and tax effort using both a cross-section and panel data approach.

This approach has been used widely and applied to samples of both developing and industrialised countries (see Tanzi, 1992; Leuthold, 1991; Tanzi, 1987; Tanzi, 1981; Tait, Gratz, & Eichengren, 1979; Tait & Eichengreen, 1978; Chelliah, Bass, & Kelly, 1975; Chillian, 1971; Bahl, 1971; Litz & Moress, 1967).

Estimating taxable capacity involves regression of the tax/GDP ratio on variables that serve as proxies for a country's tax handles (Tait, Gratz & Eichengreen, 1979).

$$T/GDP = f ( A )$$

Where:

T = tax revenue; GDP = Gross Domestic Product; A = a vector of tax base also called tax handles .

One variant of the approach measures taxable capacity by regression for a sample of country or countries, regressing the tax revenue to GDP ratio on explanatory variables that serve as proxies for possible tax bases and other factors that might affect a country's ability to raise tax revenues.

Therefore the methodology employed to estimate tax capacity and tax effort involved in identifying major economic factors that influence the taxable

capacity to levy and to pay taxes and in measuring their relative influences through regressions based on cross-section and panel data. Given the coefficients of the chosen explanatory variables, a tax ratio can be predicted for each country, and this ratio may be taken to present average use of taxable capacity factors (Chelliah et al., 1975).

Generally speaking, this type of tax ratio analysis aims to explain the main determinants of differences in the tax ratio across countries. It uses a stochastic model

$$T/Y = f ( X_i , \dots \dots \dots , X_n , U )$$

where T is the total tax revenue , Y is a proxy for income ( either GDP or GNP), T/Y is the tax revenue/GDP ratio, Xi ( i=1 .....n ) represent various independent variables expected to influence the tax ratio and U is the error term (Piancastelli , 2001):

The independent variables that have been used by previous researchers included: GDP per capita, which is positively related to T/Y; the ratio of trade to GDP (imports plus exports value over GDP), which is also assumed to be positively related to T/Y because international trade is still an important source of tax revenue in developing countries; domestic per capita income, which is also expected to be positively related to the tax ratio; the share of the mining sector in GDP is also expected to be positively related to the tax income ratio; the share of the agricultural sector in GDP is expected to be negatively related to T/Y in developing countries and this reflects a possible degree of tax evasion in this sector . A high literacy rate and higher degree of monetisation of the economy are variables which are expected to show a positive relation to the tax/GDP ratio (Piancastelli, 2001). In some

literature, value added services, index of fiscal freedom, index of business freedom, currency in circulation, index of trade freedom, and value added agriculture were also used as regressors of tax/GDP.

The present study uses a regression approach to estimating (measuring) taxable capacity and tax effort in Libya for the period 2001-2007 and comparing it with that of 37 other petroleum-producing countries, which are : Algeria; Argentina; Bahrain; Bangladesh; Bolivia; Botswana; Brazil; Cameroon; Chad; Chile; Colombia; Congo, Rep.; Cote d'Ivoire; Ecuador; Egypt; Equatorial Guinea; Ethiopia; Ghana; Guatemala; Guyana; Indonesia; Iran; Kenya; Kuwait; Lesotho; Mauritania; Nigeria; Oman; Peru; Saudi Arabia; Trinidad and Tobago; Tunisia; United Arab Emirates; Venezuela; Yemen; Zambia; Zimbabwe.

Thus the sample consists of countries that tend to have some similar economic characteristics. For example, they are all developing countries and mainly rely on petroleum-based sources of income. One advantage of considering countries having a similar level of development is that it gives a better picture when relative tax efforts are compared.

Another selection criterion of the sample size was the availability of information and data. A set of the selected petroleum-producing countries was taken. The analysis employed in this part of the study was panel data, which uses the common multiple regression model to examine the effects of some variables on taxable capacity. In the panel data analysis, the full sample of 38 countries included Libya, and 266 observations over the period of 2001 and 2007 were used. These analyses involved two methods, which were: cross-sectional data and panel data analysis. The basic regression estimated for the 34 cross-sectional analysis was:

$$Ty_i = \alpha + \beta_1 Ser + \beta_2 Fsf + \beta_3 Bf + \beta_4 Cir + \beta_5 Tf + \beta_6 Agr + \varepsilon_i$$

Where:

$\alpha$  = a constant

$Ty_i$  = Tax revenue/GDP , measure of taxable capacity of country i.

$Ser$  = service ,Value added ( as share of GDP ).

$Fsf$  = index of fiscal freedom. ( \* )

$Bf$  = index of business freedom .( \* )

$Cir$  = currency in circulation % of GDP . ( \* )

$Tf$  = index of trade freedom .( \* )

$Agr$  = agriculture ,Value added ( as share of GDP ).

$\varepsilon_i$  = disturbance term.

( \* ) The measurement of these variables is shown in the appendix to chapter six.

According to the panel data model:

$$Ty_i = \alpha + \beta_1 Agr + \beta_2 Fy + \beta_3 Ari + \beta_4 Ef + \beta_5 Cpi + \beta_6 Sde + \varepsilon_i$$

$\alpha$  = a constant

$Ty_i$  = Tax revenue/GDP , measure of taxable capacity of country i .

$Agr$  = agriculture ,Value added ( as share of GDP )

$Fy$  = international trade ( as share of GDP )

$Ari$  = annual rates of inflation ( % growth ).

$Ef$  = index of economic freedom .

$Cpi$  = corruption perception index .

$Sde$  = shadow economy index.

$\varepsilon_i$  = disturbance term.

Variables included in the cross sectional analyses are based on the results obtained for best possible model performance statistics ( $R^2$ , Adjusted  $R^2$  & Standard error of the estimate). This is also validated by variable selection methods like forward selection, backward elimination and stepwise with all these methods giving almost all of the variables in the final model fitted.

Following the literature, the current study considers GDP as the tax base, because GDP includes non-resident income earned locally and excludes income received from abroad by residents. Typically, local income of non-residents is taxed while remittances from abroad are not, and therefore GDP produces a more accurate measure of taxable capacity.

Using aforementioned independent variables, inter-country tax effort comparisons can be made for Libya with its peers. It should be noted that tax effort indices may be considered to be superior to tax/GDP ratio comparisons because they take into account the differences in the way each country exploits its taxable capacity. Thus, the tax effort indices are computed and used for comparing Libyan tax performance with some selected oil producing countries. The index of tax effort is measured by taking the ratio of the actual tax share to the predicted (calculated) tax share (Piancastelli, 2001). This index can be taken for the purposes of international tax comparison.

According to the literature (e.g. Shamsub & Akoto, 2004; Mertens, 2003; Le Minhl, 2008; Sobarzo, 2004):

$$\text{Tax effort} = \frac{\text{tax collection}}{\text{taxable capacity}}$$

If this ratio is greater than one, the country is said to be a high tax effort country; conversely if the ratio is less than one the country is a low tax effort country (Leuthold, 1991). An index of one means the country's tax effort is at the "expected" level, given the structural factors of that country. By comparing tax effort across similar countries, it may be possible to identify countries which have the potential to increase tax revenues through increasing their tax effort. Alternatively, countries may be identified where tax effort is already high and it would be more advantageous to closely examine the expenditure side of the budget (Mertens, 2003).

#### **6.5.2.2 Statistical Methods and Analysis.**

Based on the study objectives, an appropriate research design was constructed. This essentially involves a secondary data design with data collected on a sample of counties for a set of variables with tax burden being the target or dependent variable. This was collected for a period of seven years from 2001 to 2007. This effectively makes the data set a longitudinal one.

Both cross sectional and panel data analysis methods were used in this study. Cross sectional data assumes that the data on several variables is collected for different well defined sampling elements (selected oil-producing countries in this study) only once in a fixed period of time. However, the data in this study comes from a time period of 2001 to 2007, and hence a representative value (mean) is used for each variable and each country, to form part of a cross sectional data analysis. Furthermore, a multiple regression model was fitted by taking the actual tax burden data (mean value for 2001 to 2007 for each country) as the dependent variable and mean value across the time period for all the variables as set of predictor variables to be

included the regression model. Ordinary least squares method was used to fit the regression model.

The availability of longitudinal and cross-sectional data makes panel data analysis possible. Panel data regression models are increasingly being used in applied economics.

With repeated observations of an adequate number of cross-sections, panel data analysis permits the researcher to study the dynamics of change even with a short time series data. The combination of time series data with cross-sectional elements can clearly improve the quality and quantity of data in ways that would be virtually impossible using only one of these two dimensions (Gujarati, 2004).

Panel data sets remain a consistently used research technique, and there are several reasons for this continued interest. An important one is that their use may offer a solution to the problem of bias caused by unobserved heterogeneity, a common problem in the fitting of models with cross-sectional data sets (Dougherty, 2007). The second reason is that with panel data analysis it is possible to reveal dynamics that are very difficult and at times impossible to detect with cross-sectional data. A third attraction of panel data sets is that they often have very large numbers of observations (Szarowska, 2010).

The spatial dimension of panel data analysis pertains to a set of cross-sectional units of observation. These could be firms, commodities, countries, states, groups of people, or individuals. Temporal dimension of panel data refers to periodic observations of a set of variables characterising these cross-sectional units over a particular time span.

Apart from the variable number, the data structure confers upon the variables two dimensions, and the error term also has two dimensions, one for the country, and one for the time period (Dhamija, 2010).

#### **6.5.2.2.1 Panel Regression Model and its different types.**

A general panel data regression model is of the following form

$$Y_t = \alpha + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \dots + \beta_k X_{kt} + \varepsilon_t.$$

Here  $t$  is the index for time,  $Y$  is the dependent variable,  $X_1, X_2, \dots, X_k$  are set of independent predictor variables. There are several types of panel data analytic models, namely: (1) Constant coefficients model (2) Fixed effects models and (3) Random effects models. Within each of these models it is possible to fit different types of models including dynamic panel, robust, and covariance structure models (Yaffee, 2003).

##### (1) The Constant Coefficients Model

One type of panel model has constant coefficients, referring to both intercepts and regression coefficients. Supposing that there is neither significant country nor significant temporal effects, it is then possible to pool all of the data and run an ordinary least squares regression model. Such models are called the pooled regression model.

##### (2) The Fixed Effects Model

Another type of panel model will have constant regression coefficients but varying intercepts that differ according to the cross-sectional unit—for example, countries. Although there are no significant time effects, there are significant differences among countries in this type of model. While the intercept is cross-section (group) specific and differs from country to

country, it may or may not differ over time. These models are called fixed effects models (Yaffee, 2003).

Another type of fixed effects model could have constant regression coefficients but intercepts that differ according to time. In this case, the model would have no significant country differences but might have serial correlation because of time-lagged effects. The residuals of this kind of model may have autocorrelation. In this case, the variables are homogenous across the countries.

Although fixed effects models offer more flexibility than constant coefficients model, they are not without their drawbacks. Fixed effects models may have large number of cross-sectional units which means a requirement of a large number of dummy variables in the regression model. Too many dummy variables may reduce the number of degrees of freedom for powerful statistical tests (Zhang, 2010) and may seriously affect the simplicity of the model. Also, a model with many such variables may be affected by the issue of multicollinearity, which inflates standard errors and hence drains the model of statistical power to test parameters.

### (3) The Random Effects Model

Random effects model is a regression with a random constant term (Greene, 2003). That is, intercept is a random variable. The random outcome is a function of a mean value plus a random error. But this cross-sectional specific error term which indicates the deviation from the constant of the cross-sectional unit (country) must be uncorrelated with the errors of the variables if this model is to be estimated (Yaffee, 2003).

#### (4) Robust Panel Models

Panel data models work under some stringent assumptions. Outliers can easily bias regression coefficients, particularly if they report very bad leverage values. These outliers can be weighted down with the use of M-estimators in the model. Heteroskedasticity problems arise from group wise differences, and often taking group means can remove heteroskedasticity. The use of a White heteroskedasticity consistent covariance estimator with ordinary least squares estimation in fixed effects models can yield standard errors robust to unequal variance along the predicted line (Greene, 2002; Wooldridge, 2002).

Sometimes autocorrelation inheres within the panels from one time period to another. Some problems with dynamic panels that contain autocorrelation in the residuals are handled with a Prais-Winston transformation or a Cochrane-Orcutt transformation that amounts to a first partial differencing to remove the bias from the autocorrelation. Arellano, Bond, and Bover (1995) developed one and two step general methods of moments (GMM) estimators for panel data analysis. GMM is usually robust to deviations of the underlying data generation process to violations of heteroskedasticity and normality, insofar as they are asymptotically normal, but they are not always the most efficient estimators. If there is autocorrelation in the models, it is possible to obtain a weight-adjusted combination of the White and Newey-West estimator to handle both the heteroskedasticity and the autocorrelation in the model (Yaffee, 2003).

### 6.5. 3. Data and Variables used in the study.

The data for the present study were obtained from the World Development Indicators 2008, (World Bank, 2008) and the Government Finance Statistics Yearbooks, (International Monetary Fund, various years).

The tax revenue and GDP data are from IMF sources, including various country reports and the International Financial Statistics Yearbook. The study obtained data on tax revenue published by governments of the countries under study. The sectoral shares of GDP were obtained from the World Bank Development Indicators.

The estimations of tax capacity and tax effort were carried out using STATA 12 and Eviews 6 econometric software packages.

Table 6.11 Methods and variables description

Analysis	Variable Abbreviation	Variable name	Description
Cross Sectional	Ser	Services, value added (% of GDP)	Include wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and education, health care ...etc. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.
	Agr	Agriculture, Added value ( % of GDP )	Includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.
	Fsf	Index of Fiscal Freedom	Measures the fiscal burden in an economy, i.e., top tax rates on individual and corporate income; 0 = least fiscal freedom, and 100 = maximum degree of fiscal freedom.
	Bf	Index of business freedom	Measures the time and efforts of business activity ranging; 0 = least business freedom, and 100 = maximum business freedom.

Contd.

Following Table 6.11 Methods and variables description

Analysis	Variable Abbreviation	Variable name	Description
Cross Sectional	Cir	Currency in Circulation % of GDP	Currency outside the banks as a proportion of GDP
	Tf	Index of Trade Freedom	Measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services.
Panel Data Analysis	Agr	Agriculture, Added value ( % of GDP )	Includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.
	Fy	Foreign trade ( Imports + Exports) % of GDP	The sum of exports and imports of all goods and services measured as a share of gross domestic product.
	Ari	Annual Rates of Inflation ( % growth )	Measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals (annual %).
	Ef	index of Economic Freedom	Economic Freedom Index; 0 = least economic freedom, and 100 = maximum economic freedom.
	Cpi	Corruption Perceptions Index	The CPI focuses on corruption in the public sector. The scale from 0 to 10, where 0 is the highest level of perceived corruption, where the country with the lowest score is the one perceived to be the most corrupt and 10 is the lowest.
	Sde	Shadow Economy index	Weighted average size of the shadow economy (as a percentage of gross domestic product). Measure of informal economy caused by economy reasons. Estimated for 162 countries during 1999-2007 using multiple indicator-multiple causes model.

*Tax burden (Ty) was taken as a dependent variable.*

Panel data analysis, including the same set of variables used in cross sectional data, gave a significantly large number of missing values for several countries for several years. Therefore, variables included as predictor variables in panel analysis were based on the same logic adopted in cross sectional data analysis (based on model performance measures).

The data on all the variables are quantitative in nature and are continuous. A sample of 38 oil producing countries was taken for this study (using the panel regression model). Initially a sample of 56 oil producing countries was taken and the data on all the variables for the time period 2001 to 2007 were recorded. This was reduced to 38 as the data on all the variables for all the years for the period 2001 to 2007 was not available for all the countries. Therefore only those countries which reported data for all the variables for all the years during 2001 to 2007 were included as a part of the analysis. The list of variables included for cross sectional and panel regression model analysis is presented in table 6.11.

Table 6.12 The International data sources

Variable symbols		Variable name	Data Sources
Dependent variable	Ty	Tax revenue (% of GDP)	Economic Commission for Latin America and Caribbean (ECLAC), Economic Survey of Latin America and Caribbean, 2009-2010., and World Bank, World Development Indicators database. Zimbabwe: 2001-2003 from African Economic outlook, AFDB/OECD, 2003; data of 2004 were estimated; and 2005-2007 General government revenue % of GDP from Economy watch: <a href="http://www.economywatch.com">http://www.economywatch.com</a> .
Independent variables	Agr	Agriculture, Added value (% of GDP)	World Bank
	Ser	Services, value added (% of GDP)	World Bank; OECD National Accounts data.
	Fy	Foreign trade ( Imports+exports) % of GDP	LSE London School of Economic database.
	Ari	Annual Rates of Inflation (% growth)	International Marketing Data and Statistics, Euromonitor International Plc; 33rd edition, 2009., Data of 2001 estimated.
	Ef	Index of Economic Freedom	Heritage Foundation.
	Cpi	Corruption Perceptions Index CPI	Transparency International Organisation.
	Sde	Shadow Economy index	Friedrich Schneider; Andreas Buehn ; and Claudio E. Montenegro . " Shadow Economies All over world - new estimates for 162 countries from 1999 to 2007 " , The world Bank , Development Research Group , July 2010 , WPS5356 .

Follows Table 6.12 The International data sources

Variable symbols		Variable name	Data Sources
Independent variables	Cir	Currency in Circulation % of GDP	IMF, and LSE London School of Economic database, and ESCWA Economic and social commission for western Asia.
	Bf	Index of Business Freedom	Heritage Foundation.
	Tf	Index of Trade Freedom	Heritage Foundation.
	Fsf	Index of Fiscal Freedom	Heritage Foundation.

## 6.5 .4. Analysis and Results.

### 6.5.4.1 Cross Sectional Analysis.

Cross sectional data analysis is performed by taking the mean of the variables for both dependent and independent variables in the regression model. Taking the mean for all variables in both sides of the regression equation does not ignore any big difference between these variables.

Table 6.13 gives the descriptive statistics for all the variables.

**Table 6.13 Descriptive Statistics of variables included in cross sectional analysis**

	Minimum	Maximum	Mean	Std. Deviation
Ty	1.5197	28.457	15.1456	7.8044
Ser	24.126	65.686	49.079	9.852
Fsf	53.028	99.900	75.596	11.9284
Bf	34.285	75.814	59.5273	9.7420
Cir	1.476	2170.657	570.874	697.828
Tf	26.142	77.828	61.4403	11.701
Agr	.39954	45.4446	13.6202	11.295

Cross sectional analysis is performed by fitting a multiple regression model with mean of variables representing sample realisations.

Countries used in the cross sectional data analysis consisted of 34 oil producing countries which were: Algeria, Bangladesh, Belize, Benin, Bolivia, Botswana, Brazil, Chile, Colombia, Ecuador, Egypt, Ethiopia, Gabon, Ghana, Guatemala, Guyana, Indonesia, Iran, Kenya, Kuwait, Libya, Mauritania, Oman, Peru, Saudi, South Africa, Suriname, Syria, Trinidad and Tobago, Tunisia, Emirates, Yemen, Zambia, Zimbabwe, using data for the period of 2001-2007.

The fitted regression model gives coefficient of determination  $R^2 = 0.622$ , Adjusted  $R^2 = 0.593$ . The overall regression model fitted was statistically significant as indicated by the ANOVA F test ( $F(6, 27) = 7.420, p < 0.001$ ). Tolerance level and Variance inflation factors (VIF) were computed for each predictor variable. All the VIF values were below 3.00, which indicates that there was no problem of multicollinearity in the fitted regression model. Table 6.14 reports estimates of regression coefficients, their standard errors, t statistics values, and associated p values to test the significance of each predictor variable included in the model.

Table 6.14 Model parameter estimates and test for their significance for cross sectional OLS regression model

	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	16.711	8.777		1.904	.068	-1.298	34.720		
Ser	.232	.099	.293	2.345	.027	.029	.436	.893	1.119
Fsf	-.444	.102	-.678	-4.347	.000	-.653	-.234	.574	1.741

Follows Table 6.14 Model parameter estimates and test for their significance for cross sectional OLS regression model

	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
Bf	.365	.118	.456	3.095	.005	.123	.607	.644	1.552
Cir	.002	.002	.198	1.471	.153	-.001	.005	.770	1.299
Tf	-.010	.097	-.015	-.106	.917	-.209	.189	.661	1.514
Agr	-.132	.093	-.192	-1.427	.165	-.323	.058	.775	1.291

Three predictor variables included in the model were found to be statistically significant predictors of tax burden. These were: Services, value added as % of GDP " Ser " (  $t= 2.345$  ), Index of Fiscal Freedom " Fsf" (  $t=-4.347$  ), and Index of Business Freedom" Bf " (  $t= 3.095$  ). Other variables included in the model were statistically not significant predictors of Ty.

The effect of the relative importance of the agricultural sector was weak on the taxable capacity of oil-producing countries in Libya during the period under study, in the sense that the taxable capacity was not responding to changes in the agricultural sector product. According to the cross-sectional analysis, this weak relationship was negative and statistically not significant. This is attributed to the agricultural sector not representing great importance in the structure of GDP in Libya, as well as the exemption of the agricultural sector from taxation.

According to cross-sectional analysis, the product of the service sector and index of business freedom were positively and significantly correlated with taxable capacity, while the index of fiscal freedom was

negatively correlated with taxable capacity in Libya and other oil-producing countries under study during the period 2001-2007.

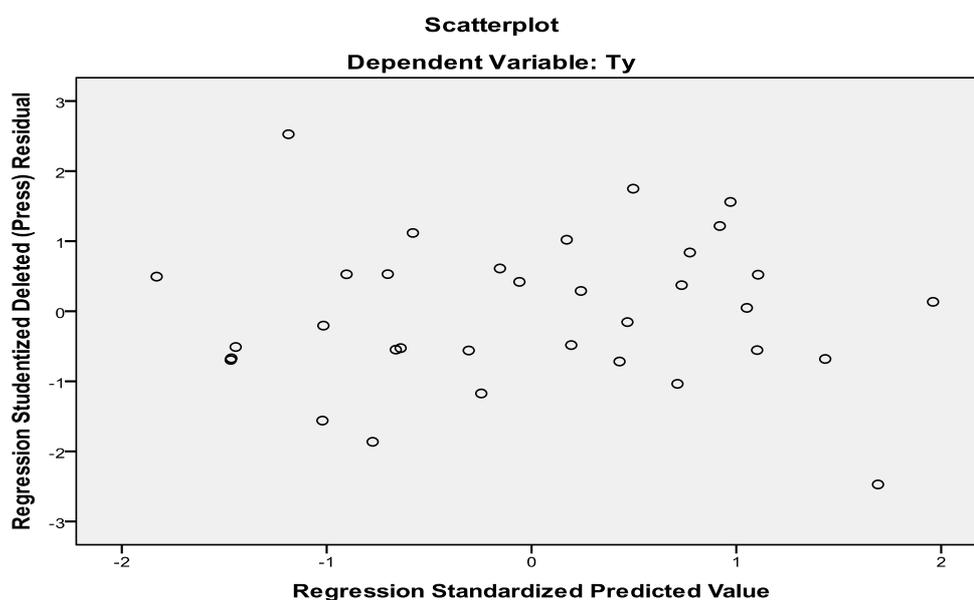
There was a relationship, semi-strong, positive and significant, between the service sector product and the taxable capacity in Libya and other oil-producing countries under study. According to the cross-sectional data, the study showed that the increase in the relative importance of the product of this sector at 10% leads to an increase in the contribution of taxes in GDP at (2.3%) during 2001-2007.

Applying the cross-sectional analysis, the currency in circulation, the index of trade freedom, and the agriculture added value were statistically not significant in determining the taxable capacity.

There was a positive relationship between currency in circulation and the taxable capacity. However, there was a negative relationship between the taxable capacity and the index of trade freedom on the one hand and agricultural product on the other.

To summarise, Services as a percentage of GDP and index of business freedom were positively and significantly correlated with taxable capacity. This means that as the percentage of services in GDP and level of business freedom increases, the associated taxable capacity is expected to increase. However, index of fiscal freedom is negatively correlated with tax burden when controlled for other variables.

*Figure 6.1 Residual plot of the regression analysis performed.*



An important assumption of the classical linear regression model is that the error terms have the same variance, meaning to be homoscedastic. The violation of this assumption results in the heteroscedasticity problem. Figure 6.1 shows scatterplot of the studentized residuals against the standardized predicted values of dependent variable Ty . Values along the horizontal axis are the standardized predicted Ty, and vertical axis are studentized residuals Ty. The scatterplot shows that the residuals fall between -3 and +3 . Also , it reveals that the most points are in a constant horizontal band , this means that the residuals are randomly scattered around zero (the horizontal line) , and no systematic pattern between the residuals and predicted values , suggesting the absence of heteroscedasticity problem in the data , and the model fits well, because the assumption of constant variance is not violated.

According to the figure 6.1 of Residual plot of the regression model for cross sectional analysis, the residual plot gives a healthy pattern of random scatter of residual values in the scatter plot indicating that assumptions of the regression model are satisfied.

#### **6.5.4.2 Panel Data Analysis.**

Panel data analysis was conducted by taking countries as panel elements and year as time index. Panel data regression offers several forms of the model based on the assumption of homogeneity of estimates, either for time or for panel elements. In this study a mixed (both fixed and random effects included) is performed. Robust standard errors were extracted to account for any deviation from homogeneity of error variance assumption.

Countries used in the panel data analysis were 38 oil producing countries, namely: Algeria, Argentina, Bahrain, Bangladesh, Bolivia, Botswana, Brazil, Cameroon, Chad, Chile, Colombia, Rep. of Congo, Côte d'Ivoire, E.Guinea, Ecuador, Egypt, Emirates, Ethiopia, Ghana, Guatemala, Guyana, Indonesia, Iran, Kenya, Kuwait, Lesotho, Libya, Mauritania, Nigeria, Oman, Peru, Saudi, T.Tobago, Tunisia, Venezuela, Yemen, Zambia, Zimbabwe.

Hausman's test is used to validate the consistency and efficiency of parameter estimates fitted using random effects model after making a comparison with fixed effect model as an alternative. Hausman's test confirms the appropriateness of the model form taken, as results clearly indicate that it is not possible to reject the null hypothesis of consistent and efficient estimates from the fitted model compared to the alternative ( $\chi^2(6) = 0.228, p = .996$ ). Table 6.15 reports the summary of results of panel data regression. The overall model is reported as statistically significant (Wald  $\chi^2$

(6) = 93.04,  $p < .001$ ). This means that there was at least one significant predictor of the dependent variable in the fitted panel regression model.

Table 6.15 Panel data mixed effect regression model parameter estimates and test for their significance.

	Robust					
	Coef.	Std. Err.	Z statistics	P> z	[95% Conf. Interval]	
Agr	.0471756	.2146138	0.22	0.826	-.3734597	.4678109
Fy	-.0808207	.0274052	-2.95	0.003	-.1345339	-.0271076
Ari	-.0006022	.0001205	-5.00	0.000	-.0008383	-.000366
Ef	.8564374	.8210275	1.04	0.297	-.752747	2.465622
Cpi	-5.096667	5.736827	-0.89	0.374	-16.34064	6.147308
Sde	.3979752	.2620084	1.52	0.129	-.1155518	.9115021
_cons	-24.76919	34.03386	-0.73	0.467	-91.47434	41.93595

The assessment of significance of each predictor variable reveals that foreign trade as a percentage of GDP and annual rates of inflation were significant predictors of tax burden in the set of predictors included in the model. Signs of the regression coefficient estimated were negative for these significant predictors. Other variables included in the panel data regression model were statistically not significant ( $p > .05$ ), with different signs (+/-). According to panel data analysis, foreign trade and the rate of inflation were negatively significantly correlated with taxable capacity in Libya and oil countries under study during the period 2001-2007. Also, the taxable capacity correlated positively with these variables: agricultural product, the index of economic freedom, the shadow economy index, while it correlated negatively with corruption perceptions index. However, these variables were statistically not significant in determining the taxable capacity.

Based on the panel regression results, both the actual tax burden and tax capacity of 38 oil producing countries were obtained, as presented in table 49 and table 50 respectively, in the statistical appendix.

There were two stages involved in estimating tax effort. First, using fitted panel regression model and substituting the values of the predictor variables to get the estimated expected tax revenue (potential tax revenue or simply, estimated taxable capacity of a country). Second, the ratio of actual tax burden to estimated taxable capacity was then computed for each country for each year for the period 2001 to 2007. This ratio is called the tax effort.

Using the panel data method, the level of taxable capacity was low in Libya compared to some oil-producing countries, in that estimated taxable capacity in Libya was about 2.22 during the study period. The reason behind that decline in taxable capacity was the narrow tax base, and a failure to diversify the sources of tax, as well as the public sector being subject to tax (see table 53 in the appendix).

Table 6.16, Average tax effort in selected oil producing countries, 2001-2007.

Country	average tax effort	Country	average tax effort	Country	average tax effort
Algeria	1.119	E.Guinea	1.297	Libya	2.549
Argentina	0.641	Ecuador	0.748	Mauritania	1.785
Bahrain	1.179	Egypt	0.781	Nigeria	0.409
Bangladesh	0.321	Emirates	0.404	Oman	5.891
Bolivia	0.481	Ethiopia	0.394	Peru	0.414
Botswana	1.712	Ghana	0.197	Saudi	0.436
Brazil	0.748	Guatemala	0.302	T.Tobago	1.004
Cameroon	0.58	Guyana	0.906	Tunisia	2.167
Chad	0.34	Indonesia	0.673	Venezuela	0.282
Chile	1.659	Iran	1.802	Yemen	0.518
Colombia	0.614	Kenya	0.584	Zambia	0.576
Congo.Rep	0.811	Kuwait	0.185	Zimbabwe	1.115
Côte d'Ivoire	0.451	Lesotho	3.416	Overall Average	1.039

Source, Table 51 in the statistical appendix .

Table 51 in the appendix shows the estimated tax effort in the selected oil producing countries, 2001-2007. The average tax efforts for selected countries during the same period are presented in table 6.16. This table contributed to this study by helping to hold the comparison of the tax effort between Libya and the rest of the countries in the study sample.

According to the literature ( Mertens, 2003; Begum, 2007; Hoek, 2008; Le et al., 2008; AFDB/OECD, 2010) any country with tax effort value more than 1.00 indicates high tax effort and those with tax effort value less than 1.00 indicates the existence of a low tax effort.

According to the panel data analysis, the index of national tax effort in Libya indicates an approximate value of 2.55 as an average for 2001-2007, which is high compared to some oil-producing countries. This means that the Libyan economy has exceeded its full utilisation of the taxable capacity.

Table 52 in the appendix provides the comparison of each country's mean actual tax burden in relation to the overall mean tax burden for all samples. Out of a sample of 38 countries, 18 countries were found to have high tax burden status with the remaining 20 low tax burden countries. Libya was one of the countries with lower than average tax burdens.

Table 53 in the statistical appendix shows the comparison of each country's mean estimated taxable capacity in relation to the overall mean taxable capacity for all the countries. Out of a sample of 38 countries, 19 countries had high taxable capacity, whilst the remaining 19 had low taxable capacity: Libya was one of them.

Table 6.17 provides a cross tabulation of taxable capacity status against tax burden status.

Eleven countries fall in the categories of high tax capacity and high tax burden status: these were Algeria; Bolivia; Brazil; Colombia; Congo.Rep; E.Guinea ; Guyana; Kenya ; Nigeria ; T.Tobago; Zambia. Eight countries fell in the categories of high taxable capacity and low tax burden. These countries were Bangladesh; Cameroon; Chad; Côte d'Ivoire; Ethiopia; Ghana; Guatemala; and Peru. This means that these countries were not fully utilising the taxable capacity of their economies and they had opportunities to increase tax rates thus enhancing government tax revenues to be potentially used for economic development. Only seven countries fell into the categories of low taxable capacity and high tax burden: these seven countries were Botswana; Chile; Egypt; Lesotho; Mauritania; Tunisia; and Zimbabwe. Finally, twelve countries fell in the categories of low taxable capacity and low tax burden.

**Table 6.17 Cross table of Taxable Capacity and Tax Burden**

taxable capacity	Tax burden			
	High		Low	
High	Algeria	Guyana	Bangladesh	Ethiopia
	Bolivia	Kenya	Cameroon	Ghana
	Brazil	Nigeria	Chad	Guatemala
	Colombia	T.Tobago	Côte d'Ivoire	Peru
	Congo.Rep	Zambia		
	E.Guinea			
Low	Botswana	Mauritania	Argentina	Kuwait
	Chile	Tunisia	Bahrain	Libya
	Egypt	Zimbabwe	Ecuador	Oman
	Lesotho		Emirates	Saudi
			Indonesia	Venezuela
			Iran	Yemen

These were: Argentina; Bahrain; Ecuador; Emirates; Indonesia; Iran; Kuwait; Libya; Oman; Saudi; Venezuela; Yemen.

#### **6.5. 5. Summary of the empirical results.**

Both cross sectional and panel data analysis were performed in this study covering data for the period 2001 to 2007. In cross section analysis the share of services in GDP and indices of fiscal and economic freedom were found to be significant influencers of tax capacity for all countries.

Specifically, the share of services in GDP and level of business freedom given in the country were found to be positively and significantly correlated with tax capacity, while index of fiscal freedom was negatively correlated with tax capacity.

The panel data analysis, which incorporated the dynamic of changes over time, conducted in this study revealed that foreign trade and inflation were significant predictors of tax capacity.

According to the research analysis, Libya was one of 12 out of 38 oil-producing countries with low tax capacity and low tax burden.

## **Chapter Seven: Conclusions and recommendations of the study.**

### **7.1 Summary of this study:**

This dissertation has provided a comprehensive study of Libyan tax system, structure and its evolution for the period of 1970 to 2005 (chapter 3, 4, and 5). Moreover, the measurement of the taxable capacity and the tax burden in the Libyan economy during the period 1970-2000 have also been examined using OLS, ORR and URR approaches. Furthermore, the major determinants of tax effort of Libya have been explored and discussed in comparison with a range of oil-producing countries for the period 2001-2007, using both cross-sectional and panel analyses.

This study shows that Libyan tax revenue derives primarily from indirect taxes, such as import tax and production tax. It has also found that the marginal propensity to indirect taxation exceeds the marginal propensity to direct taxation. One of the key findings of this study reveals that there is a low tax burden with a lower taxable capacity in Libya.

It is also noted that the impact of economic factors on the level of taxable capacity in Libya varied significantly over the study period.

### **7.2 Empirical results of the study.**

#### **7.2.1. The main empirical results.**

The empirical study of this work found the following results:

First, indirect taxes are heavily relied upon and the importance of direct taxes in tax revenue is relatively small. During 1970-2005, the relative importance of indirect taxes reached on average 60% of tax revenue, compared to 40% for direct taxes, despite of the higher growth of the direct tax rate (11%), than that of indirect taxes (9.5%).The predominance of

indirect taxes in the Libyan tax structure may be attributed to a number of reasons, including the high relative importance of the foreign trade sector, high marginal propensity to consume of the consumers, the participation of all residents in the burden of indirect taxes, the integration of indirect taxes in relation to the prices of goods and services, the clarity of the indirect tax base; the ease of collecting such taxes; and the difficulty of payment evasion. Meanwhile, the decline in the relative importance of direct taxes in Libya was due to the narrow income tax base in general.

Second, the marginal propensity to tax was generally high, as this indicator reached 0.03 for direct taxes, 0.05 for indirect taxes and 0.08 for total taxes. In the case of tax on the non-oil sector's product, an increase in the non-oil sector's product by one Libyan Dinar was taxable at 0.08 of the Dinar.

Third, the Libyan tax system was not effectively responding to the changes in the non-oil sector product during 1970-2005. This was illustrated by the low coefficient of income elasticity of tax, which amounted to 0.63 for direct taxes, 0.65 for indirect taxes and 0.56 for total taxes. This means that the change in the revenue of non-oil sector product during the study period led to only a small change in the tax revenue.

Fourth, the tax burden in Libya was relatively high in relation to citizen's income. This was evident from the per capita tax, which was on average LYD480 per year during 1970-2005, which was equivalent to LYD40 per month on average. It was a high burden compared to the growing cost of living and to average per capita income, which was close to LYD498 a month. It was estimated that the tax burden per capita was in the range of 8%, necessitating a reduction in this burden so as not to adversely affect the level of taxable capacity in the Libyan economy.

In contrast, the tax bases in Libya were weak during the study period, due in part to tax avoidance and tax evasion. In addition, there was a lack of information that could be used to monitor tax compliance (Stiglitz et al., 2006). Specifically, the reasons contributing to the narrow tax bases including: poor economic performance of most public productivity projects, reduction of the private sector's role in economic activity, nullification of estate tax, postponement of some taxes such as income on agriculture tax, expansion of the black market and low rate of return of investment due to oil prices' instability.

Fifth, the income tax rates were inconsistent with other tax bases. For example, the average rate of estate tax (its base is an income resulting from capital) was 20%, which is less than the average rates of the rest of the specific progressive income taxes, which are the taxes deducted from the incomes resulting from the work element only, or income from work and capital elements together. For example, the average rate of tax on commerce, industry and crafts (the income source of which is both capital and work) was 25%.

Finally, Libyan tax legislation is complex. Its implementation lacks stability, and the continuation of adjustments sometimes does not comply with the tax law. The tax system also suffers from excessive complexity in its administrative procedures for assessing and collecting tax. As a result, there is a widespread tax evasion and avoidance and a high cost of collection, all of which adversely affected the country's taxable capacity. During the study period, the growth rate of the tax legislation penalties in Libya reached 11%, and as an example of the effect of this, customs penalties were up to LYD12.4 million in 1997. This was a clear indication of low tax

consciousness and the phenomenon of tax evasion. In the meantime, however, there was an over-collection of tax. This overtaxing was for a number of reasons such as: finance the public budget, absence of efficient tax policy, and absence of studies on tax effort. This excessive tax imposed by several ways, such as: arbitrary tax assessment, exceeding the planned tax revenue in some years, raising some tax rates, and imposing new taxes. It exceeded, at high and ongoing rates, the planned targets under the law of the annual public budget, during the vast majority of the years under study in Libya. According to table 42 (see the statistical appendix) the excess of tax collection was about LYD535 million on average between 1970-2005, which indicates a high tax burden inside the Libyan economy.

### **7.2.2. Regression results.**

This section details the regression results of this study.

#### **7.2.2.1. The ORR: Determinants of Libya's Tax Capacity between 1970 and 2000.**

Here the period 1970-2000 was chosen in order to obtain the best estimates, and also because the period 2001-2007 was analysed using other methods (cross-sectional and panel data). The period 1970-2000 was used to study the tax effort inside Libya only; therefore, OLS, ORR and URR methods were used. In contrast, the period of 2001-2007 was used for comparison of the tax effort between Libya and the other countries in the study. Therefore, the cross sectional and the panel data methods are appropriate for these international comparisons.

Firstly, according to the ORR, there was a negative relationship between oil revenues and taxable capacity in Libya for the period 1970-2000. The regression result shows that increasing the oil revenues by 100% led to a reduction in taxable capacity of 3%. This negative relationship was due to reduced reliance on tax revenues in the years when there was a rise in oil revenues. In other words, when oil revenues increased, there was no urgent need for tax revenues. In fact, as one of the measures of fiscal policy, the Libyan government even reduced taxes and increased public spending when oil revenues increased.

Secondly, according to the ORR, there was a positive relationship between tax penalties and taxable capacity in Libya over 1970-2000. The regression results indicate that increasing tax penalties by 100% led to an increase in tax capacity of 8%. This positive relationship is attributed to these penalties encouraging taxpayers to comply with tax payment on time.

Thirdly, according to the ORR, there was a positive relationship between money supply (in the narrow M1 sense) and taxable capacity in Libya during 1970-2000, to the extent that increasing the money supply by 100% led to an increase in tax capacity of 11%. This relationship was positive because the increase in the money supply led to an increase in the volume of transactions and trade exchanges that were subject to tax.

#### **7.2.2.2. Cross-sectional Regression: Determinants of Libya's Tax Capacity between 2001 and 2007, and Comparison with that of Selected Oil-Producing Countries.**

The cross-sectional regression yielded the following results. Firstly, the importance of the agricultural sector was weak in terms of taxable capacity both in Libya and in other oil-producing countries during the period under

study, although this weak relationship was not statistically significant. This is attributed to the agricultural sector not representing great importance in the structure of GDP in these countries. Some areas of the agricultural sectors were even exempted from taxation.

Secondly, according to the cross-sectional analysis, the product of the service sector and index of business freedom were positively and significantly correlated with taxable capacity, while the index of fiscal freedom was negatively correlated with taxable capacity in Libya and oil-producing countries under study during 2001-2007; this was because the high index of fiscal freedom indicates a relative decline in the level of state intervention in economic affairs. This led to lower taxable capacity.

Thirdly, there was a positive relationship between currency in circulation and taxable capacity. At the same time, there was a negative relationship between taxable capacity and the index of trade freedom. This is a natural result of the reduction of some customs tax and barriers; this led to lower tax revenue and decreased taxable capacity in the short term. Also there was a negative relationship between taxable capacity and the agricultural product, for several reasons such as: tax exemption to the private agricultural sector, high degree of risk in this sector, and decline in the relative importance of the agricultural sector in most oil-producing countries.

#### **7.2.2.3. Panel data regression: Determinants of Libya's Tax Capacity between 2001 and 2007 and Comparison with that of Selected Oil-Producing Countries.**

First, it was found that using the panel data method, the level of taxable capacity was lower in Libya compared to some oil-producing countries. It was estimated that taxable capacity in Libya was about 2.22 during 2001-

2007, whereas the overall average of the taxable capacity in selected oil-producing countries was 20.15 during the same period. The reason behind the relative lower taxable capacity in Libya was Libya's narrow tax base, and the failure to diversify the sources of tax, as shown by the fact that the relative importance of non-oil product to GDP in Libya has decreased from 36.9% in 1970 to 34.5% in 2005 (see table 2 in the statistical appendix). Second, according to the panel data analysis, the index number of national tax effort in Libya was very high, reaching 2.55 on average for 2001-2007 compared to some oil-producing countries, where the overall average of the tax effort in selected oil-producing countries was 1.039 during the same period.

Third, the panel data analysis also showed that taxable capacity was positively correlated with the following variables: the index of economic freedom, and the shadow economy index. However, it was negatively correlated with the corruption perceptions index. This is consistent with the results reported by LeTuan Minh, Moreno-Dodson, Blanca, Rojchaichaninthorn and Jeep (2008). However, these variables were not statistically significant in determining the taxable capacity.

Fourth, according to the panel data analysis, foreign trade and the rate of inflation were negatively and significantly correlated with taxable capacity in Libya and oil-producing countries under study for the period 2001-2007. This is consistent with the results reported by Davoodi and Grigorian (2007) and Agbeyegbe, Stotsky, and WoldeMariam (2004), who found that there is an inverse relationship between the rate of consumer price inflation (as an independent variable) and taxable capacity (as a dependent variable). This negative relationship between foreign trade and taxable capacity was due to the high percentage of oil exports, this means that an increase in oil revenues

leads to reduce the need to high tax revenues; the other reason for this is that most non-oil exports are exempt from taxes. And most imports are necessary goods and exempted from tax or subject to low customs taxes.

### **7.3 Implications and recommendations of the study.**

Based on the above analyses and results, the author makes following recommendations:

#### **To promote tax equity**

Libya's tax system should be adjusted to suit local and external conditions. The tax burden should be distributed in an equitable manner. Specifically, the marginal propensity to tax should be reduced by lowering the tax rates. The imposition of progressive rates of tax should be consistent and in harmony with the nature of the tax base on the one hand, and with the ease of collecting income on the other.

#### **To consider tax convenience**

The varieties of taxable income should be expanded in proportion to the financial ability of the taxpayer. However, double taxation should be avoided. Moreover, given the income elasticity of taxation, both direct and indirect tax should be increased in order to achieve other economic and social purposes of taxation more efficiently.

#### **To restructure tax system**

There is an urgent need to restructure Libya's tax system. Given Libya's high tax burden, the authorities should reduce both direct and indirect taxes. On the one hand: there is a need to moderate the direct taxes and provide more exemptions from the collection of direct taxes, taking into account the financial ability of the taxpayer; the types of necessary goods subject to tax exemption or reduction should be accurately identified, so that this identification takes into account the social, economic and cultural

developments that have made many goods necessary. On the other hand, indirect taxes should also be reduced due to their wide coverage and direct link with increasing costs of living. It is necessary to perform large cuts to tax rates on imports, especially on essential goods and products with a low elasticity of demand. The types of necessary goods subject to tax exemption or reduction should be accurately identified, so that this identification takes into account the social, economic and cultural developments that have made many goods necessary over time.

**To expand the tax base**

The Libyan authority may consider expanding its tax base and tax capacity by adopting rates appropriate to the financial ability of the taxpayer. These can be achieved by increasing the growth rates of the existing economic sectors, establishing new and productive investment projects, encouraging private saving and investment, and improving the performance of the public sector.

The following measures may be introduced to expand the tax base and tax capacity.

1. Increase commodity exports by establishing a production base for export-oriented industry, according to Libya's economic conditions, and providing all the facilities for these industries in the early stages, so that the tax base can be relied upon in the long run.
2. The size of the black market and street vendors should be monitored or even limited.
3. Foreign workers' income should be included in the tax base in accordance with taxable employment contracts.
4. Unified and more clarified tax legislation should be promulgated, combining all the legal provisions relating to all taxes (direct and indirect),

so that they can be implemented easily. The phenomena of tax evasion and avoidance should be addressed and tax assessment and collection procedures should be simplified.

5. The tax administration should be improved and strengthened. This can be achieved by improving the taxpayer service, introducing incentive systems for employees in the tax administration, not imposing financial obligations except by law, developing accurate legal and economic standards for tax assessment and collection, and not relying on presumptive assessment.

6. A tax database should be constructed, developing a coordinated and integrated system for these data with information technology.

7. Specialised centres of tax research may be established to study and analyse the changes in economic activities and the performance of different sectors, developing appropriate standards to measure taxable capacity.

#### **7.4. Contribution of this study.**

The motivation for this study derived from a recognition that Libya was an economy highly dependent on the revenues of its oil reserves, and that tax policy might be constraining the economy's capacity to diversify. From this working theory it was conjectured that a change in tax policy might allow for faster diversification and growth in the Libyan economy, and that therefore an investigation of the taxable capacity and tax burden of Libya must be undertaken, including an analysis of these factors in comparison with other oil producing countries that may be facing problems of revenue dependency similar to Libya's.

There are several contributions made by this study. First, according to the knowledge of the author, this is the first of its kind to provided

comprehensive analyses for Libya's tax system, structure and performance for the time period of 1970 and 2005. Based on the time series analysis, it has found that Libya's tax burden was high in relation to people's income, while the tax base was narrow and weak inside the Libyan economy. Based on the cross-section and panel data analyses, this research has found that Libya's taxable capacity was relatively low in comparison with other selected oil-producing countries. Second, there are some new additions of new variables to the existing theoretical framework built by a large body of literature on taxable capacity and tax effort in developing countries (e.g., Williamson, 1961; Plasschaert, 1962; Hinrichs, 1965; Lotz & Morss, 1967, 1970; Shin, 1969; Bahl, 1971; Chelliah, 1971; Chelliah, Bass & Kelly, 1975; Tait & Eichengreen, 1978; Truong & Gash, 1979; Askari, Cumming & Glover, 1982; Musgrave & Musgrave, 1989; Leuthold, 1991; Abu Hammour, 1997; Al Mutawkel, 2000; Eltony, 2002; among others) to study the impact of tax effort on developing countries. Although numerous variables were used in the previous studies, to examine the determinants of tax effort, some other important variables were overlooked. In the current study, several new variables including oil revenues, non-oil exports, tax penalties, currency in circulation, and narrow money supply (M1) are added to the framework. These are pioneering and have helped to fill in a gap in the literature. Due to the additions of new variables, the research has generated some fresh results.

For example, this study found a positive relationship between the taxable capacity and the tax penalties and narrow money supply.

The reasons for increasing the tax penalties leading to an increase in tax capacity is attributed to the fact that these penalties encouraged taxpayers to comply with tax payment on time. Tax penalty was also a tool to combat tax

evasion. The reason why money supply (in the narrow sense) was positively related to taxable capacity was because the increase in the money supply led to an increase in the volume of transactions and trade exchanges that were subject to taxes.

This study also found some negative relationships between the taxable capacity and non-oil exports and oil revenue.

The inverse relationship is the result of several causes. An increase in the non-oil exports means a decrease in taxable capacity for several reasons, including: exports were exempt from taxes, and the size of non-oil exports was low. The factors explaining the inverse relationship between oil revenue and taxable capacity was mainly due to a reduced reliance on tax revenues in the years when there was a rise in oil revenues. In other words, when oil revenues increased, there was no urgent need for tax revenues. As one of the measures of fiscal policy, the government also reduced taxes and increased public spending when oil revenues increased.

The aforementioned new variables were employed in statistical tests to analyse the taxable capacity, tax burden and tax base, in line with previous literature (see Toye, 1978). However, these variables have not been included in previous studies into the tax systems of developing countries, and the emphasis on oil revenues and non-oil exports is vital to establishing a picture of the future taxable capacity of a nation and its potential to grow in non-oil areas of its economy. Whereas previous researchers such as Amin (2008) and McGee (2008) regarded tax effort as a representative of the government's willingness to exploit available taxable capacity, this study widens the perspective of taxable capacity to include the ability of private individuals to pay, and the logic of employing oil revenues to fund salaries

in the public sector that are then taxed, leading to the circulation of money at considerable administrative expense but with little positive effect on tax effort.

Finally, this research makes recommendations of a practical nature that, if adopted, would increase the people's ability to pay and the state's ability to collect taxes. Specifically, it has demonstrated how the Libya government may diversify the Libyan economy and encourage growth in the non-oil private sector and private sectors through an appropriate taxation mechanism.

The study's findings suggest that as a country moving from a command economy towards a liberalised capitalist economy, Libya needs to be sensitive to fluctuations in tax burden and willing to change the thrust of their tax policy to encourage growth in the private sector, even at the expense of short term reductions in tax revenue: the tax base needs time to expand, and will not do so if it is subjected to levels of tax burden found by this study.

Overall, this study contributes to the literature on tax policy, particularly in terms of concerning how to improve the tax effort through linking between oil policy, trade policy, monetary policy, as well as tax policy. The findings and recommendations of this study provide important suggestions for decision makers and others concerned with Libyan economy and tax system in Libya

#### **7.5. Limitation of this study and a proposal for future studies:**

The author of this study acknowledges that there is a limitation of this study: The study was constrained by the availability of the data used. For example,

there is a lack of the required data for representative tax system RTS and Kalman filter methods such as comprehensive tax revenue coverage classified by each economic sector, especially taxes in the oil sector and administrative region, and the classified tax revenues into separated sources which reflect distinctive characteristics of the tax base. If this were not the case, a more detailed comparative study between Libya's tax effort and tax capacity and those of selected oil-producing countries could have been conducted.

This study suggests some areas of research and studies related to the subject matter which can be carried out by scholars and specialist researchers in future

This includes the following aspects and themes:

Firstly, to study the tax effort, one may take into consideration the price changes and the circumstances of the labour market. This study also suggests a future link between inflation and unemployment with tax effort and tax capacity, as the former may have adverse impacts on the latter.

Secondly, in order to reduce the tax effort, the possibilities of increasing the quality of public goods such as electricity and water services, postal services and telecommunications may be studied. Studies may be undertaken to explore how to actively expand public goods and, in pursuit of obtaining the benefits of economies of scale, which are cost-cutting rather than raising prices, should be established for these services, which constitutes an additional burden together with the tax burden for the taxpayer.

Thirdly, this research also suggests that further study the tax effort in Libya is necessary, taking into consideration the possible roles taxes may play in

the oil sector, using representative tax system RTS and Kalman filter methods.

Finally, to establish the link between tax and public expenditure, more specific studies on developing standards for efficient public expenditure should be encouraged. These may include studies on spending the proceeds of tax on services of public interest, control of return of expenditure, so as to contribute to raising the level of taxable capacity, to act as an incentive for tax compliance by the taxpayers.

### **7.6. Policy implications.**

However, notwithstanding the above recommendations, it must be acknowledged that Libya finds itself at the time of writing in a state of transition, not only from a managed economy to a more liberal one, but from a closed political system to a more democratic one. Given these circumstances the researcher makes the following further recommendations for Libya's policy makers:

- 1) The tax system should be streamlined and some of the additional taxes imposed on individuals in Libya should be abolished. Specifically the Al-jihad tax, the tax for the blind, and the tax for the Palestinian national fund should be removed from the list of taxes imposed, for the reasons that the cost of collecting these taxes is at least as much as the revenue raised; and that they produce little utility to Libyan economy as a whole.
- 2) Most of the tax burden imposed by the Libyan state falls on the public sector. This is illogical, because in effect the state is simply taxing its own revenues, most of which are derived from the profits of oil extraction activities. Increasingly the state should be seeking to reduce

the tax burden on the public sector and to concentrate its efforts in taxation on the public sector, which is benefiting from the considerable outlay on infrastructure development the state has made in recent years.

- 3) In order to achieve the aims of point two, the state needs to take measures to increase the tax base. In almost all its previous adjustments to taxation in Libya the state has concerned itself with the tax rate and has done little to expand the tax base. This must now be a priority; the public sector must be increasingly protected from taxation, while any activities of the public sector that have the potential to be profitable and/or benefit from competition and better management practices should be privatised and become potentially revenue producing entities that expand the tax base.

## STATISTICAL APPENDIX

Table( 1 ):The Gross Domestic Product at current factors cost - by economic Sectors ( LYD million)

years	A			B	GDP	
	A1	A2	A3			
1970	33.1	22.5	420.1	475.7	812.6	1288.3
1971	33	25.1	605.7	663.8	922.7	1586.5
1972	43.6	36.6	752.2	832.4	920.6	1753
1973	60	50.8	939.7	1050.5	1131.8	2182.3
1974	64.7	56	1285	1405.7	2390	3795.7
1975	82.9	65.5	1564.8	1713.2	1961.1	3674.3
1976	99.7	90.6	1827.8	2018.1	2750	4768.1
1977	90	124.7	2122.1	2336.8	3275.9	5612.7
1978	122.1	148.7	2416.6	2687.4	2808.7	5496.1
1979	140.4	185.8	2731.5	3057.7	4545.3	7603
1980	236.4	210.4	3581.3	4028.1	6525.7	10553.8
1981	273.6	252.4	3869.5	4395.5	4403.3	8798.8
1982	285.7	265.8	4145.1	4696.6	4235.8	8932.4
1983	303	329.1	4056	4688.1	3823.6	8511.7
1984	323	361.2	3910.7	4594.9	3209.8	7804.7
1985	342.2	421.7	3587.8	4351.7	3500.4	7852.1
1986	384.6	356.1	3620.6	4361.3	2406.2	6767.5
1987	407.5	423.6	3390.5	4221.6	1711.6	5933.2
1988	399.5	448.4	3795.5	4643.4	1527.2	6170.6
1989	421.2	474.6	4283.4	5179.2	1915.5	7094.7
1990	391.1	547.1	4062.6	5000.8	2740.8	7741.6
1991	460.5	562	4620.5	5643	2783.2	8426.2
1992	486.2	686.8	5121	6294	2480.4	8774.4
1993	540.5	775.5	5452	6768	2519.5	9287.5
1994	601.5	865.5	5887	7354	2559.5	9913.5
1995	680.5	980	6257	7917.5	2675	10592.5
1996	782.5	1107	7071	8960.5	2822	11782.5
1997	1250.4	848.9	7584.2	9683.5	3204.5	12888
1998	1394.3	977.5	7452.8	9824.6	2786	12610.6
1999	1449.9	1086.4	7543	10079.3	3995.9	14075.2
2000	1439.7	1286.4	8233.1	10959.2	6661	17620.2
2001	1319.8	1129.7	12373.5	14823	7045.5	21868.5
2002	1294.7	1479.4	13391.2	16165.3	14384.1	30549.4
2003	1333	1991.9	14061.2	17386.1	20217.9	37604
2004	1328.6	2448.7	15788.7	19566	29227.4	48793.4
2005	1447.5	3131.7	18522.4	23101.6	43946.7	67048.3
Average	565.2	673.7	5453.5	6692.4	5689.6	12382.1
CAGR	11.4%	15.1%	11.4%	11.7%	12.1%	12.0%

where :

A:Non-oil economic activities , A1:Agriculture & forestry and fishing sector , A2:The manufacturing sector

A3:Other non-oil economic sectors ,  $\Sigma$ A:Total non-oil activities , B:The activity of oil and natural gas

GDP:Gross Domestic Product at current factors cost. , LYD :Libyan Dinar ., CAGR : Compound Annual Growth Rate,

Sources:

-General People's Committee for Planning, the economic and social achievements during the nine years of the Libyan revolution ,January 1989,table 9 , p.13.

-Council of arab unity , sectoral study for Libya during 1970-78 , November 1978.

-Libyan national Accounts for period of 1971-75 , table (1-1).

-General people's committee for planning ,focus on economic and social development in Libya during 1970-78 , November 1978.

-General people's committee for planning,statistical Collection , 1976 , table 5 , p.316.

-General people's committee for planning, the national accounts for 1975-80 ,January 1982 , table 2 , p.11.

-General people's committee for planning and economic and trade , national accounts for the period of 1980-92 , july 1997 , table 2 , p.29.

-The national authority for information and documentation ,statistical handbook, 1998 , No.5,table.43 ,p.44.

-Central bank of libya,the economic bulletin,1997 ,vo.37, No.4-6.

-General people's committee for planning,the social and economic indicators for 1962-96,December 1997,tables (1);(4) , p.40;43.

-General people's committee for planning, national accounts for the period of 1986-97 , December 1999 , table 2 , pp.24-25

-Economic research centre, Total Economic , financial and demographic data in Libya during 1962-2006, Benghazi, Libya , July 2009.

table ( 2 ) The structure of GDP at current factors cost -Economic Sectors ( %)

years	A1				B	GDP
	A1	A2	A3	$\Sigma A$		
1970	2.6	1.7	32.6	36.9	63.1	100
1971	2.1	1.6	38.2	41.8	58.2	100
1972	2.5	2.1	42.9	47.5	52.5	100
1973	2.7	2.3	43.1	48.1	51.9	100
1974	1.7	1.5	33.9	37	63	100
1975	2.3	1.8	42.6	46.6	53.4	100
1976	2.1	1.9	38.3	42.3	57.7	100
1977	1.6	2.2	37.8	41.6	58.4	100
1978	2.2	2.7	44	48.9	51.1	100
1979	1.8	2.4	35.9	40.2	59.8	100
1980	2.2	2	33.9	38.2	61.8	100
1981	3.1	2.9	44	50	50	100
1982	3.2	3	46.4	52.6	47.4	100
1983	3.6	3.9	47.7	55.1	44.9	100
1984	4.1	4.6	50.1	58.9	41.1	100
1985	4.4	5.4	45.7	55.4	44.6	100
1986	5.7	5.3	53.5	64.4	35.6	100
1987	6.9	7.1	57.1	71.2	28.8	100
1988	6.5	7.3	61.5	75.3	24.7	100
1989	5.9	6.7	60.4	73	27	100
1990	5.1	7.1	52.5	64.6	35.4	100
1991	5.5	6.7	54.8	67	33	100
1992	5.5	7.8	58.4	71.7	28.3	100
1993	5.8	8.3	58.7	72.9	27.1	100
1994	6.1	8.7	59.4	74.2	25.8	100
1995	6.4	9.3	59.1	74.7	25.3	100
1996	6.6	9.4	60	76	24	100
1997	9.7	6.6	58.8	75.1	24.9	100
1998	11.1	7.8	59.1	77.9	22.1	100
1999	10.3	7.7	53.6	71.6	28.4	100
2000	8.2	7.3	46.7	62.2	37.8	100
2001	6	5.2	56.6	67.8	32.2	100
2002	4.2	4.8	43.8	52.9	47.1	100
2003	3.5	5.3	37.4	46.2	53.8	100
2004	2.7	5	32.4	40.1	59.9	100
2005	2.2	4.7	27.6	34.5	65.5	100
Average	4.6	5	47.5	57.1	42.9	100

Where:

A:Non-oil economic activities , A1:Agriculture & forestry and fishing sector , A2:The manufacturing sector

A3:Other non-oil economic sectors ,  $\Sigma A$ :Total non-oil activities , B:The activity of oil and natural gas

GDP:Gross Domestic Product at current factors cost.

source : the ratios were calculated based on table 1 .

Table ( 3 ) Exports and Imports of Goods and Services in Libya\* ( LYD/million )

years	Exports		Imports		Total
	value	source	value	source	
1970	844.9	(1)	198	(1),(6)	1042.9
1971	975.1	(2),(3)	250.4	(1),(6)	1225.5
1972	997.8	(2),(3)	343.2	(1),(6)	1341
1973	1240.3	(2),(3)	539.9	(6),(12)	1780.2
1974	2489.9	(2),(3)	817.8	(6),(13),(14)	3307.7
1975	2053.2	(4)	1048.7	(6)	3101.9
1976	2881.4	(4)	950.8	(6)	3832.2
1977	3430.8	(4)	1117.1	(6),(7),(13),(15)	4547.9
1978	2978.1	(4)	1362.6	(6),(7),(13),(15)	4340.7
1979	4801.4	(4)	1572.4	(6),(7),(16),(17)	6373.8
1980	6486.4	(5),(6)	2006.2	(6),(7),(16),(17)	8492.6
1981	4609.8	(5),(6)	2481.4	(6),(7),(16)	7091.2
1982	3908.8	(5),(6),(7)	2124.3	(6),(7),(16)	6033.1
1983	3616.6	(6),(8)	1784.8	(6),(8)	5401.4
1984	3300.4	(6),(8)	1841.7	(6),(8)	5142.1
1985	3645.6	(6),(8)	1214.4	(6),(8)	4860
1986	2431.5	(8)	1315.7	(8)	3747.2
1987	2372.3	(8)	1278.1	(8)	3650.4
1988	1906.7	(8)	1677.3	(8)	3584
1989	2407.4	(9)	1475	(9)	3882.4
1990	3744.9	(10)	1510.9	(10)	5255.8
1991	3153.7	(10)	1505.4	(10)	4659.1
1992	3038.8	(10)	1422.1	(10)	4460.9
1993	2477.6	(10)	1711.3	(10)	4188.9
1994	3117.2	(10)	1487.9	(10)	4605.1
1995	3222.1	(10)	1728.5	(10)	4950.6
1996	3578.7	(10)	1914.8	(10)	5493.5
1997	3439.16	(11)	2995.1	(11)	6434.26
1998	2467.6	(18)	2660.7	(18)	5128.3
1999	3374.3	(18)	2432.9	(18)	5807.2
2000	6185.6	(18)	2690.3	(18)	8875.9
2001	5563.1	(18)	4751.2	(18)	10314.3
2002	14434.2	(18)	11087.5	(18)	25521.7
2003	18431.8	(18)	10877.8	(18)	29309.6
2004	24897.3	(18)	12917.8	(18)	37815.1
2005	39955.2	(18)	16807.9	(18)	56763.1
**Total	198.46		103.9		302.36
Average	5512.77	-	2886.16	-	8398.93
CAGR	11.6%	-	13.5%	-	12.1%

( \* ) in current prices ., Exports includes the re-exports.( \*\* ) in LYD/Milliard .

Sources :

- 1- Libyan Arab republic , Ministry of planning, foreign trade statistics, 1972,table 1 .
- 2- Planning secretariat, national income accounts(1971-75),account No.1,p.5.
- 3- Libyan Arab republic , Ministry of planning and scientific research, national accounts ( 1971-74)
- 4- The planning secretariat, the national accounts(1975-80), account No.1,p.4.
- 5- The planning secretariat, foreign trade statistics, 1985,table 1 ,p.1.
- 6- The Secretariat of information(1989)," Libya's revolution in twenty years 1969-89", table(3-15),p.525.
- 7- Central Bank of Libya , The Economic bulletin Oct/Dec 1988, Vol.28,No.10-12,table 29.
- 8- The planning secretariat, The foreign trade trends 1983-88,table 1 , p.12.
- 9- The national Authority for information and documentation, foreign trade statistics, 1995, table 1,p.1.

( turn over )

- 10- The national Authority for information and documentation, the fifth statistical handbook 1990-96, table 31, p.32.
- 11- The unified Arab economic report, sep/1998 p.287. ( the values were converted to its equivalent in local currency \$ 1=0.3704 Dirham)
- 12- The Libyan Arab republic ,planning ministry, the foreign trade statistics, 1973.
- 13- The planning secretariat , the foreign trade statistics , 1979, table 1 , p.1.
- 14- Central Bank of Libya , The Economic bulletin Jan/Mar 1978, No.1-3, table 30.
- 15- The planning secretariat , the foreign trade statistics , 1978.
- 16- The planning secretariat , the foreign trade statistics ( 1980-85 ), table 1 , p.8.
- 17- The planning secretariat , summary of the foreign trade statistics, 1980.
- 18- Economic research centre, Total Economic , financial and demographic data in Libya during 1962-2006, Benghazi, Libya , July 2009.

Table ( 4 ) Rate of change in GDP in Libya

years	GDP at current prices			GDP at constant prices 1970=100		
	LYD/million	rate of annual change %		LYD/million	rate of annual change %	
		$\Delta 1$	$\Delta 0$		$\Delta 1$	$\Delta 0$
1970	1288.3	-	-	1288.3	-	-
1971	1586.5	23.1	23.1	1625.5	26.2	26.2
1972	1753	10.5	36.1	1767.1	8.7	37.2
1973	2182.3	24.5	69.4	1964.3	11.2	52.5
1974	3795.7	73.9	194.6	3260.9	66	153.1
1975	3674.3	-3.2	185.2	2861.6	-12.2	122.1
1976	4768.1	29.8	270.1	3442.7	20.3	167.2
1977	5612.7	17.7	335.7	3925	14	204.7
1978	5496.1	-2.1	326.6	2837.4	-27.7	120.2
1979	7603	38.3	490.2	4539.1	60	252.3
1980	10553.8	38.8	719.2	5598.8	23.3	334.6
1981	8798.8	-16.6	583	4199.9	-25	226
1982	8932.4	1.5	593.3	3875.2	-7.7	200.8
1983	8511.7	-4.7	560.7	3337.9	-13.9	159.1
1984	7804.7	-8.3	505.8	2721.3	-18.5	111.2
1985	7852.1	0.6	509.5	2508.7	-7.8	94.7
1986	6767.5	-13.8	425.3	2093.3	-16.6	62.5
1987	5933.2	-12.3	360.5	1758.5	-16	36.5
1988	6170.6	4	379	1773.7	0.9	37.7
1989	7094.7	15	450.7	2013.3	13.5	56.3
1990	7741.6	9.1	500.9	2022.4	0.5	57
1991	8426.2	8.8	554.1	1970.6	-2.6	53
1992	8774.4	4.1	581.1	1828.4	-7.2	41.9
1993	9287.5	5.8	620.9	1794.7	-1.8	39.3
1994	9913.5	6.7	669.5	1776.3	-1	37.9
1995	10592.5	6.8	722.2	1759.6	-0.9	36.6
1996	11782.5	11.2	814.6	1814.6	3.1	40.9
1997	12888	9.4	900.4	1840.4	1.4	42.9
1998	12610.6	-2.2	878.9	1669.8	-9.3	29.6
1999	14075.2	11.6	992.5	1728.5	3.5	34.2
2000	17620.2	25.2	1267.7	2006.2	16.1	55.7
2001	21868.5	24.1	1597.5	2308.5	15.1	79.2
2002	30549.4	39.7	2271.3	2990.3	29.5	132.1
2003	37604	23.1	2818.9	3412.7	14.1	164.9
2004	48793.4	29.8	3687.4	4105.8	20.3	218.7
2005	67048.3	37.4	5104.4	5231.2	27.4	306.1
Average	12382.1	13.4	885.7	2657	5.9	109.3
CAGR	12.0%	-	-	4.1%	-	-

where  $\Delta 1$  : compared to the previous year ,  $\Delta 0$ : compared to the base year 1970 .

CAGR : compound annual growth rate .

source : table 7.

Table ( 5 ) The evolution of per capita nominal/real income in Libya

years	G.D.P	N	yp ( LYD )	yp ( U.S \$ )	yp * ( LYD )				
	( 1 )	( 2 )	( 3 )	( 4 )	( 5 )	( 6 )	( 7 )	( 8 )	( 9 )
	LYD million	No. million	LYD	U.S \$	1964=100	1970=100	1975=100	1984=100	2003=100
1970	1288.3	2.01	640.9	1794.7	417.8	640.9	822.7	1836.4	4244.4
1971	1586.5	2.1	755.5	2245.8	504.7	774.1	994.1	2222.1	5139.5
1972	1753	2.2	796.8	2416.7	523.9	803.2	1032.1	2302.9	5347.7
1973	2182.3	2.35	928.6	3136.1	545	835.8	1073.5	2399.5	5560.5
1974	3795.7	2.51	1512.2	5107.1	847.2	1299.1	1669.1	3724.6	8641.1
1975	3674.3	2.68	1371	4630.2	695.9	1067.8	1371	3060.3	7103.6
1976	4768.1	2.84	1678.9	5670	790.1	1212.2	1556	3476	8033
1977	5612.7	2.94	1909.1	6447.5	870.5	1335	1715.3	3825.9	8879.5
1978	5496.1	3.01	1825.9	6166.5	614.4	942.6	1210	2701	6253.1
1979	7603	3.13	2429.1	8203.6	945.5	1450.2	1862.8	4159.4	9271.4
1980	10553.8	3.25	3247.3	10966.9	1123.2	1722.7	2212.1	4942.6	11275.3
1981	8798.8	3.5	2513.9	8490	782.4	1200	1541.3	3443.7	7955.4
1982	8932.4	3.73	2394.7	8087.5	677.2	1038.9	1334.1	2978.5	6901.2
1983	8511.7	3.91	2176.9	7351.9	556.6	853.7	1096.7	2448.7	5669
1984	7804.7	3.64	2144.1	7241.1	487.4	747.6	960.2	2144.1	4963.2
1985	7852.1	3.62	2169.1	7325.6	451.8	693	890.1	1988.2	4605.3
1986	6767.5	3.67	1844	5854	371.8	570.4	732.6	1636.2	3786.4
1987	5933.2	4.07	1457.8	4906.8	281.7	432.1	554.9	1239.6	2869.7
1988	6170.6	4.23	1458.8	5102.5	273.3	419.3	538.5	1202.6	2784
1989	7094.7	4.36	1627.2	5519.7	301	461.7	593	1324	3070.2
1990	7741.6	4.52	1712.7	6051.9	291.7	447.4	574.5	1282.9	2973.4
1991	8426.2	4.8	1755.5	6161.8	267.6	410.5	527.2	1177.4	2725.9
1992	8774.4	4.9	1790.7	5999	243.3	373.1	479.2	1070.4	2550.9
1993	9287.5	5.2	1786.1	5540	225	345.1	443.2	989.5	2313.6
1994	9913.5	5.24	1891.9	5232	221	339	435.3	972.2	2159.7
1995	10592.5	5.31	1994.8	5641.4	216	331.4	425.5	950.4	2054.4
1996	11782.5	5.32	2214.8	6098	222.4	341.1	438.1	978.3	2050.7
1997	12888	4.9	2630.2	7101	244.9	375.6	482.3	1077.1	2190
1998	12610.6	4.98	2532.2	1146.3	218.6	335.3	430.6	961.4	2008.1
1999	14075.2	5.05	2787.2	1287.5	223.1	342.3	439.6	981.4	2177.5
2000	17620.2	5.13	3434.7	1871.1	254.9	391.1	502.2	1121.4	2763.2
2001	21868.5	5.2	4205.5	2715.5	289.4	443.9	570.2	1273.2	3721.7
2002	30549.4	5.33	5731.6	6956.2	365.7	561	720.5	1608.6	5608.2
2003	37604	5.4	6963.7	9088.5	412	632	811.6	1812.5	6963.7
2004	48793.4	5.49	8887.7	11087.6	487.5	747.9	960.4	2144.7	8799.7
2005	67048.3	5.57	12037.4	16274.8	612.2	939.2	1206	2692.9	11574.4

Average :

70-1979	3776	2.6	1384.8	4581.8	675.5	1036.1	1330.7	2970.8	6847.4
80-1989	7842	3.8	2103.4	7084.6	530.6	813.9	1045.4	2334.8	5388
90-2005	20598.5	5.1	3897.3	6140.8	299.7	459.7	590.4	1318.4	3914.7
70-2005	12382.1	4.1	2701.1	5969.9	468.2	718.2	922.4	2059.7	5138.6

compound Annual Growth rate(CAGR)

70-1979	21.8%	5.0%	16.0%	18.4%	9.5%	9.5%	9.5%	9.5%	9.1%
80-1989	-4.3%	3.3%	-7.4%	-7.3%	-13.6%	-13.6%	-13.6%	-13.6%	-13.5%
90-2005	15.5%	1.4%	13.9%	6.8%	5.1%	5.1%	5.1%	5.1%	9.5%
70-2005	12.0%	3.0%	8.7%	6.5%	1.1%	1.1%	1.1%	1.1%	2.9%

where , G.D.P: Gross domestic product at current factors cost-Economic sectors . , N : Number of total population , yp ( LYD ) : per capita nominal income at current price by Libyan dinar .,yp ( U.S \$ ) : per capita nominal income at current price by U.S dollar., yp \* ( LYD ) : per capita real income .

Column ( 1 ) : source , Table .1 .; Column ( 2 ) : source , Table.2.; column ( 4 ) : converted values using the exchange rates in table .3 .; columns ( 5-8 ) : converted values using the General cost of living indexes in table 4 .

Table ( 6 ) Average monthly/annual income of employees in the libyan public sector (LYD/million)

years	compensation of employees	No. of employees	average annual income per employee			average monthly income per employee		
	LYD/million	million employees	annual value*	value of annual change*	rate of annual change	monthly value**	value of monthly change**	rate of monthly change
	( 1 )	( 2 )	( 3 )	( 4 )	( 5 )	( 6 )	( 7 )	( 8 )
1970	288.7	0.4335	666	-	-	55.5	-	-
1971	415.5	0.459	905.2	239.2	36%	75.4	19.9	36%
1972	518.2	0.488	1061.9	156.7	17%	88.5	13.1	17%
1973	625.9	0.5381	1163.2	101.3	10%	96.9	8.4	9%
1974	909.6	0.6072	1498	334.8	29%	124.8	27.9	29%
1975	1068.3	0.6771	1577.8	79.8	5%	131.5	6.7	5%
1976	1221.4	0.7327	1667	89.2	6%	138.9	7.4	6%
1977	1431.7	0.765	1871.5	204.5	12%	156	17.1	12%
1978	1654.9	0.7727	2141.7	270.2	14%	178.5	22.5	14%
1979	1929.4	0.789	2445.4	303.7	14%	203.8	25.3	14%
1980	2325.9	0.8128	2861.6	416.2	17%	238.5	34.7	17%
1981	2485.8	0.9464	2626.6	-235	-8%	218.9	-19.6	-8%
1982	2766.1	1.0837	2552.5	-74.1	-3%	212.7	-6.2	-3%
1983	2770.7	1.1795	2349	-203.5	-8%	195.8	-16.9	-8%
1984	2778.5	0.9271	2997	648	28%	249.8	54	28%
1985	2408.7	0.8942	2693.7	-303.3	-10%	224.5	-25.3	-10%
1986	2241.1	0.9047	2477.2	-216.5	-8%	206.4	-18.1	-8%
1987	2052.8	0.9368	2191.3	-285.9	-12%	182.6	-23.8	-12%
1988	2431.6	0.9636	2523.5	332.2	15%	210.3	27.7	15%
1989	2839.6	0.9954	2852.7	329.2	13%	237.7	27.4	13%
1990	2646.7	1.0186	2598.4	-254.3	-9%	216.5	-21.2	-9%
1991	3193.2	1.0125	3153.8	555.4	21%	262.8	46.3	21%
1992	3550.9	1.044	3401.2	247.4	8%	283.4	20.6	8%
1993	3600.9	1.1137	3233.3	-167.9	-5%	269.4	-14	-5%
1994	3645.3	1.149	3172.6	-60.7	-2%	264.4	-5	-2%
1995	3724	1.1862	3139.4	-33.2	-1%	261.6	-2.8	-1%
1996	4341.3	1.224	3546.8	407.4	13%	295.6	34	13%
1997	5086.1	1.2551	4052.3	505.5	14%	337.7	42.1	14%
1998	5184	1.3237	3916.3	-136	-3%	326.4	-11.3	-3%
1999	5255.4	1.3838	3797.8	-118.5	-3%	316.5	-9.9	-3%
2000	5778.8	1.445	3999.2	201.4	5%	333.3	16.8	5%
2001	7224.9	1.4487	4987.2	988	25%	415.6	82.3	25%
2002	8013.2	1.4926	5368.6	381.4	8%	447.4	31.8	8%
2003	8878.1	1.5349	5784.2	415.6	8%	482	34.6	8%
2004	9923.8	1.5889	6245.7	461.5	8%	520.5	38.5	8%
2005	11782	1.6651	7075.9	830.2	13%	589.7	69.2	13%
average	3527.6	1.022	3016.5	183.1	10%	251.4	15.3	10%
CAGR	11.2%	3.9%	7.0%	3.7%	-	7.0%	3.7%	-

source : tables 8,9

(\*) LYD/year ; (\*\*) LYD/month

Table ( 7 ) The public Revenues in Libya LYD/million ( unless stated otherwise )

years	Non-oil Revenues												oil Revenues						public Revenues		sources
	TD			TI			TJ			NOR			OR			TR					
	ES	AC	ES	ES	AC	ES	ES	AC	ES	ES	AC	ES	ES	AC	ES	AC					
1970	12.5	16.2	40	50.5	16.1	25.3	77.8	82.8	468.7	453	546.5	535.8	(18),(17),(4),(2)								
1971	14.1	17.5	38.6	54.8	103.835	19.7	72.4	176.135	560	652.318	632.4	828.453	(19),(18),(17),(4),(2)								
1972	17.3	22.8	37.6	73.4	110.49	20.1	75	206.69	716	624.575	791	831.265	(19),(18),(17),(4)								
1973	*21.1	24	47	99.3	125.288	*15.6	*83.4	248.588	*285.6	604.108	*369	852.696	Approximate *(27),(19),(18),(17)								
1974	46	58.5	96.5	165.1	163.4	26.6	169.1	387	140.8	1474.279	309.9	1861.279	(19),(18),(17),(5)								
1975	33.6	85.4	134.8	220	155.349	145.7	314.1	460.749	123.2	1323.995	437.3	1784.744	(19),(18),(17),(6),(2)								
1976	52	112.1	208.2	243	257.044	124.8	385	612.144	115	2077.336	500	2689.48	(25),(19),(18),(17),(6),(3),(2)								
1977	60.1	136.8	238.6	264	349.955	162.3	461	750.755	122	2625.846	583	3376.601	(25),(19),(18),(17),(7),(3),(2)								
1978	84.5	176.6	292.2	307.4	339.738	198.3	574.9	823.738	120	2183.483	694.9	3007.221	(25),(24),(19),(18),(17),(7),(2)								
1979	83.3	197.8	293.5	393.4	430.777	179.2	556	1021.977	214	3682.176	770	4704.153	(25),(24),(19),(18),(17),(7),(2)								
1980	106	270.9	351.3	509.5	68.8	327.7	785	849.2	165	6691.9	950	7541.1	(25),(21),(20),(18),(17),(8),(2)								
1981	140	344.4	427.8	575.9	-	482.2	1050	920.3	-	3420	1050	4340.3	(25),(22),(20),(18),(17),(8),(2)								
1982	175	371.2	470.1	552.2	-	535.7	1180.8	923.4	74.2	4145.4	1255	5068.8	(25),(21),(20),(18),(17),(8),(2)								
1983	230	372.8	625.1	488	67.3	374.1	1229.2	928.1	291.2	2520	1520.4	3448.1	(25),(20),(18),(17),(2)								
1984	240	461.2	560.3	654.3	-	349.9	1150.2	1115.5	290	2125	1440.2	3240.5	(25),(20),(18),(17),(2)								
1985	230	354.3	540.3	413.9	184.4	274.7	1045	952.6	155	1846	1200	2798.6	(25),(20),(18),(17),(2)								
1986	280	329.1	490.3	401.9	189.1	315	1085.3	920.1	297	1074	1382.3	1994.1	(20),(18),(17),(9),(2)								
1987	279.435	312.3	348.732	348.5	274	437.533	1065.7	934.8	177.8	1029.7	1243.5	1964.5	(28),(20),(18),(17)								
1988	330	304	359.275	617.7	210.1	397.55	1086.825	1131.8	156.675	898	1243.5	2029.8	(29),(20),(18),(17)								
1989	330	303.4	345.275	506.8	391.2	438.05	1113.325	1201.4	96.675	1181.5	1210	2382.9	(30),(20),(18),(17)								
1990	357.8	306.4	362.6	334.6	619	353.6	1074	1260	1254	1600	2328	2860	(26),(20),(18),(17),(10)								
1991	343	273.5	458	434.5	584	419	1220	1292	1435	2230	2655	3522	(26),(20),(18),(17),(11)								
1992	353	347.4	336	425.2	646.4	278	967	1419	1284	1267	2251	2686	(26),(20),(18),(17),(13),(12),(11)								
1993	*237.5	237.5	*280.6	427.1	821.3	*250.4	*768.5	1485.9	*718	2451.852	*1486.5	3937.752	Approximate *(32),(23),(18),(17),(11)								
1994	359.4	664	505.7	589	-	473.3	1338.4	1253	870	761	2208.4	2014	(23),(18),(17),(14),(11),(1)								
1995	*275.4	397.8	*325.8	640	3.2	*416.9	*1018.1	1041	*1264	2940.4	*2282.1	3981.4	Approximate *(23),(18),(17),(1)								
1996	466.8	441.4	471.7	665.5	379.4	777.5	1716	1486.3	2922	3494	4638	4980.3	(18),(17),(15),(1)								
1997	500	386.6	500	677.5	1739	926.4	1926.4	2803.1	3455	3351	5381.4	6154.1	(16),(17),(18),(32)								
1998	*507.4	436.8	*646.2	727.8	1878.5	*616	*1769.6	3043.1	*2362.7	2551	*4132.3	5594.1	Approximate *(17),(18),(32)								
1999	*528.1	391	*571.9	787.9	1518.4	578	1678	2697.3	3633	3444.4	5311	6141.7	Approximate *(17),(18),(31),(32)								

Follows Table ( 7 ) The public Revenues in Libya													LYD/million ( unless stated otherwise )	
years	Non-oil Revenues								oil Revenues		public Revenues		sources	
	TD		TI		TJ		NOR		OR		TR			
	ES	AC	ES	AC	ES	AC	ES	AC	ES	AC	ES	AC		
2000	552.5	391.4	440	598	1449.1	2651.2	2441.6	3640.6	2203.5	2203	4645.1	5843.6	(17),(18),(31),(32)	
2001	572.5	438.1	567.6	791.7	1390.6	2235.3	2530.7	3465.1	3603.5	3603	6134.2	7068.1	(17),(18),(31),(32)	
2002	150	573.7	636	866.4	1701.9	1662.1	2487.9	3102.2	6550.9	6551	9038.8	9653.2	(17),(18),(31),(32)	
2003	275	682.7	660	1172.8	2037.9	2404.5	2972.9	4260	6160	3929	9132.9	8189	(17),(18),(31),(32)	
2004	309.5	680.5	602	1197	2240.9	3143.7	3152.4	5021.2	2105.3	19956	5257.7	24977.2	(17),(18),(31),(32)	
2005	426.2	618.8	660	1207	1762.5	2739.5	2848.7	4565.3	15154.4	34378	18003.1	38943.3	(17),(18),(31),(32)	
total**	8.98	11.54	13.97	18.48	20.52	26.46	43.47	56.48	59.54	135.34	103.01	191.83	** in milliard Libyan dinars	
Average	249.4	320.5	388	513.4	570.1	826.9	1207.5	1569	1701.3	3759.5	2861.5	5328.5		
CAGR	10.6%	11.0%	8.3%	9.5%	12.9%	15.8%	10.8%	12.1%	10.4%	13.2%	10.5%	13.0%		

where, TD: direct taxes include ( tax on Business incomes, tax on individual incomes, Agricultural tax, real estate tax); TI: indirect taxes include( stamp tax,tax of the entertainments, customs taxes,production tax); TJ: other revenues ,such as the services charges and the like.; NOR: non-oil revenues .; OR: oil revenues.; TR: total public revenues.; ES: Budget estimates ; AC: Actual .

Sources : 1- central Bank of Libya, Economic bulletin , the second quarter, 1998,vol.38,table 28.

3- the libyan Ministry of treasury , details of the Administrative budget,1977,vol1, table ( B )

4- Central Bank of Libya, the annual report, No.16, fiscal year 1971/72,p.99.

5- Central Bank of Libya, the annual report, No.18, fiscal year 1973/74.

6- Central Bank of Libya, the annual report,fiscal year 1975, p.101.

7- Central Bank of Libya, the annual report,No.23, fiscal year 1978, p.70.

8- Central Bank of Libya, the annual report,No.26, fiscal year 1981, p.63.

9- Details of revenues of the Administrative budget for 1986.

10- The treasury secretariat ,details of public budget for fiscal year of 90-1991.

11- Central Bank of Libya, the annual report,No.38, fiscal year 1994, tables 42-43.

12- The General people's committee for treasury , estimations of the public budget for 1992/93.

13- Report of the investment climate in Arab countries , 1992.

14- The General people's committee of planning and finance, details of the public budget, 1994 , p.37.

15- The General people's committee , Note & draft of the law of public budget , was presented to the basic people's congresses,1996.

16- The General people's committee , Note & draft of the law of public budget , was presented to the basic people's conferences,1997.

17- Records of the libyan tax Authority, Tripoli.

18- Records of the libyan customs Authority, Tripoli.

19- The planning secretariat, the national accounts for 1971-79, Libya.

20- Central Bank of Libya , Economic bulletin , vol 37, No.4-6, April/June 1997.

21- Shokir, Mohamed(1985), " study on the transmission of the labour force between the arab countries ", publications of the Arab monetary fund . ( the values were converted to its equivalent in million libyan dinars, using the exchange rates which listed in the economic bulletin, central bank of libya , 1988, vol.28, No.10-12.

22- Arab Monetary fund , Economic indicators for 1980-90, No.8,1990. ( the values were converted to its equivalent in millions libyan dinars, according to the prevailing exchange rates at that time LYD 1 = \$ 0.2961 )

23- The unified Arab economic report for 1997 . ( the values were converted to its equivalent in million libyan dinars , using the exchange rates which listed in the Economic indicators for 1986-96, Arab monetary fund , 1997, vol.14, table 54, p.64.

24- The General people's committee for treasury , details of the Administrative budget, 1979, vol.1, pp.7-20.

25- Central Bank of Libya , Economic bulletin, Jan/Mar 1986, vol 26, No.1-3, tables 31,34.

26- Central Bank of Libya, the annual report, No.37, table 47, p.176..

27- The Ministry of treasury , Libyan Arab Republic, details of Administrative budget, 1973.

28- The Libyan official Gazette , 1987, No.13, PP.334-35.

29- The Libyan official Gazette , 1988, No.18, P.642.

30- The Libyan official Gazette , 1989, No.12, PP.362-63.

31- The Libyan official Gazette , for years of (1999-2007).

32- Economic research centre, Total Economic , financial and demographic data in Libya during 1962-2006, Benghazi, Libya , July 2009.

2- Ajam, Maithem, (1992), "public finance - Applied study on the libyan economy", publications of the national Authority for scientific research , 1st Edition , tables 7-9, pp.115,120-122.

Table ( 8 ) Structure of the public revenues in Libya

percentages %

years	Non-oil revenues								Oil revenues		Public Revenues	
	TD		TI		TJ		NOR		EC	AC	EC	AC
	EC	AC	EC	AC	EC	AC	EC	AC				
1970	2%	3%	7%	9%	5%	3%	14%	15%	86%	85%	100%	100%
1971	2%	2%	6%	7%	3%	13%	11%	21%	89%	79%	100%	100%
1972	2%	3%	5%	9%	3%	13%	9%	25%	91%	75%	100%	100%
1973	6%	3%	13%	12%	4%	15%	23%	29%	77%	71%	100%	100%
1974	15%	3%	31%	9%	9%	9%	55%	21%	45%	79%	100%	100%
1975	8%	5%	31%	12%	33%	9%	72%	26%	28%	74%	100%	100%
1976	10%	4%	42%	9%	25%	10%	77%	23%	23%	77%	100%	100%
1977	10%	4%	41%	8%	28%	10%	79%	22%	21%	78%	100%	100%
1978	12%	6%	42%	10%	29%	11%	83%	27%	17%	73%	100%	100%
1979	11%	4%	38%	8%	23%	9%	72%	22%	28%	78%	100%	100%
1980	11%	4%	37%	7%	34%	1%	83%	11%	17%	89%	100%	100%
1981	13%	8%	41%	13%	46%	0%	100%	21%	0%	79%	100%	100%
1982	14%	7%	37%	11%	43%	0%	94%	18%	6%	82%	100%	100%
1983	15%	11%	41%	14%	25%	2%	81%	27%	19%	73%	100%	100%
1984	17%	14%	39%	20%	24%	0%	80%	34%	20%	66%	100%	100%
1985	19%	13%	45%	15%	23%	7%	87%	34%	13%	66%	100%	100%
1986	20%	17%	35%	20%	23%	9%	79%	46%	21%	54%	100%	100%
1987	22%	16%	28%	18%	35%	14%	86%	48%	14%	52%	100%	100%
1988	27%	15%	29%	30%	32%	10%	87%	56%	13%	44%	100%	100%
1989	27%	13%	29%	21%	36%	16%	92%	50%	8%	50%	100%	100%
1990	15%	11%	16%	12%	15%	22%	46%	44%	54%	56%	100%	100%
1991	13%	8%	17%	12%	16%	17%	46%	37%	54%	63%	100%	100%
1992	16%	13%	15%	16%	12%	24%	43%	53%	57%	47%	100%	100%
1993	16%	6%	19%	11%	17%	21%	52%	38%	48%	62%	100%	100%
1994	16%	33%	23%	29%	21%	0%	61%	62%	39%	38%	100%	100%
1995	12%	10%	14%	16%	18%	0%	45%	26%	55%	74%	100%	100%
1996	10%	9%	10%	13%	17%	8%	37%	30%	63%	70%	100%	100%
1997	9%	6%	9%	11%	17%	28%	36%	46%	64%	54%	100%	100%
1998	12%	8%	16%	13%	15%	34%	43%	54%	57%	46%	100%	100%
1999	10%	6%	11%	13%	11%	25%	32%	44%	68%	56%	100%	100%
2000	12%	7%	9%	10%	31%	45%	53%	62%	47%	38%	100%	100%
2001	9%	6%	9%	11%	23%	32%	41%	49%	59%	51%	100%	100%
2002	2%	6%	7%	9%	19%	17%	28%	32%	72%	68%	100%	100%
2003	3%	8%	7%	14%	22%	29%	33%	52%	67%	48%	100%	100%
2004	6%	3%	11%	5%	43%	13%	60%	20%	40%	80%	100%	100%
2005	2%	2%	4%	3%	10%	7%	16%	12%	84%	88%	100%	100%
Average	12%	8%	23%	13%	22%	13%	56%	34%	44%	66%	100%	100%

Where , TD: Direct taxes , TI: Indirect taxes , TJ: Other non-oil revenues , NOR : Total of non-oil revenues , ES: Budget Estimates , AC: Actu

Source : Table 25

Table ( 9 ) The nominal and real world prices for crude oil  
US Dollar/barrel

years	Nominal price	Index Number** 1995=100	The real price 1995=100
1970	2.1	23	9.1
1971	2.6	25	10.4
1972	2.8	27	10.4
1973	3.1	33	9.4
1974	10.4	40	26
1975	10.4	45	23.1
1976	11.2	45	24.9
1977	12.6	49	25.7
1978	12.9	55	23.5
1979	29.2	63	46.3
1980	36	72	50
1981	34.2	69	49.6
1982	31.7	66	48
1983	30.1	65	46.3
1984	28.1	63	44.6
1985	27.5	62	44.4
1986	13	72	18.1
1987	17.7	80	22.1
1988	14.2	86	16.5
1989	17.3	86	20.1
1990	22.3	93	24
1991	18.6	93	20
1992	18.4	95	19.4
1993	16.3	90	18.1
1994	15.5	93	16.7
1995	16.9	100	16.9
1996	20.3	97	20.9
1997	18.7	92	20.3

The index Number represents a unit of exports of industrial countries expressed in US dollars , as published by the international monetary fund .

Source : The organization of Arab petroleum exporting countries , the annual report

Table ( 10 ) Non- Oil Revenues percentage %

years	TD		TI		TJ		NOR	
	ES	AC	ES	AC	ES	AC	ES	AC
1970	16%	20%	51%	61%	33%	19%	100%	100%
1971	19%	10%	53%	31%	27%	59%	100%	100%
1972	23%	11%	50%	36%	27%	53%	100%	100%
1973	25%	10%	56%	40%	19%	50%	100%	100%
1974	27%	15%	57%	43%	16%	42%	100%	100%
1975	11%	19%	43%	48%	46%	34%	100%	100%
1976	14%	18%	54%	40%	32%	42%	100%	100%
1977	13%	18%	52%	35%	35%	47%	100%	100%
1978	15%	21%	51%	37%	34%	41%	100%	100%
1979	15%	19%	53%	38%	32%	42%	100%	100%
1980	14%	32%	45%	60%	42%	8%	100%	100%
1981	13%	37%	41%	63%	46%	0%	100%	100%
1982	15%	40%	40%	60%	45%	0%	100%	100%
1983	19%	40%	51%	53%	30%	7%	100%	100%
1984	21%	41%	49%	59%	30%	0%	100%	100%
1985	22%	37%	52%	43%	26%	19%	100%	100%
1986	26%	36%	45%	44%	29%	21%	100%	100%
1987	26%	33%	33%	37%	41%	29%	100%	100%
1988	30%	27%	33%	55%	37%	19%	100%	100%
1989	30%	25%	31%	42%	39%	33%	100%	100%
1990	33%	24%	34%	27%	33%	49%	100%	100%
1991	28%	21%	38%	34%	34%	45%	100%	100%
1992	37%	24%	35%	30%	29%	46%	100%	100%
1993	31%	16%	37%	29%	33%	55%	100%	100%
1994	27%	53%	38%	47%	35%	0%	100%	100%
1995	27%	38%	32%	61%	41%	0%	100%	100%
1996	27%	30%	27%	45%	45%	26%	100%	100%
1997	26%	14%	26%	24%	48%	62%	100%	100%
1998	29%	14%	37%	24%	35%	62%	100%	100%
1999	31%	14%	34%	29%	34%	56%	100%	100%
2000	23%	11%	18%	16%	59%	73%	100%	100%
2001	23%	13%	22%	23%	55%	65%	100%	100%
2002	6%	18%	26%	28%	68%	54%	100%	100%
2003	9%	16%	22%	28%	69%	56%	100%	100%
2004	10%	14%	19%	24%	71%	63%	100%	100%
2005	15%	14%	23%	26%	62%	60%	100%	100%
Average	22%	23%	39%	39%	39%	37%	100%	100%

Where , TD: Direct txes , TI: Indirect taxes , TJ: Other non-oil revenues , NOR: Total of non-oil revenues , ES: Budget Estimates , AC: Actual .

Source : Table 25

Table ( 11 ) Proportion of the actual public revenues to the GDP in Libya ( the values in LYD/million )

years	TD	TI	TJ	NOR	OR	PR	GDP	TD/GDP	TI/GDP	TJ/GDP	NOR/GDP	OR/GDP	PR/GDP
1970	16.2	50.5	16.1	82.8	453	535.8	1288.3	1%	4%	1%	6%	35%	42%
1971	17.5	54.8	103.835	176.135	652.318	828.453	1586.5	1%	3%	7%	11%	41%	52%
1972	22.8	73.4	110.49	206.69	624.575	831.265	1753	1%	4%	6%	12%	36%	47%
1973	24	99.3	125.288	248.588	604.108	852.696	2182.3	1%	5%	6%	11%	28%	39%
1974	58.5	165.1	163.4	387	1474.279	1861.279	3795.7	2%	4%	4%	10%	39%	49%
1975	85.4	220	155.349	460.749	1323.995	1784.744	3674.3	2%	6%	4%	13%	36%	49%
1976	112.1	243	257.044	612.144	2077.336	2689.48	4768.1	2%	5%	5%	13%	44%	56%
1977	136.8	264	349.955	750.755	2625.846	3376.601	5612.7	2%	5%	6%	13%	47%	60%
1978	176.6	307.4	339.738	823.738	2183.483	3007.221	5496.1	3%	6%	6%	15%	40%	55%
1979	197.8	393.4	430.777	1021.977	3682.176	4704.153	7603	3%	5%	6%	13%	48%	62%
1980	270.9	509.5	68.8	849.2	6691.9	7541.1	10553.8	3%	5%	1%	8%	63%	71%
1981	344.4	575.9	0	920.3	3420	4340.3	8798.8	4%	7%	0%	10%	39%	49%
1982	371.2	552.2	0	923.4	4145.4	5068.8	8932.4	4%	6%	0%	10%	46%	57%
1983	372.8	488	67.3	928.1	2520	3448.1	8511.7	4%	6%	1%	11%	30%	41%
1984	461.2	654.3	0	1115.5	2125	3240.5	7804.7	6%	8%	0%	13%	27%	40%
1985	354.3	413.9	184.4	952.6	1846	2798.6	7852.1	5%	5%	2%	12%	24%	36%
1986	329.1	401.9	189.1	920.1	1074	1994.1	6767.5	5%	6%	3%	14%	16%	29%
1987	312.3	348.5	274	934.8	1029.7	1964.5	5933.2	5%	6%	5%	16%	17%	33%
1988	304	617.7	210.1	1131.8	898	2029.8	6170.6	5%	10%	3%	18%	15%	33%
1989	303.4	506.8	391.2	1201.4	1181.5	2382.9	7094.7	4%	7%	6%	17%	17%	34%
1990	306.4	334.6	619	1260	1600	2860	7741.6	4%	4%	8%	16%	21%	37%
1991	273.5	434.5	584	1292	2230	3522	8426.2	3%	5%	7%	15%	26%	42%
1992	347.4	425.2	646.4	1419	1267	2686	8774.4	4%	5%	7%	16%	14%	31%
1993	237.5	427.1	821.3	1485.9	2451.852	3937.752	9287.5	3%	5%	2%	10%	26%	36%
1994	664	589	0	1253	761	2014	9913.5	7%	6%	0%	13%	8%	20%
1995	397.8	640	3.2	1041	2940.4	3981.4	10592.5	4%	6%	0%	10%	28%	38%
1996	441.4	665.5	379.4	1486.3	3494	4980.3	11782.5	4%	6%	3%	13%	30%	42%
1997	386.6	677.5	1739	2803.1	3351	6154.1	12888	3%	5%	4%	12%	27%	39%
1998	436.8	727.8	1878.5	3043.1	2551	5594.1	12610.6	3%	6%	15%	24%	20%	44%
1999	391	787.9	1518.4	2697.3	3444.4	6141.7	14075.2	3%	6%	11%	19%	24%	44%
2000	391.4	598	2651.2	3640.6	2203	5843.6	17620.2	2%	3%	15%	21%	13%	33%
2001	438.1	791.7	2235.3	3465.1	3603	7068.1	21868.5	2%	4%	10%	16%	16%	32%
2002	573.7	866.4	1662.1	3102.2	6551	9653.2	30549.4	2%	3%	5%	10%	21%	32%
2003	682.7	1172.8	2404.5	4260	3929	8189	37604	2%	3%	6%	11%	10%	22%
2004	680.5	1197	3143.7	5021.2	19956	24977.2	48793.4	1%	2%	6%	10%	41%	51%
2005	618.8	1207	2739.5	4565.3	34378	38943.3	67048.3	1%	2%	4%	7%	51%	58%
average	320.5	513.4	735.1	1569	3759.5	5328.5	12382.1	3%	5%	5%	13%	30%	43%
CAGR	11.0%	9.5%	15.8%	12.1%	13.2%	13.0%	12.0%	-0.9%	-2.2%	3.4%	0.2%	1.1%	1.0%

where : TD: Direct taxes , TI: Indirect taxes , TJ: other non-oil revenues , NOR: Total non-oil revenues , OR: Oil Revenues , PR: Total public revenues , GDP: Gross domestic product , CAGR: Compound annual growth rate .

The results of this table were derived from tables 1, 25.

Table ( 12 ) The actual and estimated public expenditures in Libya . LYD/million ( unless stated otherwise )

years	Administrative expenditures		Development expenditures		Public expenditures		sources
	ES	AC	ES	AC	ES	AC	
1970	183	288.5	224.5	146	407.5	434.5	(38),(35),(34),(30),(29),(28),(24),(23),(22),(20),(1)
1971	207.7	230.2	302	248	509.7	478.2	(38),(35),(34),(30),(29),(28),(24),(22),(20),(2)
1972	241	263.9	442.9	397.3	683.9	661.2	(38),(35),(34),(30),(29),(28),(24),(22),(20),(2)
1973	143	234.5	545	413.8	688	648.3	(38),(35),(34),(30),(24),(22),(20),(2)
1974	252.4	432.9	916.2	866	1168.6	1298.9	(38),(35),(34),(30),(24),(22),(20),(2)
1975	437	573.2	1124.7	923.2	1561.7	1496.4	(38),(35),(34),(30),(24),(22),(20),(3)
1976	500	564	1406.9	1187.2	1906.9	1751.2	(38),(35),(34),(30),(24),(22),(20),(3)
1977	583	669.3	1520.1	1294.8	2103.1	1964.1	(38),(35),(34),(30),(24),(22),(20),(4)
1978	695	695	1785	1380	2480	2075	(38),(35),(34)0(30),(27),(24)0(22),(20),(6),(5)
1979	770	770	1573	1868.8	2343	2638.8	(38),(35),(34),(30),(24),(22),(21),(6),(5),(7)
1980	950	950	2527.4	2551.6	3477.4	3501.6	(38),(35),(34),(30),(24),(22),(21),(8),(6)
1981	1050	1050	2955	2872.8	4005	3922.8	(38),(30),(24),(22),(21),(8)
1982	1255	1285	2600	2365.9	3855	3650.9	(38),(30),(24),(22),(21),(8)
1983	1520.3	1567.6	2370	2096.3	3890.3	3663.9	(38),(26),(25),(24)0(22),(21),(32)
1984	1440.2	1645.3	2110	1834.7	3550.2	3480	(38),(26),(25),(24),(22),(21),(32)
1985	1200	1182.1	1700	1523.3	2900	2705.4	(38),(26),(25),(22),(21),(32)
1986	1364.8	1332.9	1700	1081.1	3064.8	2414	(38),(26),(25),(22),(21),(9)
1987	1244	1075	1450	993	2694	2068	(38),(31),(26),(25),(22),(21),(10)
1988	1244	1125	1355	845.3	2599	1970.3	(38),(31),(26),(25),(21),(10)
1989	1468	1170	900	760.9	2368	1930.9	(38),(31),(26),(25),(22),(21),(10)
1990	1470	1498	1170	1100	2640	2598	(38),(33),(26),(25),(22),(21),(12),(11),(10)
1991	1391	1508	1875	682	3266	2190	(33),(26),(25),(22),(21),(14),(13)
1992	1600	1534	820	540	2420	2074	(33),(26),(25),(16),(15),(14),(11)
1993	*1076.8	1600	484.5	405.5	*1561.3	2005.5	Approximate (*),(38),(22)'
1994	1630.5	1769.3	900	900	2530.5	2669.3	(39),(33),(26),(25)0(17)
1995	2728	2710.1	700	318.9	3428	3029	(33),(22),(18)
1996	3178	3761.2	800	660.9	3978	4422.1	(33),(22),(18)
1997	3505.393	3505.4	1303	943	4808.393	4448.4	(33),(19)
1998	*2380.1	3163.8	1073.1	485.2	*3453.2	3649	Approximate (*),(39),(38)
1999	3635	2966.9	1133	794.1	4768	3761	(39),(38),(36)
2000	2441.6	3153.2	1765	1541	4206.6	4694.2	(39),(38),(36)
2001	3737.7	3596.6	1900	1813	5637.7	5409.6	(39),(36)
2002	4682.9	4210.3	4356	3701.7	9038.9	7912	(39),(36)
2003	3537.9	3577.7	2664	2910	6201.9	6487.7	(39),(36)
2004	4988.4	6720	5237	6718	10225.4	13438	(39),(36)
2005	6263.8	8282	11105	10273	17368.8	18555	(39),(36)
**Total	64.995	70.661	66.793	59.436	131.789	130.097	in milliard Libyan dinars
Average	1805.4	1962.8	1855.4	1651	3660.8	3613.8	
CAGR	10.6%	10.1%	11.8%	12.9%	11.3%	11.3%	

1- The Libyan Arab republic , the ministry of petroleum , " Libya`s oil 1954-71" , Table 40, P.132.

2- The Libyan Arab republic , the ministry of treasury , "development of the Administrative budget during 1968-76" , November 1976.

3- The planning secretariat, the statistival collection , 1976, table 11 , p.304.

4- The Libyan Arab republic , the ministry of treasury , details of the Administrative budget , 1977,vol.1.

5- Central Bank of libya , the annual report , No.23, 1978.

6- Central Bank of libya , the annual report , No.24, 1979,p.66..

7- The General people`s committee for treasury , details of the Administrative budget, 1979, vol.1.

8- Central Bank of Libya , The annual report, 1981, No.26, pp.59,62.

9- The treasury secretariat, The details of administrative budget, 1986.

( turn over )

- 10- The General people's committee of people's controlling authority , the General annual report which presented to the basic people's congresses , 1996, p.9.
- 11- The central Bank of Libya , the annual report, 1992/93, No.37,table.46.
- 12- The treasury secretariat, details of the public budget,1990/91, p.14.
- 13- The Arab investment Guarantee corporation , report of the investment climate in Arab countries, 1991, p.424.
- 14- Central Bank of Libya , the annual report, 1991/92, No.36.
- 15- The report of investment climate in Arab countries, 1992, p.407.
- 16- The General people's committee of treasury , estimations of the public budget, 1992/93.
- 17- The General people's committee of planning and finance , details of the public budget , 1994.
- 18- The General people's committee , note & draft of law of the public budget , which presented to the basic people's congresses,1996, p.50.
- 19- The General people's committee , note & draft of law of the public budget , which presented to the basic people's congresses,1997.
- 20- The planning secretariat,spotlights on the economic & social development in Libya during 1970-78, November 1978, tables 2, 3 .
- 21- Journal of economic research , 1996, vol.7, No,1-2, tables 3-4, p.5.
- 22- The Genral people's committee of planning , The Economic & social indicators during 1962-96, Dec 1997, pp.22-23 , 26,28.
- 23- The General Bank of Libya , The Economic bulletin , October/december 1997, vol.17, No. 10-11-12 , tables. 33-34.
- 24- Journal of economic research , 1997, vol.8, No,1-2, table 1, p.68.
- 25- The central Bank of libya , the Economic bulletin , 1996, No.7-9, tables 29-31.
- 26- Central Bank of Libya , the Economic bulletin, Apr/Jun 1997, Vol.37, No.4-6, tables. 28-31.
- 27- The planning secretariat , achievements of the revolution within ten years 1970-79 , table . 7 , p.15.
- 28- Central Bank of Libya , the economic bulletin, Jan /Mar 1978, No.1-3, table 32.
- 29- Central Bank of Libya , the economic bulletin, Mar/Apr 1977, vol.17, No.3-4, table 34.
- 30- The General people's committee of planning , main features of the economic & social evolution in Libya during 1970-82 , tables 4-5.
- 31- Central Bank of Libya , the annual report, 1988, No.33, pp.67,69.
- 32- Ajam,Maithem,(1992),"public finance - Applied study on the libyan economy", publications of the national Authority for scientific research , 1st Edition , tables 7-9 , pp.115,120-122.
- 33- The central bank of libya , the economic bulletin , 1998, the second quarter, tables: 26-28 ( the additional expenditures is not included )
- 34- The planning secretariat, achievements of the economic & social transformation during 1970-80, tables 6-7
- 35- The planning secretariat, the economic & social indicators for 1970-80, tables 1-3, p.12.
- 36- The lLibyan official Gazette , for years of (1999-2007 ).
- 37- National council for planning , public budget proposal for 2009.
- 38- The General planning council , The Economic&Social indicators during 1962-2000 , December 2001.
- 39- Economic research centre, Total Economic , financial and demographic data in Libya during 1962-2006, Benghazi, Libya , July 2009.

Table ( 13 ) The relative importance of public expenditures in Libya percent ( % )

years	The relative importance of public expenditures						Proportion of the public expenditures to GDP					
	G <sub>s</sub>		G <sub>i</sub>		public expenditure		G <sub>s</sub>		G <sub>i</sub>		public expenditure	
	ES	AC	ES	AC	ES	AC	ES	AC	ES	AC	ES	AC
1970	45%	66%	55%	34%	100%	100%	14%	22%	17%	11%	32%	34%
1971	41%	48%	59%	52%	100%	100%	13%	15%	19%	16%	32%	30%
1972	35%	40%	65%	60%	100%	100%	14%	15%	25%	23%	39%	38%
1973	21%	36%	79%	64%	100%	100%	7%	11%	25%	19%	32%	30%
1974	22%	33%	78%	67%	100%	100%	7%	11%	24%	23%	31%	34%
1975	28%	38%	72%	62%	100%	100%	12%	16%	31%	25%	43%	41%
1976	26%	32%	74%	68%	100%	100%	10%	12%	30%	25%	40%	37%
1977	28%	34%	72%	66%	100%	100%	10%	12%	27%	23%	37%	35%
1978	28%	33%	72%	67%	100%	100%	13%	13%	32%	25%	45%	38%
1979	33%	29%	67%	71%	100%	100%	10%	10%	21%	25%	31%	35%
1980	27%	27%	73%	73%	100%	100%	9%	9%	24%	24%	33%	33%
1981	26%	27%	74%	73%	100%	100%	12%	12%	34%	33%	46%	45%
1982	33%	35%	67%	65%	100%	100%	14%	14%	29%	26%	43%	41%
1983	39%	43%	61%	57%	100%	100%	18%	18%	28%	25%	46%	43%
1984	41%	47%	59%	53%	100%	100%	18%	21%	27%	24%	45%	45%
1985	41%	44%	59%	56%	100%	100%	15%	15%	22%	19%	37%	34%
1986	45%	55%	55%	45%	100%	100%	20%	20%	25%	16%	45%	36%
1987	46%	52%	54%	48%	100%	100%	21%	18%	24%	17%	45%	35%
1988	48%	57%	52%	43%	100%	100%	20%	18%	22%	14%	42%	32%
1989	62%	61%	38%	39%	100%	100%	21%	16%	13%	11%	33%	27%
1990	56%	58%	44%	42%	100%	100%	19%	19%	15%	14%	34%	34%
1991	43%	69%	57%	31%	100%	100%	17%	18%	22%	8%	39%	26%
1992	66%	74%	34%	26%	100%	100%	18%	17%	9%	6%	28%	24%
1993	69%	80%	31%	20%	100%	100%	12%	17%	5%	4%	17%	22%
1994	64%	66%	36%	34%	100%	100%	16%	18%	9%	9%	26%	27%
1995	80%	89%	20%	11%	100%	100%	26%	26%	7%	3%	32%	29%
1996	80%	85%	20%	15%	100%	100%	27%	32%	7%	6%	34%	38%
1997	73%	79%	27%	21%	100%	100%	27%	27%	10%	7%	37%	35%
1998	69%	87%	31%	13%	100%	100%	19%	25%	9%	4%	27%	29%
1999	76%	79%	24%	21%	100%	100%	26%	21%	8%	6%	34%	27%
2000	58%	67%	42%	33%	100%	100%	14%	18%	10%	9%	24%	27%
2001	66%	66%	34%	34%	100%	100%	17%	16%	9%	8%	26%	25%
2002	52%	53%	48%	47%	100%	100%	15%	14%	14%	12%	30%	26%
2003	57%	55%	43%	45%	100%	100%	9%	10%	7%	8%	16%	17%
2004	49%	50%	51%	50%	100%	100%	10%	14%	11%	14%	21%	28%
2005	36%	45%	64%	55%	100%	100%	9%	12%	17%	15%	26%	28%
Average	47%	54%	53%	46%	100%	100%	16%	17%	19%	15%	34%	32%
CAGR	-0.6%	-1.1%	0.4%	1.4%	0.0%	0.0%	-1.2%	-1.7%	-0.1%	0.9%	-0.6%	-0.6%

where G<sub>s</sub> : Administrative expenditure.; G<sub>i</sub>: Development expenditures.; ES: Budget Estimates , AC: Actual .

the results were derived from tables : 1 , 12 .

Table ( 14 ) Compararison between the public expenditures and the public revenues in Libya

years	public expenditure *			public revenue *			(1):(4)	(2):(5)	(3):(6)	(6):(3)	(4)-(1)	(5)-(2)	(6)-(3)
	G <sub>s</sub>	G <sub>i</sub>	Total	NOR	OR	Total							
	( 1 )	( 2 )	( 3 )	( 4 )	( 5 )	( 6 )							
1970	288.5	146	434.5	82.8	453	535.8	348%	32%	81%	123%	-205.7	307	101.3
1971	230.2	248	478.2	176.135	652.318	828.453	131%	38%	58%	173%	-54.065	404.318	350.253
1972	263.9	397.3	661.2	206.69	624.575	831.265	128%	64%	80%	126%	-57.21	227.275	170.065
1973	234.5	413.8	648.3	248.588	604.108	852.696	94%	68%	76%	132%	14.088	190.308	204.396
1974	432.9	866	1298.9	387	1474.279	1861.279	112%	59%	70%	143%	-45.9	608.279	562.379
1975	573.2	923.2	1496.4	460.749	1323.995	1784.744	124%	70%	84%	119%	-112.451	400.795	288.344
1976	564	1187.2	1751.2	612.144	2077.336	2689.48	92%	57%	65%	154%	48.144	890.136	938.28
1977	669.3	1294.8	1964.1	750.755	2625.846	3376.601	89%	49%	58%	172%	81.455	1331.046	1412.501
1978	695	1380	2075	823.738	2183.483	3007.221	84%	63%	69%	145%	128.738	803.483	932.221
1979	770	1868.8	2638.8	1021.977	3682.176	4704.153	75%	51%	56%	178%	251.977	1813.376	2065.353
1980	950	2551.6	3501.6	849.2	6691.9	7541.1	112%	38%	46%	215%	-100.8	4140.3	4039.5
1981	1050	2872.8	3922.8	920.3	3420	4340.3	114%	84%	90%	111%	-129.7	547.2	417.5
1982	1285	2365.9	3650.9	923.4	4145.4	5068.8	139%	57%	72%	139%	-361.6	1779.5	1417.9
1983	1567.6	2096.3	3663.9	928.1	2520	3448.1	169%	83%	106%	94%	-639.5	423.7	-215.8
1984	1645.3	1834.7	3480	1115.5	2125	3240.5	147%	86%	107%	93%	-529.8	290.3	-239.5
1985	1182.1	1523.3	2705.4	952.6	1846	2798.6	124%	83%	97%	103%	-229.5	322.7	93.2
1986	1332.9	1081.1	2414	920.1	1074	1994.1	145%	101%	121%	83%	-412.8	-7.1	-419.9
1987	1075	993	2068	934.8	1029.7	1964.5	115%	96%	105%	95%	-140.2	36.7	-103.5
1988	1125	845.3	1970.3	1131.8	898	2029.8	99%	94%	97%	103%	6.8	52.7	59.5
1989	1170	760.9	1930.9	1201.4	1181.5	2382.9	97%	64%	81%	123%	31.4	420.6	452
1990	1498	1100	2598	1260	1600	2860	119%	69%	91%	110%	-238	500	262
1991	1508	682	2190	1292	2230	3522	117%	31%	62%	161%	-216	1548	1332
1992	1534	540	2074	1419	1267	2686	108%	43%	77%	130%	-115	727	612
1993	1600	405.5	2005.5	1485.9	2451.852	3937.752	108%	17%	51%	196%	-114.1	2046.352	1932.252
1994	1769.3	900	2669.3	1253	761	2014	141%	118%	133%	75%	-516.3	-139	-655.3
1995	2710.1	318.9	3029	1041	2940.4	3981.4	260%	11%	76%	131%	-1669.1	2621.5	952.4
1996	3761.2	660.9	4422.1	1486.3	3494	4980.3	253%	19%	89%	113%	-2274.9	2833.1	558.2
1997	3505.4	943	4448.4	2803.1	3351	6154.1	125%	28%	72%	138%	-702.3	2408	1705.7
1998	3163.8	485.2	3649	3043.1	2551	5594.1	104%	19%	65%	153%	-120.7	2065.8	1945.1
1999	2966.9	794.1	3761	2697.3	3444.4	6141.7	110%	23%	61%	163%	-269.6	2650.3	2380.7
2000	3153.2	1541	4694.2	3640.6	2203	5843.6	87%	70%	80%	124%	487.4	662	1149.4
2001	3596.6	1813	5409.6	3465.1	3603	7068.1	104%	50%	77%	131%	-131.5	1790	1658.5
2002	4210.3	3701.7	7912	3102.2	6551	9653.2	136%	57%	82%	122%	-1108.1	2849.3	1741.2
2003	3577.7	2910	6487.7	4260	3929	8189	84%	74%	79%	126%	682.3	1019	1701.3
2004	6720	6718	13438	5021.2	19956	24977.2	134%	34%	54%	186%	-1698.8	13238	11539.2
2005	8282	10273	18555	4565.3	34378	38943.3	181%	30%	48%	210%	-3716.7	24105	20388.3
**Total	70.7	59.4	130.1	56.5	135.3	191.8	-	-	-	-	-14.2	75.9	61.7
*Average	1962.8	1651	3613.8	1569	3759.5	5328.5	1.3	0.6	0.8	1.4	-393.8	2108.5	1714.7
CAGR	10.1%	12.9%	11.3%	12.1%	13.2%	13.0%	-1.8%	-0.2%	-1.5%	1.5%	-	13.3%	16.4%

where ( \* ) in LYD/million ; ( \*\* ) in LYD/Milliard.; G<sub>S</sub> : Administrative expenditure.; G<sub>i</sub>: Development expenditures.;NOR: non-oil revenues.;OR: Oil revenues.

Sources : Tables 25 , 32 .

Table ( 15 ) The public expenditures in Libya ( Annual increasing rate % )

years	Administrative		Development		Total	
	ES	AC	ES	AC	ES	AC
1970	-	-	-	-	-	-
1971	13%	-20%	35%	70%	25%	10%
1972	16%	15%	47%	60%	34%	38%
1973	-41%	-11%	23%	4%	1%	-2%
1974	77%	85%	68%	109%	70%	100%
1975	73%	32%	23%	7%	34%	15%
1976	14%	-2%	25%	29%	22%	17%
1977	17%	19%	8%	9%	10%	12%
1978	19%	4%	17%	7%	18%	6%
1979	11%	11%	-12%	35%	-6%	27%
1980	23%	23%	61%	37%	48%	33%
1981	11%	11%	17%	13%	15%	12%
1982	20%	22%	-12%	-18%	-4%	-7%
1983	21%	22%	-9%	-11%	1%	0%
1984	-5%	5%	-11%	-12%	-9%	-5%
1985	-17%	-28%	-19%	-17%	-18%	-22%
1986	14%	13%	0%	-29%	6%	-11%
1987	-9%	-19%	-15%	-8%	-12%	-14%
1988	0%	5%	-7%	-15%	-4%	-5%
1989	18%	4%	-34%	-10%	-9%	-2%
1990	0%	28%	30%	45%	11%	35%
1991	-5%	1%	60%	-38%	24%	-16%
1992	15%	2%	-56%	-21%	-26%	-5%
1993	-33%	4%	-41%	-25%	-35%	-3%
1994	51%	11%	86%	122%	62%	33%
1995	67%	53%	-22%	-65%	35%	13%
1996	16%	39%	14%	107%	16%	46%
1997	10%	-7%	63%	43%	21%	1%
1998	-32%	-10%	-18%	-49%	-28%	-18%
1999	53%	-6%	6%	64%	38%	3%
2000	-33%	6%	56%	94%	-12%	25%
2001	53%	14%	8%	18%	34%	15%
2002	25%	17%	129%	104%	60%	46%
2003	-24%	-15%	-39%	-21%	-31%	-18%
2004	41%	88%	97%	131%	65%	107%
2005	26%	23%	112%	53%	70%	38%
Average	14%	12%	20%	23%	15%	14%
years	The public expenditures in libya ( LYD/Milliard )					
	Administrative		Development		Total	
	ES	AC	ES	AC	ES	AC
70-1980	4.96	5.67	12.37	11.28	17.33	16.95
81-1990	13.26	12.93	18.31	15.47	31.57	28.4
91-2005	46.78	52.06	36.12	32.69	82.89	84.74
70-2005	65	70.66	66.79	59.44	131.79	130.1
years	The public expenditures in libya ( % )					
	Administrative		Development		Total	
	ES	AC	ES	AC	ES	AC
70-1980	8%	8%	19%	19%	13%	13%
81-1990	20%	18%	27%	26%	24%	22%
91-2005	72%	74%	54%	55%	63%	65%
70-2005	100%	100%	100%	100%	100%	100%

where ES: Budget Estimates , AC: Actual .the values and percentages were derived from table 32

Table ( 16 ) Allocations of the Administrative budget in Libya during different years

years	Administrative Expenditures LYD/ million				Administrative Expenditures %			
	the wages and salaries	miscellaneous expenses	other expenses	total	the wages and salaries	miscellaneous expenses	other expenses	total
1970	88	32.4	62.7	183.1	48%	18%	34%	100%
1971	107	28.2	72.5	207.7	52%	14%	35%	100%
1972	122.5	29	89.2	240.7	51%	12%	37%	100%
1973	46.9	30.7	65.4	143	33%	21%	46%	100%
1974	63.2	18.3	171.4	252.9	25%	7%	68%	100%
1975	229.4	47.5	156.1	433	53%	11%	36%	100%
1976	158.4	85.7	255.9	500	32%	17%	51%	100%
1979	364.5	401.1	4.4	770	47%	52%	1%	100%
1986	975	389	0.8	1364.8	71%	29%	0%	100%
1987	915.5	327.3	0.8	1243.6	74%	26%	0%	100%
1992	1188.2	411.8	0	1600	74%	26%	0%	100%
1994	832.1	348.4	450	1630.5	51%	21%	28%	100%
1995	1335	937	456	2728	49%	34%	17%	100%
1996	1577	1145	456	3178	50%	36%	14%	100%
1997	1915.8	1126.6	463	3505.4	55%	32%	13%	100%
average	661.23	357.2	180.28	1198.7	51%	24%	25%	100%
CAGR	12.10%	14.00%	7.70%	11.60%	0.50%	2.20%	-3.50%	-

source : The treasury secretariat details of the public budget for different years .

The ratios were prepared by the researcher.

Table ( 17 ) Evolution of the public expenditures , revenues & deficit / surplus in the public budget and income elasticity / marginal propensity to the public expenditures .

years	public expenditures			public revenues			annual deficit /surplus*	accumulated deficit /surplus*	marginal propensity 1:3 (%)	income elasticity 2:4 %
	value*	(1) Δ	(2) Δ%	value*	(3) Δ	(4) Δ%				
1970	434.5	-	-	535.8	-	-	101.3	101.3	-	-
1971	478.2	43.7	10.1	828.453	292.653	54.6	350.3	451.6	0.15	0.18
1972	661.2	183	38.3	831.265	2.812	0.3	170.1	621.7	65.08	127.67
1973	648.3	-12.9	-2	852.696	21.431	2.6	204.4	826.1	-0.6	-0.77
1974	1298.9	650.6	100.4	1861.279	1008.583	118.3	562.4	1388.5	0.65	0.85
1975	1496.4	197.5	15.2	1784.744	-76.535	-4.1	288.3	1676.8	-2.58	-3.71
1976	1751.2	254.8	17	2689.48	904.736	50.7	938.3	2615.1	0.28	0.34
1977	1964.1	212.9	12.2	3376.601	687.121	25.5	1412.5	4027.6	0.31	0.48
1978	2075	110.9	5.6	3007.221	-369.38	-10.9	932.2	4959.8	-0.3	-0.51
1979	2638.8	563.8	27.2	4704.153	1696.932	56.4	2065.4	7025.2	0.33	0.48
1980	3501.6	862.8	32.7	7541.1	2836.947	60.3	4039.5	11064.7	0.3	0.54
1981	3922.8	421.2	12	4340.3	-3200.8	-42.4	417.5	11482.2	-0.13	-0.28
1982	3650.9	-271.9	-6.9	5068.8	728.5	16.8	1417.9	12900.1	-0.37	-0.41
1983	3663.9	13	0.4	3448.1	-1620.7	-32	-215.8	12684.3	-0.01	-0.01
1984	3480	-183.9	-5	3240.5	-207.6	-6	-239.5	12444.8	0.89	0.83
1985	2705.4	-774.6	-22.3	2798.6	-441.9	-13.6	93.2	12538	1.75	1.64
1986	2414	-291.4	-10.8	1994.1	-804.5	-28.7	-419.9	12118.1	0.36	0.38
1987	2068	-346	-14.3	1964.5	-29.6	-1.5	-103.5	12014.6	11.69	9.53
1988	1970.3	-97.7	-4.7	2029.8	65.3	3.3	59.5	12074.1	-1.5	-1.42
1989	1930.9	-39.4	-2	2382.9	353.1	17.4	452	12526.1	-0.11	-0.11
1990	2598	667.1	34.5	2860	477.1	20	262	12788.1	1.4	1.73
1991	2190	-408	-15.7	3522	662	23.1	1332	14120.1	-0.62	-0.68
1992	2074	-116	-5.3	2686	-836	-23.7	612	14732.1	0.14	0.22
1993	2005.5	-68.5	-3.3	3937.752	1251.752	46.6	1932.3	16664.4	-0.05	-0.07
1994	2669.3	663.8	33.1	2014	-1923.752	-48.9	-655.3	16009.1	-0.35	-0.68
1995	3029	359.7	13.5	3981.4	1967.4	97.7	952.4	16961.5	0.18	0.14
1996	4422.1	1393.1	46	4980.3	998.9	25.1	558.2	17519.7	1.39	1.83
1997	4448.4	26.3	0.6	6154.1	1173.8	23.6	1705.7	19225.4	0.02	0.03
1998	3649	-799.4	-18	5594.1	-560	-9.1	1945.1	21170.5	1.43	1.98
1999	3761	112	3.1	6141.7	547.6	9.8	2380.7	23551.2	0.2	0.32
2000	4694.2	933.2	24.8	5843.6	-298.1	-4.9	1149.4	24700.6	-3.13	-5.06
2001	5409.6	715.4	15.2	7068.1	1224.5	21	1658.5	26359.1	0.58	0.72
2002	7912	2502.4	46.3	9653.2	2585.1	36.6	1741.2	28100.3	0.97	1.27
2003	6487.7	-1424.3	-18	8189	-1464.2	-15.2	1701.3	29801.6	0.97	1.18
2004	13438	6950.3	107.1	24977.2	16788.2	205	11539.2	41340.8	0.41	0.52
2005	18555	5117	38.1	38943.3	13966.1	55.9	20388.3	61729.1	0.37	0.68
average 70-1980		306.71	25.67	2546.62	700.53	35.37	1005.88	3159.85	6.36	12.56
average 81-1990		-90.36	-1.91	3012.76	-468.11	-6.67	172.34	12357.04	1.4	1.19
average 91-2005		1063.8	17.83	8912.38	2405.55	29.51	3262.73	24799.03	0.17	0.16
average 70-2005		517.73	14.43	5328.5	1097.36	20.85	1714.7	14730.95	2.29	4

where , ( \* ) in LYD/million.; Δ : amount of the annual change in LYD/million ; Δ% : the relative change

Sources: tables 25 , 32.

Table ( 18 )Evolution of the investment expenditures ; oil revenues and deficit/surplus in the development budget & the marginal propensity and income elasticity of the investment expenditures in Libya .

years	investment expenditures			oil revenues			annual surplus /deficit*	accumulated surplus /deficit*	marginal propensity 1:3 (%)	income elasticity 2:4 (%)
	value*	(1)amount of the annual change*	(2) relative change %	value*	(3)amount of the annual change*	(4) relative change %				
1970	146	-	-	453	-	-	307	307	-	-
1971	248	102	69.86	652.318	199.318	44	404.318	711.318	0.51	1.59
1972	397.3	149.3	60.2	624.575	-27.743	-4.25	227.275	938.593	-5.38	-14.16
1973	413.8	16.5	4.15	604.108	-20.467	-3.28	190.308	1128.901	-0.81	-1.27
1974	866	452.2	109.28	1474.279	870.171	144.04	608.279	1737.18	0.52	0.76
1975	923.2	57.2	6.61	1323.995	-150.284	-10.19	400.795	2137.975	-0.38	-0.65
1976	1187.2	264	28.6	2077.336	753.341	56.9	890.136	3028.111	0.35	0.5
1977	1294.8	107.6	9.06	2625.846	548.51	26.4	1331.046	4359.157	0.2	0.34
1978	1380	85.2	6.58	2183.483	-442.363	-16.85	803.483	5162.64	-0.19	-0.39
1979	1868.8	488.8	35.42	3682.176	1498.693	68.64	1813.376	6976.016	0.33	0.52
1980	2551.6	682.8	36.54	6691.9	3009.724	81.74	4140.3	11116.316	0.23	0.45
1981	2872.8	321.2	12.59	3420	-3271.9	-48.89	547.2	11663.516	-0.1	-0.26
1982	2365.9	-506.9	-17.64	4145.4	725.4	21.21	1779.5	13443.016	-0.7	-0.83
1983	2096.3	-269.6	-11.4	2520	-1625.4	-39.21	423.7	13866.716	0.17	0.29
1984	1834.7	-261.6	-12.48	2125	-395	-15.67	290.3	14157.016	0.66	0.8
1985	1523.3	-311.4	-16.97	1846	-279	-13.13	322.7	14479.716	1.12	1.29
1986	1081.1	-442.2	-29.03	1074	-772	-41.82	-7.1	14472.616	0.57	0.69
1987	993	-88.1	-8.15	1029.7	-44.3	-4.12	36.7	14509.316	1.99	1.98
1988	845.3	-147.7	-14.87	898	-131.7	-12.79	52.7	14562.016	1.12	1.16
1989	760.9	-84.4	-9.98	1181.5	283.5	31.57	420.6	14982.616	-0.3	-0.32
1990	1100	339.1	44.57	1600	418.5	35.42	500	15482.616	0.81	1.26
1991	682	-418	-38	2230	630	39.38	1548	17030.616	-0.66	-0.96
1992	540	-142	-20.82	1267	-963	-43.18	727	17757.616	0.15	0.48
1993	405.5	-134.5	-24.91	2451.852	1184.852	93.52	2046.352	19803.968	-0.11	-0.27
1994	900	494.5	121.95	761	-1690.852	-68.96	-139	19664.968	-0.29	-1.77
1995	318.9	-581.1	-64.57	2940.4	2179.4	286.39	2621.5	22286.468	-0.27	-0.23
1996	660.9	342	107.24	3494	553.6	18.83	2833.1	25119.568	0.62	5.7
1997	943	282.1	42.68	3351	-143	-4.09	2408	27527.568	-1.97	-10.44
1998	485.2	-457.8	-48.55	2551	-800	-23.87	2065.8	29593.368	0.57	2.03
1999	794.1	308.9	63.66	3444.4	893.4	35.02	2650.3	32243.668	0.35	1.82
2000	1541	746.9	94.06	2203	-1241.4	-36.04	662	32905.668	-0.6	-2.61
2001	1813	272	17.65	3603	1400	63.55	1790	34695.668	0.19	0.28
2002	3701.7	1888.7	104.18	6551	2948	81.82	2849.3	37544.968	0.64	1.27
2003	2910	-791.7	-21.39	3929	-2622	-40.02	1019	38563.968	0.3	0.53
2004	6718	3808	130.86	19956	16027	407.92	13238	51801.968	0.24	0.32
2005	10273	3555	52.92	34378	14422	72.27	24105	75906.968	0.25	0.73
Average 1970/80		240.56	36.63	2035.73	623.89	38.72	1010.57	3418.47	-0.46	-1.23
Average 1981/90		-145.16	-6.34	1983.96	-509.19	-8.74	436.63	14161.92	0.53	0.61
Average 1991/05		611.53	34.46	6207.38	2185.2	58.84	4028.29	32163.13	-0.04	-0.21
Average 1970/05		289.34	23.43	3759.54	969.29	33.78	2108.53	18379.71	0.004	-0.27

\* in LYD/million . The indicators were calculated by the researcher .

sources : tables 25 , 32 .

Table ( 19 ) Evolution of the current(administrative) expenditures ; non-oil revenues and deficit/surplus in the administrative budget & the marginal propensity and income elasticity of the administrative expenditures in Libya .

years	administrative expenditures			Non-oil revenues			annual surplus /deficit*	accumulated surplus /deficit*	marginal propensity 1 : 3 %	income elasticity 2 : 4 %
	value*	(1)amount of the annual change*	(2) relative change %	value*	(3)amount of the annual change*	(4) relative change%				
1970	288.5	-	-	82.8	-	-	-205.7	-205.7	-	-
1971	230.2	-58.3	-20.2	176.135	93.335	112.7	-54.065	-259.765	-0.62	-0.18
1972	263.9	33.7	14.6	206.69	30.555	17.3	-57.21	-316.975	1.1	0.84
1973	234.5	-29.4	-11.1	248.588	41.898	20.3	14.088	-302.887	-0.7	-0.55
1974	432.9	198.4	84.6	387	138.412	55.7	-45.9	-348.787	1.43	1.52
1975	573.2	140.3	32.4	460.749	73.749	19.1	-112.451	-461.238	1.9	1.7
1976	564	-9.2	-1.6	612.144	151.395	32.9	48.144	-413.094	-0.06	-0.05
1977	669.3	105.3	18.7	750.755	138.611	22.6	81.455	-331.639	0.76	0.83
1978	695	25.7	3.8	823.738	72.983	9.7	128.738	-202.901	0.35	0.39
1979	770	75	10.8	1021.977	198.239	24.1	251.977	49.076	0.38	0.45
1980	950	180	23.4	849.2	-172.777	-16.9	-100.8	-51.724	-1.04	-1.38
1981	1050	100	10.5	920.3	71.1	8.4	-129.7	-181.424	1.41	1.25
1982	1285	235	22.4	923.4	3.1	0.3	-361.6	-543.024	75.81	74.67
1983	1567.6	282.6	22	928.1	4.7	0.5	-639.5	-1182.524	60.13	44
1984	1645.3	77.7	5	1115.5	187.4	20.2	-529.8	-1712.324	0.41	0.25
1985	1182.1	-463.2	-28.2	952.6	-162.9	-14.6	-229.5	-1941.824	2.84	1.93
1986	1332.9	150.8	12.8	920.1	-32.5	-3.4	-412.8	-2354.624	-4.64	-3.76
1987	1075	-257.9	-19.3	934.8	14.7	1.6	-140.2	-2494.824	-17.54	-12.06
1988	1125	50	4.7	1131.8	197	21.1	6.8	-2488.024	0.25	0.22
1989	1170	45	4	1201.4	69.6	6.1	31.4	-2456.624	0.65	0.66
1990	1498	328	28	1260	58.6	4.9	-238	-2694.624	5.6	5.71
1991	1508	10	0.7	1292	32	2.5	-216	-2910.624	0.31	0.28
1992	1534	26	1.7	1419	127	9.8	-115	-3025.624	0.2	0.17
1993	1600	66	4.3	1485.9	66.9	4.7	-114.1	-3139.724	0.99	0.91
1994	1769.3	169.3	10.6	1253	-232.9	-15.7	-516.3	-3656.024	-0.73	-0.68
1995	2710.1	940.8	53.2	1041	-212	-16.9	-1669.1	-5325.124	-4.44	-3.15
1996	3761.2	1051.1	38.8	1486.3	445.3	42.8	-2274.9	-7600.024	2.36	0.91
1997	3505.4	-255.8	-6.8	2803.1	1316.8	88.6	-702.3	-8302.324	-0.19	-0.08
1998	3163.8	-341.6	-9.7	3043.1	240	8.6	-120.7	-8423.024	-1.42	-1.13
1999	2966.9	-196.9	-6.2	2697.3	-345.8	-11.4	-269.6	-8692.624	0.57	0.54
2000	3153.2	186.3	6.3	3640.6	943.3	35	487.4	-8205.224	0.2	0.18
2001	3596.6	443.4	14.1	3465.1	-175.5	-4.8	-131.5	-8336.724	-2.53	-2.94
2002	4210.3	613.7	17.1	3102.2	-362.9	-10.5	-1108.1	-9444.824	-1.69	-1.63
2003	3577.7	-632.6	-15	4260	1157.8	37.3	682.3	-8762.524	-0.55	-0.4
2004	6720	3142.3	87.8	5021.2	761.2	17.9	-1698.8	-10461.324	4.13	4.91
2005	8282	1562	23.2	4565.3	-455.9	-9.1	-3716.7	-14178.024	-3.43	-2.55
Average 1970/80		66.15	15.54	510.89	76.64	29.75	-4.7	-258.69	0.35	0.36
Average 1981/90		54.8	6.19	1028.8	41.08	4.51	-264.29	-1804.98	12.49	11.29
Average 1991/05		452.27	14.67	2705.01	220.35	11.92	-765.56	-7364.25	-0.41	-0.31
Average 1970/05		228.39	12.5	1568.97	128.07	14.9	-393.83	-3648.87	3.49	3.19

\* in LYD/million . The indicators were calculated by the researcher .

sources : tables 25 , 32 .

Table ( 20 ) Proportion of the public revenues , surplus/deficit to the GDP in Libya

years	Actual public expenditures *			Actual public revenues *			D *	GDP *	D/GDP %	OR/GDP %	NOR/GDP %	PR/GDP %
	G <sub>s</sub>	G <sub>i</sub>	total	NOR	OR	PR						
1970	288.5	146	434.5	82.8	453	535.8	101.3	1288.3	8%	35%	6%	42%
1971	230.2	248	478.2	176.135	652.318	828.453	350.3	1586.5	22%	41%	11%	52%
1972	263.9	397.3	661.2	206.69	624.575	831.265	170.1	1753	10%	36%	12%	47%
1973	234.5	413.8	648.3	248.588	604.108	852.696	204.4	2182.3	9%	28%	11%	39%
1974	432.9	866	1298.9	387	1474.279	1861.279	562.4	3795.7	15%	39%	10%	49%
1975	573.2	923.2	1496.4	460.749	1323.995	1784.744	288.3	3674.3	8%	36%	13%	49%
1976	564	1187.2	1751.2	612.144	2077.336	2689.48	938.3	4768.1	20%	44%	13%	56%
1977	669.3	1294.8	1964.1	750.755	2625.846	3376.601	1412.5	5612.7	25%	47%	13%	60%
1978	695	1380	2075	823.738	2183.483	3007.221	932.2	5496.1	17%	40%	15%	55%
1979	770	1868.8	2638.8	1021.977	3682.176	4704.153	2065.4	7603	27%	48%	13%	62%
1980	950	2551.6	3501.6	849.2	6691.9	7541.1	4039.5	10553.8	38%	63%	8%	71%
1981	1050	2872.8	3922.8	920.3	3420	4340.3	417.5	8798.8	5%	39%	10%	49%
1982	1285	2365.9	3650.9	923.4	4145.4	5068.8	1417.9	8932.4	16%	46%	10%	57%
1983	1567.6	2096.3	3663.9	928.1	2520	3448.1	-215.8	8511.7	-3%	30%	11%	41%
1984	1645.3	1834.7	3480	1115.5	2125	3240.5	-239.5	7804.7	-3%	27%	14%	42%
1985	1182.1	1523.3	2705.4	952.6	1846	2798.6	93.2	7852.1	1%	24%	12%	36%
1986	1332.9	1081.1	2414	920.1	1074	1994.1	-419.9	6767.5	-6%	16%	14%	29%
1987	1075	993	2068	934.8	1029.7	1964.5	-103.5	5933.2	-2%	17%	16%	33%
1988	1125	845.3	1970.3	1131.8	898	2029.8	59.5	6170.6	1%	15%	18%	33%
1989	1170	760.9	1930.9	1201.4	1181.5	2382.9	452	7094.7	6%	17%	17%	34%
1990	1498	1100	2598	1260	1600	2860	262	7741.6	3%	21%	16%	37%
1991	1508	682	2190	1292	2230	3522	1332	8426.2	16%	26%	15%	42%
1992	1534	540	2074	1419	1267	2686	612	8774.4	7%	14%	16%	31%
1993	1600	405.5	2005.5	1485.9	2451.852	3937.752	1932.3	9287.5	21%	26%	16%	42%
1994	1769.3	900	2669.3	1253	761	2014	-655.3	9913.5	-7%	8%	13%	20%
1995	2710.1	318.9	3029	1041	2940.4	3981.4	952.4	10592.5	9%	28%	10%	38%
1996	3761.2	660.9	4422.1	1486.3	3494	4980.3	558.2	11782.5	5%	30%	13%	42%
1997	3505.4	943	4448.4	2803.1	3351	6154.1	1705.7	12888	13%	26%	22%	48%
1998	3163.8	485.2	3649	3043.1	2551	5594.1	1945.1	12610.6	15%	20%	24%	44%
1999	2966.9	794.1	3761	2697.3	3444.4	6141.7	2380.7	14075.2	17%	24%	19%	44%
2000	3153.2	1541	4694.2	3640.6	2203	5843.6	1149.4	17620.2	7%	13%	21%	33%
2001	3596.6	1813	5409.6	3465.1	3603	7068.1	1658.5	21868.5	8%	16%	16%	32%
2002	4210.3	3701.7	7912	3102.2	6551	9653.2	1741.2	30549.4	6%	21%	10%	32%
2003	3577.7	2910	6487.7	4260	3929	8189	1701.3	37604	5%	10%	11%	22%
2004	6720	6718	13438	5021.2	19956	24977.2	11539.2	48793.4	24%	41%	10%	51%
2005	8282	10273	18555	4565.3	34378	38943.3	20388.3	67048.3	30%	51%	7%	58%
**total	70.66	59.44	130.1	56.48	135.34	191.83	61.73	445.76	-	-	-	-
*Average	1962.8	1651.01	3613.81	1568.97	3759.54	5328.5	1714.7	12382.09	11%	30%	14%	43%
CAGR	10.1%	12.9%	11.3%	12.1%	13.2%	13.0%	16.4%	12.0%	3.9%	1.1%	0.2%	1.0%

where , \* in LYD/million ; \*\* in LYD/milliard ; GS: Administrative expenditures ; Gi : development expenditures ; NOR: Non-oil revenues ;

OR: oil revenues ; PR: public revenues ; D : deficit/surplus in the public budget ; GDP: Gross domestic product .

sources : columns 1-6 from tables 25,31.; column 9 from table 1 .; The other remaining indicators were calculated by the researcher .

Table ( 21 ) Assets &amp; Liabilities of Central Bank of Libya

LYD/Million ( unless stated otherwise )

years	Assets					Liabilities			sources
	public Treasury bills & securities	public Treasury Loans & Advances	Loans & Advances to public Enterprises	total of Banking operations in CBL	Total	Treasury account at the CBL	public Enterprises accounts at CBL	Total	
1970	-	-	-	40.2	477.6	278.8	78.8	477.6	(3)
1971	-	* 0.567	-	33.9	786	480	134.1	786	(3)
1972	-	*4	-	175.1	953.2	520.8	132.5	953.2	(3)
1973	144.3	*54	-	371.3	892.6	325.7	178.5	892.6	(5),(4),(3)
1974	264	*13	-	450	1609.4	376.3	332.3	1609.4	(5),(4),(3)
1975	298.7	* 255.5	-	873.2	1583.2	308.3	263.8	1583.2	(5),(4),(3)
1976	489.2	* 22.3	-	829.7	1764.9	321.6	331.2	1764.9	(5),(4),(3)
1977	296.8	* 22.6	-	683.4	2050.5	312.1	407.6	2050.5	(5),(4),(3)
1978	1009	*23.5	-	1446	2686.8	423.4	423.5	2686.8	(5),(4),(3)
1979	1014	* 20.8	-	1521.9	2606.5	490	672.6	2606.5	(5),(4),(3)
1980	301.6	* 18.3	-	1214.6	5601.4	847.3	1009.7	5601.4	(5),(4),(3)
1981	1155.9	* 14.1	-	2395.9	5735.1	716.9	1020.7	5735.1	(5),(4),(3)
1982	1256.7	* 547	-	3156.2	5489.4	681.1	950.3	5489.4	(5),(4)
1983	366.3	* 544	-	3244.3	5073.8	653.7	606.5	5073.8	(5),(4)
1984	506.4	* 570.7	-	3588.3	4884.2	648.4	595.3	4884.2	(5),(4)
1985	262.2	* 567.6	-	3806.6	5200.7	641.6	692.5	5200.7	(5),(4)
1986	120.4	* 566	-	3858.3	5246.2	639	471.2	5246.2	(5)
1987	94.8	526	30	4617.1	5714.7	662.2	450.2	5714.7	(2),(1)
1988	2544.1	581	30	4488.6	5420.4	665.6	420.6	5420.4	(2),(1)
1989	2679.4	989.4	47	4884.3	6047.2	681.2	551.5	6047.2	(2),(1)
1990	3928.1	-	180.5	5499.4	6997.2	696.1	974.7	6997.2	(2),(1)
1991	3928.1	-	176.2	5686.5	7190.3	697.1	1173.5	7190.3	(2),(1)
1992	4181.4	-	166	5594.8	7408.4	697.9	593.3	7408.4	(2),(1)
1993	3439.3	29.9	158.7	5444.1	7730.7	676.6	626.9	7730.7	(2),(1)
1994	3784.4	646.2	237.2	6954.8	9060.7	678.2	869	9060.7	(2),(1)
1995	4484.1	696.2	486.8	8001.8	10136.4	708.3	1006.2	10136.4	(2),(1)
1996	4328	696.2	529.6	8264.7	10771.3	741.2	829.5	10771.3	(2),(1)
1997	4374.3	782.6	590	8461	9525.7	684.2	929	9525.7	(6)
1998	4519.4	1307.8	606.1	9495.4	2787.7	792.7	757.9	2787.7	(7)
1999	4373.9	696.2	603.5	9387.1	2744.1	1613.4	840.8	2744.1	(7)
2000	4624.6	696.2	647.7	12424.3	2826.7	3891.8	819.7	2826.7	(7)
2001	4581.1	1600.1	499.5	14611	2690.7	4418.1	1087.8	2690.7	(7)
2002	4581.7	1600.1	344.2	23503.1	2751.8	4860.9	988.6	2751.8	(7)
2003	4584	1600.1	330.8	32366.6	2883.3	6324.1	901.6	2883.3	(7)
2004	0	0	317.5	33422	2794.7	13627.5	1036.5	2794.7	(7)
2005	0	0	776.7	54934.8	3482.1	28866.1	1757.7	3482.1	(7)
<b>**Total</b>	72.52	15.69	6.76	285.73	161.61	80.65	24.92	161.61	**in LYD/Milliard
Average	2014.34	435.89	187.72	7936.95	4489.04	2240.23	692.11	4489.04	
CAGR	<b>12.2% (a)</b>	<b>28.2% (b)</b>	<b>19.8% (c)</b>	<b>22.9%</b>	<b>5.8%</b>	<b>14.2%</b>	<b>9.3%</b>	<b>5.8%</b>	

\* includes laons of the public treasury and public enterprises ,(a) for1973-2003.,(b) for 1971-2003., ( c ) for 1987-2005.

where , CBL : central Bank of Libya ; CAGR : compound annual growth rate .

Sources : Central Bank of Libya , the Economic bulletin , the following No.s:- ( 1 ) jul/sep 1997 , vol.37,No.7-9, table 1.;

( 2 ) Apr/Jun 1997,vol.37,No.4-6,table 1.;( 3 ) Apr/Jun 1982 ,vol.22, No. 4-6, table 2. ; ( 4 ) Oct/Dec 1986 ,vol 26 , No.10-12, 1986

table 2. ; ( 5 ) Apr/Jun ,vol 27, No.4-6, table 2. ;( 6 ) the second quarter 1998, vol 38, table 5 . ;( 7 )second quarter 2008,vol.48,table 6.

Table ( 22 ) Money Supply and its facors affecting ( LYD/million )

years	Narrow Money supply			sources
	currency in circulation	Demand deposits	Total	
1970	112.28	128.28	240.56	(2) , (1)
1971	120.68	243.79	364.47	(2) , (1)
1972	147.37	245.37	392.74	(2) , (1)
1973	202.6	288.37	490.97	(5), (4), (2) , (1)
1974	262.21	491.63	753.84	(5), (4), (2) , (1)
1975	345.99	498.46	844.45	(5), (4), (2) , (1)
1976	435.96	703.41	1139.37	(5), (4), (2) , (1)
1977	584.97	858.79	1443.76	(5), (4), (3) , (1)
1978	868.52	819.29	1687.81	(5), (4), (3) , (1)
1979	1053.73	1169.88	2223.61	(5), (4), (3), (1)
1980	682.27	2174.56	2856.83	(5), (4), (3) , (1)
1981	791.1	2721	3512.1	(5) , (4) , (3)
1982	8899	2362.9	11261.9	(5) , (3)
1983	838.2	2056.2	2894.4	(5) , (3)
1984	767.5	1943.8	2711.3	(5) , (3)
1985	985	2507.2	3492.2	(5), (3)
1986	1023.7	2017.7	3041.4	(5), (3)
1987	1068.2	2370.4	3438.6	(7) , (6)
1988	899.6	2133.1	3032.7	(7) , (6)
1989	1131.6	2389.9	3521.5	(7), (6)
1990	1461.1	2991.2	4452.3	(7) , (6)
1991	1620.8	2672	4292.8	(7) , (6)
1992	1982.2	3005	4987.2	(7) , (6)
1993	2216.9	2731.2	4948.1	(7) , (6)
1994	1989.8	3142.8	5132.6	(7) , (6)
1995	2035.4	3201.8	5237.2	(7) , (6)
1996	2419	3963.4	6382.4	(7) , (6)
1997	2534.2	5473.5	8007.7	(8)
1998	2698.6	4336.3	7034.9	(10)
1999	2634.9	4750.5	7385.4	(10)
2000	2699.2	4579.7	7278.9	(9),(10)
2001	2559.6	5711.2	8270.8	(9),(10)
2002	2613.9	6091.9	8705.8	(9),(10)
2003	2763.5	6265.7	9029.2	(9),(10)
2004	2612.7	7923.9	10536.6	(9),(10)
2005	3308.7	10719.4	14028.1	(9),(10)
Average	1649.19	2935.65	4584.85	
CAGR	10.1%	13.5%	12.3%	

sources : Central Bank Of Libya , The Economic bulletin :(1)Apr/Jun 1982, vol.22, No.4-6,table 14.;(2)Jan/Mar 1978, No.1-2-3 , table 14.;(3)Jan/Mar 1988 , vol.28,No.1-3. (4)Oct/Dec 1986, vol.26,No.10-12,table 14.;(5)Apr/Jun 1987, vol.27,No.4-6,table 14. (6)Apr/Jun 1997,vol.37,No.4-6, table 12.(7)Jul/Sep 1997, vol.37,No.7-9,table 12. (8)The second quarter, 1998 , vol.38, table.3.; (9) Second quarter 2008, Vol.48. (10) General Authority for information, Statistics book, 2007, p.219.

Table ( 23 ) The relative importance of taxes to operating surplus in the non-oil sectors in Libya ( LYD/million )

years	total production at cost price	intermediate consumption	GDP at cost price	depreciation of fixed capital	factors of domestic income	compensations of employees	( 1 ) operating surplus	( 2 ) direct taxes	( 3 ) indirect taxes	( 4 ) Total Taxes	rate of the surplus mobilization		
											( 2 ) : ( 1 )	( 3 ) : ( 1 )	( 4 ) : ( 1 )
1970	-	-	475.7	-	-	-	0	16.2	50.5	66.7	0	0	0
1971	978.7	314.3	663.8	50.3	614.1	382.5	231.6	17.5	54.8	72.3	0.076	0.237	0.312
1972	1234.7	402.3	832.4	56.9	775.5	484.2	291.3	22.8	73.4	96.2	0.078	0.252	0.33
1973	1638.3	587.8	1050.5	67.1	983.4	593.1	390.3	24	99.3	123.3	0.061	0.254	0.316
1974	2571.1	1165.4	1405.7	20.8	1384.9	869.1	515.8	58.5	165.1	223.6	0.113	0.32	0.434
1975	3130.8	1287.2	1843.9	118.9	1725	1024.2	700.8	85.4	220	305.14	0.122	0.314	0.436
1976	3440.5	1422.4	2018.1	138.2	1879.9	1166.7	713.2	112.1	243	355.1	0.157	0.341	0.498
1977	-	-	2336.8	-	-	-	0	136.8	264	400.8	0	0	0
1978	-	-	2687.4	-	-	-	0	176.6	307.4	484	0	0	0
1979	-	-	3057.7	-	-	-	0	197.8	393.4	591.2	0	0	0
1980	7370	3341.9	4028.1	308.9	3719.2	2217.2	1502	270.9	509.5	780.4	0.18	0.339	0.52
1981	7791.8	3396.3	4395.5	347.7	4047.8	2340.8	1707	344.4	575.9	920.3	0.202	0.337	0.539
1982	7904.6	3208	4696.6	394.1	4302.5	2626.6	1675.9	371.2	552.2	923.4	0.221	0.329	0.551
1983	7683.1	2995	4688.1	411.2	4276.9	2645.7	1631.2	372.8	488	860.8	0.229	0.299	0.528
1984	8203.6	3608.7	4594.9	439	4155.9	2626.5	1529.4	461.2	654.3	1115.5	0.302	0.428	0.729
1985	7408.7	3057	4351.7	509.7	3842	2259.9	1582.1	354.3	413.9	768.2	0.224	0.262	0.486
1986	7190.4	2829.1	4361.3	543.8	3817.5	2093.7	1723.8	329.1	401.9	731	0.191	0.233	0.424
1987	6828.4	2606.8	4221.6	575.1	3646.5	1895.1	1751.4	312.3	348.5	660.8	0.178	0.199	0.377
1988	7553.3	2909.9	4643.4	612.7	4030.7	2261.6	1769.1	304	617.7	921.7	0.172	0.349	0.521
1989	8456.5	3277.3	5179.2	669.4	4509.8	2663	1846.8	303.4	506.8	810.2	0.164	0.274	0.439
1990	8370.1	3369.3	5000.8	571.4	4429.4	2436.1	1993.3	306.4	334.6	641	0.154	0.168	0.322
1991	8918.9	3275.9	5643	622.5	5020.5	2952.5	2068	273.5	434.5	708	0.132	0.21	0.342
1992	10106.7	3812.7	6294	636.7	5657.3	3312.1	2345.2	347.4	425.2	772.6	0.148	0.181	0.329
1993	10415.6	3101	7314.6	1185.6	6129	3420.9	2708.1	237.5	427.1	664.6	0.088	0.158	0.245
1994	10580.6	2684.2	7896.4	1743.5	6152.9	3465.3	2687.6	664	589	1253	0.247	0.219	0.466
1995	11290.6	3373.1	7917.5	1366.1	6551.4	3544	3007.4	397.8	640	1037.8	0.132	0.213	0.345
1996	13098.4	4289.1	8809.3	1286.7	7522.6	4161.3	3361.3	441.4	665.5	1106.9	0.131	0.198	0.329
1997	14830.4	5147.1	9683.5	1027.8	8655.7	4906.1	3749.6	386.6	677.5	1064.1	0.103	0.181	0.284
					Average	(1970-97)	1481.507	261.639	397.607	659.237	0.136	0.225	0.361
					CAGR	(1971-97)	10.9%	12.1%	9.8%	10.5%	1.1%	-1.0%	-0.3%

where , CAGR: compounding annual growth rate ; ( - ) not available .

sources : The planning secretariat , National accounts for various years ., Also tables 1,31,37 . The ratios were prepared by the researcher .

Table ( 24 ) Tax on the real estate incomes &amp; Tax on Business incomes ( LYD/million )

years	tax on real estate income	Tax on Business incomes		Total of tax on Business incomes
		Tax on income of trade, industry and crafts	Tax on the corporate incomes	
1970	0.41	4.771	0.373	5.145
1971	0.738	3.692	0.462	4.154
1972	0.83	8.27	0	8.27
1973	0.631	1.954	3.594	5.548
1974	0.896	2.36	13.591	15.951
1975	0.946	2.975	17.856	20.832
1976	1.196	4.662	25.627	30.289
1977	0.978	4.719	29.822	34.542
1978	0.583	3.486	51.452	54.938
1979	0.277	2.722	61.684	64.405
1980	0	4.451	114.584	119.035
1981	0	11.101	155.59	166.691
1982	0	5.882	177.458	183.34
1983	0	4.461	185.621	190.083
1984	0	4.591	148.499	153.09
1985	0	4.195	160.557	164.751
1986	0	9.444	145.111	154.555
1987	0	3.781	137.869	141.651
1988	0	4.33	127.767	132.097
1989	0	4.005	141.148	145.153
1990	0	7.63	85.024	92.654
1991	0	8.925	86.353	95.278
1992	0	16.14	126.906	143.046
1993	0	9.59	84.86	94.449
1994	0	18.464	403.348	421.812
1995	0.02	18.031	182.54	200.57
1996	0.025	26.463	212.977	239.44
1997	0.002	30.378	159.412	189.79
1998	0.018	33.068	187.664	220.732
1999	0.012	27.816	197.517	225.333
2000	0.033	24.601	152.946	177.547
2001	0.015	21.642	162.792	184.434
2002	0.016	21.184	245.936	267.12
2003	9.471	23.751	267.738	291.489
2004	7.662	24.352	302.952	327.304
2005	16.243	24.407	323.28	347.687
TOTAL	41.002	432.294	4880.91	5313.205
Average	1.139	12.008	135.581	147.589
CAGR	11.1%	4.8%	21.3%	12.8%

source : Libyan tax authority , Tripoli .

Table ( 25 ) Tax on individuals incomes

( LYD/ million )

years	tax on salaries & wages	* tax on the free professions incomes	General tax on the income	tax on the banks deposit benefits and saving accounts	tax on external incomes	total of tax on the individuals incomes
1970	7.114	0.001	0.142	0	0	7.257
1971	6.516	0.005	0.226	0	0	6.747
1972	5.424	0	0	0	0	5.424
1973	7.435	0.014	1.214	0	0	8.663
1974	17.731	0.073	3.235	0.015	0	21.054
1975	30.305	0.082	4.145	0.027	0	34.559
1976	36.011	0.096	5.432	0.041	0	41.58
1977	47.953	0.195	6.706	0.07	0	54.924
1978	55.823	0.225	5.144	0.035	0	61.227
1979	63.631	0.165	5.135	0.011	0	68.942
1980	75.668	0.471	6.628	0.013	0	82.78
1981	108.24	0.329	12.329	0.02	0	120.918
1982	118.294	0.103	13.392	0.121	0	131.91
1983	116.037	0.149	10.511	0.041	0	126.738
1984	128.634	0.133	122.987	0.061	0	251.815
1985	126.697	0.099	11.721	0.064	0	138.581
1986	116.898	0.125	11.398	0.072	0	128.493
1987	114.339	0.205	11.881	0.08	0	126.505
1988	117.584	0.068	11.781	0.063	0	129.496
1989	101.602	0.202	13.465	0.029	0.001	115.299
1990	136.081	0.203	21.119	0.225	0.001	157.629
1991	118.219	0.366	19.228	0.138	0	137.951
1992	122.942	0.499	14.515	0.177	0	138.133
1993	102.486	0.255	10.148	0.268	0	113.157
1994	161.466	0.846	23.76	0.127	0.004	186.203
1995	128.905	0.769	23.497	0.116	0.006	153.293
1996	125.031	0.994	23.302	0.109	0.005	149.441
1997	127.649	1.681	16.275	0.104	0.011	145.72
1998	135.892	1.987	17.772	0.058	0.018	155.727
1999	99.494	2.461	10.32	0.01	0.007	112.292
2000	133.038	5.04	20.839	0.036	0.074	159.027
2001	169.01	5.279	21.896	0.036	0.044	196.265
2002	208.621	3.559	26.349	0.098	0.076	238.703
2003	238.509	3.322	62.757	0.036	0.028	304.652
2004	180.303	7.509	74.473	0.096	0.07	262.451
2005	141.144	9.12	10.559	0.084	0.054	160.961
TOTAL	3730.726	46.63	654.281	2.481	0.399	4434.517
Average	103.6	1.3	18.2	0.069	0.011	123.2
CAGR	8.9%	29.8%	13.1%	5.7%	28.3%	9.3%

( \* ) Includes : tax on the partner's income .

Source : The General people's committee of finance , Libyan tax Authority , Tripoli .

Table ( 26) total of incomes tax ( LYD/ million )

years	tax on the real estate incomes	tax on the Business incomes	tax on the individuals incomes	tax on the agricultural incomes	tax on the livestock	other items	total of the income tax
1970	0.41	5.145	7.257	0	0	0.004	12.816
1971	0.738	4.154	6.747	0	0	0	11.639
1972	0.83	8.27	5.424	0	0	0	14.524
1973	0.631	5.548	8.663	0	0	0	14.842
1974	0.896	15.951	21.054	0	0	0	37.901
1975	0.946	20.832	34.559	0	0	0	56.337
1976	1.196	30.289	41.58	0	0	0	73.065
1977	0.978	34.542	54.924	0	0	0	90.444
1978	0.583	54.938	61.227	0	0	0	116.748
1979	0.277	64.405	68.942	0	0	0	133.624
1980	0	119.035	82.78	0	0	0	201.815
1981	0	166.691	120.918	0	0	0	287.609
1982	0	183.34	131.91	0	0	0	315.25
1983	0	190.083	126.738	0.014	0	0	316.835
1984	0	153.09	251.815	0.035	0	0	404.94
1985	0	164.751	138.581	0.369	0	0	303.701
1986	0	154.555	128.493	0.506	0	0	283.554
1987	0	141.651	126.505	0.653	0	0	268.809
1988	0	132.097	129.496	0.463	0	0	262.056
1989	0	145.153	115.299	0.317	0	0	260.769
1990	0	92.654	157.629	0.291	0	0	250.574
1991	0	95.278	137.951	0.133	0	0	233.362
1992	0	143.046	138.133	0.124	0	0	281.303
1993	0	94.449	113.157	0.05	0	0	207.656
1994	0	421.812	186.203	0.148	0.001	0	608.164
1995	0	200.57	153.293	0.101	0.011	0	353.975
1996	0	239.44	149.441	0.129	0.001	0	389.011
1997	0	189.79	145.72	0.148	0.003	0	335.661
1998	0.018	220.732	155.727	0.143	0.001	0	376.621
1999	0.012	225.333	112.292	0.134	0.001	0	337.772
2000	0.033	177.547	159.027	0.109	0.001	0	336.717
2001	0.015	184.434	196.265	0.144	0	0	380.858
2002	0.016	267.12	238.703	0.197	0.01	0	506.046
2003	9.471	291.489	304.652	0.045	0	0	605.657
2004	7.662	327.304	262.451	0.056	0	0	597.473
2005	16.243	347.687	160.961	0.011	0	0	524.902
TOTAL	40.955	5313.205	4434.517	4.32	0.029	0.004	9793.03
Average	1.138	147.589	123.181	0.12	0.001	0	272.029
CAGR	11.1%	12.8%	9.3%	-1.1%	-	-	11.2%

Source : the libyan tax authority , triopli .

Table ( 27 ) The total deposits collected by tax authority for benefit of other parties . ( LYD/Million )

years	tax of Al-jihad	tax of the palestinian national fund	tax of the blind	cadastre fees	national companies supporting	Defense fees*	Dinar discount	other** items	total deposits
1970	2.255	0.072	0	0	0	0	0	0	2.327
1971	3.823	0.167	0	0	0	0	0	0	3.99
1972	5.648	0.221	0.093	0	0	0	0	0	5.962
1973	5.921	0.257	0.088	0	0	0	0	0.018	6.284
1974	12.52	0.367	0.123	0	0	0	0	0.017	13.027
1975	17.945	0.598	0.129	0.555	0	0	0	0	19.227
1976	22.686	0.608	0.128	1.451	0	0	0	0	24.873
1977	28.382	0.868	0.129	1.605	0	0	0	0	30.984
1978	31.394	0.641	0.127	1.239	0	0	0	0	33.401
1979	33.224	0.867	0.12	0.619	0	0	0	0	34.83
1980	36.644	30.305	0.083	1.703	0	0	0	0	68.735
1981	52.039	0.95	0.061	3.253	0	0	0	0	56.303
1982	53.48	0.749	0.044	1.184	0	0	0	0	55.457
1983	53.747	0.685	0.038	0.93	0	0	0	0	55.4
1984	52.983	0.6	0.039	0.848	0	0	0	0	54.47
1985	42.862	0.534	0.047	0.368	0	0	0	0	43.811
1986	38.624	0.493	0.041	0.417	0	0.036	0	0	39.611
1987	32.065	3.126	0.144	0.806	1.701	0.472	0	0	38.314
1988	33.47	0.518	0.039	0.935	2.472	0.234	0	0	37.668
1989	32.238	0.472	0.03	1.202	2.74	0.111	0	0	36.793
1990	38.365	0.514	0.077	5.704	4.58	0.088	0.006	0	49.334
1991	30.64	0.413	0.029	1.628	3.707	0.01	0.022	0	36.449
1992	34.444	0.398	0.036	24.414	3.594	0.001	0.04	0	62.927
1993	24.533	0.253	0.029	1.001	2.476	0.001	0.035	0	28.328
1994	47.104	0.354	0.038	1.481	5.183	0.001	0.076	0	54.237
1995	37.087	0.266	0.062	0.675	4.819	0.002	0.076	0	42.987
1996	44.243	0.17	0.034	0	6.976	0.001	0.098	0	51.522
1997	44.074	0.166	0.027	0.015	6.108	0.001	0.096	0	50.487
1998	51.24	0.541	0.022	0.018	7.661	0	0.092	0.39	59.964
1999	46.475	0.137	0.017	0.026	5.998	0	0.147	0.073	52.873
2000	48.314	0.134	0.009	0.005	5.552	0.001	0.343	0.166	54.524
2001	51.55	0.13	0.005	0	4.768	0.008	0.322	0.302	57.085
2002	59.48	0.148	0.003	0	4.614	0.008	0.294	2.828	67.375
2003	68.736	0.125	0.002	0	4.393	0.001	0.308	3.224	76.789
2004	73.204	0.118	0.001	0	4.844	0	0.365	3.992	82.524
2005	83.153	0.198	0	0	5.806	0.001	0.492	3.865	93.515
TOTAL	1374.592	47.163	1.894	52.082	87.992	0.977	2.812	14.875	1582.387
Average	38.183	1.31	0.053	1.447	2.444	0.027	0.078	0.413	43.955
CAGR	10.90%	2.90%	-13.20%	-17.20%	7.10%	-17.20%	34.10%	38.80%	11.10%

( \* ) called : gun installment , ( \*\* )Includes:military service fees;petition&contest fees;social solidarity fund ; and other deposits .

source : the libyan tax authority , Tripoli .

Table (28 ) total of fine &amp; seizure and miscellaneous ( part 6 ) ( LYD /million )

years	finest & seizures	total of the miscellaneous	total of part 6
1970	0.231	0.062	0.293
1971	0.185	0.04	0.225
1972	0.336	0	0.336
1973	0.409	0.012	0.421
1974	0.88	0.012	0.892
1975	0.931	0.009	0.94
1976	2.141	0.013	2.154
1977	1.017	0.011	1.028
1978	1.651	0.01	1.661
1979	1.496	0.002	1.498
1980	2.883	0.237	3.12
1981	3.147	0.281	3.428
1982	3.566	0.304	3.87
1983	4.433	0.239	4.672
1984	4.712	0.213	4.925
1985	4.527	0.281	4.808
1986	3.888	0.196	4.084
1987	2.289	0.2	2.489
1988	3.355	0.327	3.682
1989	2.364	0.379	2.743
1990	2.488	0.813	3.301
1991	2.612	0.368	2.98
1992	2.462	0.211	2.673
1993	1.806	0.075	1.881
1994	3.952	0.091	4.043
1995	7.293	0.124	7.417
1996	11.083	0.403	11.486
1997	11.376	0.376	11.752
1998	9.318	0.286	9.604
1999	8.988	0.336	9.324
2000	8.084	0.158	8.242
2001	6.32	0.178	6.498
2002	6.543	0.297	6.84
2003	0	0.266	0.266
2004	0	0.455	0.455
2005	0	0.355	0.355
TOTAL	126.766	7.62	134.386
Average	3.521	0.212	3.733
C.A.G.R	11.00%	5.10%	0.50%

The miscellaneous , include : license fees , the rights of income & buildings tax collection; collection and implementation ( enforcement ) rights ( Execution rights fees ); judiciary fees revenues of prior years ; other various revenues .

Source : the libyan tax authority, tripoli .

Table ( 29 ) Indirect taxes revenues in Libya

( LYD/million )

years	import tax(A)	*other customs tax(B)	customs & production tax(C=A+B)	stamp tax(D)	tax of the entertainments(E)	**tax of the blind (F)	other indirect taxes(G)	***total indirect taxes(C+D+E+F+G)
1970	35.5	11.134	46.634	3.77	0.096	0	0	50.5
1971	43.045	5.443	48.488	6.204	0.108	0	0	54.8
1972	57.421	7.181	64.602	8.58	0.118	0.093	0	73.393
1973	77.675	8.761	86.436	12.679	0.085	0.088	0	99.288
1974	123.779	10.073	133.852	31.007	0.141	0.123	0	165.123
1975	172.7	11.677	184.377	35.351	0.172	0.129	0	220.029
1976	181.431	18.107	199.538	43.178	0.184	0.128	0	243.028
1977	189.031	20.121	209.152	54.847	0.201	0.129	0	264.329
1978	225.783	21.863	247.646	59.654	0	0.127	0	307.427
1979	278.819	53.164	331.983	61.317	0	0.12	0	393.42
1980	291.762	127.41	419.172	89.952	0.276	0.083	0	509.483
1981	350	95.782	445.782	129.809	0.209	0.061	0	575.861
1982	390	105.361	495.361	56.651	0.188	0.044	0	552.244
1983	216.81	26.282	243.092	63.181	0.19	0.038	181.537	488.038
1984	251.285	39.766	291.508	59.157	0.248	0.038	303.844	654.338
1985	194.624	32.992	232.66	46.618	0.285	0.046	139.381	413.946
1986	187.479	15.845	208.508	44.344	0.211	0.041	154.021	401.941
1987	166.363	25.857	196.575	41.148	0.253	0.144	114.779	348.544
1988	267.074	31.192	301.466	60.602	0.238	0.039	258.594	617.739
1989	192.076	19.696	215.86	54.934	0.206	0.03	239.888	506.83
1990	143.61	42.28	188.915	78.597	0.322	0.077	69.691	334.577
1991	195.96	100.156	298.477	52.625	0.295	0.029	85.464	434.529
1992	189.76	156.412	348.417	59.653	0.359	0.036	19.016	425.236
1993	214.532	161.328	376.935	51.013	0.235	0.029	0	427.137
1994	247.05	263.416	511.209	78.04	0.413	0.038	0	588.957
1995	316.905	240.584	557.696	82.232	0.307	0.062	0	640.09
1996	300.992	278.524	579.533	85.675	0.27	0.034	0	665.495
1997	323.901	301.201	625.117	52.11	0.288	0.027	0	677.527
1998	388.403	234.028	622.431	105.12	0.227	0.022	0	727.8
1999	362.844	286.816	649.66	138	0.2	0.017	0	787.877
2000	299.831	165.28	465.111	132.782	0.124	0.009	0	598.026
2001	402.077	249.456	651.533	140.13	0.064	0.005	0	791.732
2002	353.08	251.729	604.809	261.588	0.046	0.003	0	866.446
2003	623.015	326.594	949.609	223.143	0.032	0.002	0	1172.786
2004	553.427	384.1	937.527	259.486	0.021	0.001	0	1197.035
2005	350.392	524.016	874.408	332.539	0.005	0	0	1206.952
Total	9158.436	4653.627	13844.079	3095.716	6.617	1.892	1566.215	18482.503
Average	254.4	129.27	384.56	85.99	0.18	0.05	156.62	513.4
CAGR	6.80%	11.60%	8.70%	13.70%	-8.10%	-	-	9.50%

( \*) includes : Oil products;Carbonated water;Other products;Consumption tax; Medicine consumption fees.

( \*\*) tax for the benefit of the blind . ; ( \*\*\*) customs fines & recaptures not included .

sources :- Records of the Libyan customs authority , tripoli.

- Records of the Libyan tax authority , Tripoli.

- Alhasea, Miloud ( 1988 ) , " income accounts and national accounts " , Higher institute of Administrative & financial sciences , Benghazi, Libya, 1st Edition , p.96.

- The Ministry of planning, Libyan Arab Republic, National accounts for 1962-71.

Table ( 30 ) Total stamp tax ( LYD / million )

year	ST1	ST2	ST3	ST4	total
1970	0.517	2.717	0.536	-	3.77
1971	0.352	5.259	0.593	-	6.204
1972	0.288	7.589	0.704	-	8.581
1973	0.518	11.394	0.767	-	12.679
1974	1.361	28.276	1.37	-	31.007
1975	1.705	32.226	1.419	-	35.35
1976	2.117	39.652	1.409	-	43.178
1977	3.153	50.127	1.567	-	54.847
1978	2.757	55.356	1.541	-	59.654
1979	2.39	57.263	1.665	-	61.318
1980	2.463	85.93	1.559	-	89.952
1981	3.578	124.692	1.539	-	129.809
1982	2.752	52.51	1.389	-	56.651
1983	3.291	58.687	1.203	-	63.181
1984	2.834	55.019	1.303	-	59.156
1985	2.546	42.951	1.121	-	46.618
1986	2.626	40.708	1.01	-	44.344
1987	2.132	38.248	0.768	-	41.148
1988	2.02	57.504	1.077	-	60.601
1989	1.853	51.906	1.175	-	54.934
1990	2.047	75.04	1.509	-	78.596
1991	1.86	49.397	1.369	-	52.626
1992	1.711	56.483	1.459	-	59.653
1993	1.582	48.384	1.047	-	51.013
1994	4.684	71.942	1.414	-	78.04
1995	1.884	79.002	1.347	-	82.233
1996	2.22	81.769	1.687	-	85.676
1997	1.975	48.312	1.823	-	52.11
1998	2.669	99.222	1.919	1.31	105.12
1999	4.137	127.241	3.855	2.767	138
2000	5.145	119.94	5.29	2.407	132.782
2001	5.388	125.741	5.744	3.257	140.13
2002	6.66	244.908	6.817	3.203	261.588
2003	7.288	205.637	5.66	4.558	223.143
2004	7.647	242.138	5.021	4.68	259.486
2005	8.028	312.374	7.51	4.627	332.539
TOTAL	106.178	2885.544	77.186	26.809	3095.717
Average	2.95	80.15	2.14	3.35	85.99
CAGR	8.2%	14.5%	7.8%	19.8%	13.7%

source : the libyan tax authority , and the Libyan Customs Authority ; Tripoli .

where :

ST1: stamp tax on the official edited documents

ST2: stamp tax on the actions & disposes ( transactions and facts )

ST3: sale of stamped papers & official documents.

ST4: stamp tax collected by the customs Authority .

Table( 31 ) the evolution of tax revenue in Libya during the period of 1970-2005 , ( Values in current prices )

years	Tax revenue ( LYD million )			The rate of increase			relative distribution (tax structure)		
	TD	TI	TT	TD	TI	TT	TD	TI	TT
1970	16.199	50.5	66.699	-	-	-	24%	76%	100%
1971	17.51	54.8	72.31	8.1%	8.5%	8.4%	24%	76%	100%
1972	22.805	73.393	96.198	30.2%	33.9%	33.0%	24%	76%	100%
1973	23.988	99.288	123.276	5.2%	35.3%	28.1%	19%	81%	100%
1974	58.546	165.123	223.669	144.1%	66.3%	81.4%	26%	74%	100%
1975	85.414	220.029	305.443	45.9%	33.3%	36.6%	28%	72%	100%
1976	112.09	243.028	355.118	31.2%	10.5%	16.3%	32%	68%	100%
1977	136.81	264.329	401.139	22.1%	8.8%	13.0%	34%	66%	100%
1978	176.56	307.427	483.987	29.1%	16.3%	20.7%	36%	64%	100%
1979	197.83	393.42	591.25	12.0%	28.0%	22.2%	33%	67%	100%
1980	270.87	509.483	780.353	36.9%	29.5%	32.0%	35%	65%	100%
1981	344.39	575.861	920.251	27.1%	13.0%	17.9%	37%	63%	100%
1982	371.18	552.244	923.424	7.8%	-4.1%	0.3%	40%	60%	100%
1983	372.8	488.038	860.838	0.4%	-11.6%	-6.8%	43%	57%	100%
1984	461.22	654.338	1115.558	23.7%	34.1%	29.6%	41%	59%	100%
1985	354.3	413.946	768.246	-23.2%	-36.7%	-31.1%	46%	54%	100%
1986	329.12	401.941	731.061	-7.1%	-2.9%	-4.8%	45%	55%	100%
1987	312.34	348.544	660.884	-5.1%	-13.3%	-9.6%	47%	53%	100%
1988	303.98	617.739	921.719	-2.7%	77.2%	39.5%	33%	67%	100%
1989	303.39	506.83	810.22	-0.2%	-18.0%	-12.1%	37%	63%	100%
1990	306.38	334.577	640.957	1.0%	-34.0%	-20.9%	48%	52%	100%
1991	273.53	434.529	708.059	-10.7%	29.9%	10.5%	39%	61%	100%
1992	347.39	425.236	772.626	27.0%	-2.1%	9.1%	45%	55%	100%
1993	237.53	427.137	664.667	-31.6%	0.4%	-14.0%	36%	64%	100%
1994	664.01	588.957	1252.967	179.5%	37.9%	88.5%	53%	47%	100%
1995	397.8	640.09	1037.89	-40.1%	8.7%	-17.2%	38%	62%	100%
1996	441.41	665.495	1106.905	11.0%	4.0%	6.6%	40%	60%	100%
1997	386.62	677.527	1064.147	-12.4%	1.8%	-3.9%	36%	64%	100%
1998	436.849	727.8	1164.649	13.0%	7.4%	9.4%	38%	62%	100%
1999	390.964	787.877	1178.841	-10.5%	8.3%	1.2%	33%	67%	100%
2000	391.39	598.026	989.416	0.1%	-24.1%	-16.1%	40%	60%	100%
2001	438.116	791.732	1229.848	11.9%	32.4%	24.3%	36%	64%	100%
2002	573.715	866.446	1440.161	31.0%	9.4%	17.1%	40%	60%	100%
2003	682.71	1172.786	1855.496	19.0%	35.4%	28.8%	37%	63%	100%
2004	680.451	1197.035	1877.486	-0.3%	2.1%	1.2%	36%	64%	100%
2005	618.772	1206.952	1825.724	-9.1%	0.8%	-2.8%	34%	66%	100%
Total	11538.979	18482.503	30021.482	-	-	-	-	-	-
Average	320.5	513.4	833.9	20.0%	10.0%	10.0%	40.0%	60.0%	100.0%
T.I.R	3720.0%	2290.0%	2640.0%	-	-	-	-	-	-
CAGR	11.0%	9.5%	9.9%	-	-	-	-	-	-

Where , TD :direct taxes , TI : indirect taxes , TT : total taxes . , T.I.R: total increaseing ratio .

Sources :

- Direct Taxes :

Records of the general administration of taxes authority , Tripoli , Libya. (Data does not include tax fines and confiscations).

- Indirect Taxes :

- Records of the general administration of customs authority , Tripoli , Libya.

- Planning Secretariat, The national accounts for periods of (1971-75),(1971-79),(1980-92).

-Dr Miloud Alhasea , " Income accounts and national accounts " , Publications of the Higher Institute of Administrative & Financial Sciences, Benghazi , Libya , 1st Edition , 1988, p.96.

( The ratios prepared by the researcher )

Table ( 32 ) Population in Libya ( millions )

years	Libyan		Non-Libyan		Total	
	No.	%	No.	%	No.	%
1970	1.92	96%	0.09	4%	2.01	100%
1971	1.99	95%	0.11	5%	2.1	100%
1972	2.07	94%	0.13	6%	2.2	100%
1973	2.15	91%	0.2	9%	2.35	100%
1974	2.23	89%	0.28	11%	2.51	100%
1975	2.32	87%	0.36	13%	2.68	100%
1976	2.41	85%	0.43	15%	2.84	100%
1977	2.5	85%	0.44	15%	2.94	100%
1978	2.6	86%	0.41	14%	3.01	100%
1979	2.7	86%	0.43	14%	3.13	100%
1980	2.8	86%	0.45	14%	3.25	100%
1981	2.92	83%	0.58	17%	3.5	100%
1982	3.03	81%	0.7	19%	3.73	100%
1983	3.15	81%	0.76	19%	3.91	100%
1984	3.24	89%	0.4	11%	3.64	100%
1985	3.33	92%	0.29	8%	3.62	100%
1986	3.42	93%	0.25	7%	3.67	100%
1987	3.52	86%	0.55	14%	4.07	100%
1988	3.62	86%	0.61	14%	4.23	100%
1989	3.72	85%	0.64	15%	4.36	100%
1990	3.82	85%	0.7	15%	4.52	100%
1991	3.93	82%	0.87	18%	4.8	100%
1992	4.04	82%	0.86	18%	4.9	100%
1993	4.15	80%	1.05	20%	5.2	100%
1994	4.27	81%	0.97	19%	5.24	100%
1995	4.41	83%	0.9	17%	5.31	100%
1996	4.52	85%	0.8	15%	5.32	100%
1997	4.5	92%	0.4	8%	4.9	100%
1998	4.58	92%	0.4	8%	4.98	100%
1999	4.66	92%	0.39	8%	5.05	100%
2000	4.74	92%	0.39	8%	5.13	100%
2001	4.82	93%	0.38	7%	5.2	100%
2002	4.95	93%	0.38	7%	5.33	100%
2003	5.03	93%	0.37	7%	5.4	100%
2004	5.12	93%	0.37	7%	5.49	100%
2005	5.21	94%	0.36	6%	5.57	100%
Average	3.57	88.0%	0.49	12.0%	4.06	100.0%
CAGR	2.9%	-	4.0%	-	3.0%	-

Sources :

(1)Planning Secretariat, The achievements of the revolution in Libya during ten years, 1979 , table 23 , p.42.

(2)Planning Secretariat, The national accounts , January , 1982, p.39.:(3) National Authority for Scientific Research , Journal of Economic Research, vol.7 , No. 1 &amp; 2 , 1996 , table 1 , p.43.:(4) Research and discussions of the symposium for the consumption in the Libyan economy , publications of the economic science research center , Benghazi ,1990, table 3 , p. 184.:(5)The national authority for information and documentation, statistical handbook, 1998 , No.5,table.9 ,p. 10.:(6)Arab monetary fund, Economic indicators, 1997, No.14, table .56, p.66.;

(7)Arab monetary fund, National accounts, 1997, table 12, p.12 .

-Economic research centre, Total Economic , financial and demographic data in Libya during 1962-2006, Benghazi, Libya , July 2009.

Table ( 33 ) : Evolution of employees Numbers in Libyan Economy ( Thousands employees )

years	Libyans		Non-libyans		Total		sources
	No.	%	No.	%	No.	%	
1970	383.5	88%	50	12%	433.5	100%	(1),(2),(4),(6),(7),(8),(11)
1971	395	86%	64	14%	459	100%	(4),(10),(11)
1972	407	83%	81	17%	488	100%	(4),(10),(11)
1973	419.7	78%	118.4	22%	538.1	100%	(4),(10),(11)
1974	437.4	72%	169.8	28%	607.2	100%	(4),(10),(11)
1975	454.1	67%	223	33%	677.1	100%	(1),(2),(4),(7),(9),(10),(11)
1976	470.1	64%	262.6	36%	732.7	100%	(4),(9),(11)
1977	498.8	65%	266.2	35%	765	100%	(4),(9),(11)
1978	520.4	67%	252.3	33%	772.7	100%	(4),(9),(11)
1979	529.6	67%	259.4	33%	789	100%	(4),(8),(9),(11)
1980	532.8	66%	280	34%	812.8	100%	(1),(2),(3),(4),(7),(11)
1981	560	59%	386.4	41%	946.4	100%	(4),(11)
1982	588.4	54%	495.3	46%	1083.7	100%	(4),(11)
1983	617.4	52%	562.1	48%	1179.5	100%	(1),(4),(11)
1984	664	72%	263.1	28%	927.1	100%	(4),(11)
1985	700	78%	194.2	22%	894.2	100%	(2),(4),(7),(11)
1986	738.7	82%	166	18%	904.7	100%	(4),(5),(11)
1987	792.5	85%	144.3	15%	936.8	100%	(4),(5),(11)
1988	820.8	85%	142.8	15%	963.6	100%	(1),(4),(5),(11)
1989	840.7	84%	154.7	16%	995.4	100%	(4),(11)
1990	879.4	86%	139.2	14%	1018.6	100%	(2),(4),(7),(11)
1991	927.2	92%	85.3	8%	1012.5	100%	(4),(11)
1992	967.9	93%	76.1	7%	1044	100%	(4),(11)
1993	962.1	86%	151.6	14%	1113.7	100%	(11).
1994	992.9	86%	156.1	14%	1149	100%	(11).
1995	1025.2	86%	161	14%	1186.2	100%	(11).
1996	1057.5	86%	166.5	14%	1224	100%	(11).
1997	1085.7	87%	169.4	13%	1255.1	100%	(12).
1998	1151.6	87%	172.1	13%	1323.7	100%	(12).
1999	1203.9	87%	179.9	13%	1383.8	100%	(12).
2000	1257.1	87%	187.9	13%	1445	100%	(12).
2001	1271.9	88%	176.8	12%	1448.7	100%	(12).
2002	1318.3	88%	174.3	12%	1492.6	100%	(12).
2003	1364.7	89%	170.2	11%	1534.9	100%	(12).
2004	1419.8	89%	169.1	11%	1588.9	100%	(12).
2005	1479.1	89%	186	11%	1665.1	100%	(12).
Average	826	80%	196	20%	1022	100%	
C.A.G.R	3.90%	-	3.80%	-	3.90%	-	

C.A.G.R : Compound Annual Growth Rate . , Sources :

Libyan Revolution in twenty years ( 1969-89 ) , the political , economic and social changes ,

General people`s committee of information and culture , september, 1989 , table (1-20) p.677.

General people`s committee of economy`s planning , Economic & social growth in libya ,1991,february, table 22 , p.81.

General people`s committee of planning, Summary of the economic & social transition plan 1981-85, table 19 , p.70.

Kaaiba,Mohamed," Labour productivity in the libyan manufacturing sector - comparative study " ,  
Economic research center,the conference of reality and prospects of libyan industries , Benghazi,  
during 4-6 october 1994,

Central Bank of Libya , The annual report , No.33, 1988, p.47.

General people`s committee of planning , the main features of economic&social evolution in libya  
1970-82, table 24 , p.61.

Genral people`s committee of planning & trade and finance , the achievements of the national economy  
1970-92, table 19, p.64.

Planning secretariat, the achievements of the libyan revolution during ten years 1970-79,table 25,p.45.

The general people`s committee of planning , the national accounts 1975-80, january 1982, table 9,p.20.

Planning secretariat, the national accounts 1971-75,p.87.

General people`s committee of planning, the economic and social indicators during the period of  
1962-96, december , 1997, tables 1,4 ; pp.12,15.

Economic research centre, Total Economic , financial and demographic data in Libya during 1962-2006,  
Benghazi, Libya , July 2009.

Table ( 34 ) , The average daily exchange rate announced by the Central bank of Libya

years	Average exchange rate		Sources
	LYD Vs. \$ "dollars"	\$ Vs. LYD "dirhams"	
1970	2.8003	0.3571	( 1 )
1971	2.9727	0.3364	( 2 )
1972	3.0331	0.3297	( 2 )
1973	3.3772	0.2961	( 2 )
1974	3.3772	0.2961	( 2 )
1975	3.3772	0.2961	( 2 )
1976	3.3772	0.2961	( 2 )
1977	3.3772	0.2961	( 2 )
1978	3.3772	0.2961	( 2 )
1979	3.3772	0.2961	( 3 )
1980	3.3772	0.2961	( 3 )
1981	3.3772	0.2961	( 3 )
1982	3.3772	0.2961	( 3 )
1983	3.3772	0.2961	( 3 )
1984	3.3772	0.2961	( 3 )
1985	3.3772	0.2961	( 3 )
1986	3.1746	0.315	( 3 )
1987	3.3659	0.2971	( 3 )
1988	3.4977	0.2859	( 3 )
1989	3.3921	0.2948	( 4 )
1990	3.5336	0.283	( 4 )
1991	3.51	0.2849	( 4 )
1992	3.3501	0.2985	( 4 )
1993	3.1017	0.3224	( 5 )
1994	2.7655	0.3616	( 5 )
1995	2.8281	0.3536	( 5 )
1996	2.7533	0.3632	( 5 )
1997	2.6998	0.3704	( 6 )
1998	0.45267	2.2091	( 7 )
1999	0.461925	2.1649	( 7 )
2000	0.544765	1.8357	( 7 )
2001	0.645705	1.5487	( 7 ),( 8 )
2002	1.21366	0.824	( 7 ),( 8 )
2003	1.30513	0.7662	( 7 ),( 8 )
2004	1.24752	0.8016	( 7 ),( 8 )
2005	1.35202	0.7396	( 7 ),( 8 )
average	2.72	0.544	
CAGR	-2.10%	2.10%	

Where :

LYD : Libyan dinar ( 1 LYD = 1000 dirhams ) , \$ : U.S. dollar.

Sources :

1- Statistical indicators of the Arab world, the league of Arab States and the economic commission for western asia,1981,Table:VIII-I , p.161.

2- Central bank of libya, the economic bulletin,1978 ,vol.18 , No.1-2-3 and 10-11-12.

3- Central bank of libya, the economic bulletin,1988 ,vol.28 , No.10-12.

4- Central bank of libya, the thirty-seventh annual report , 1992-93.

5- Arab monetary fund, Economic indicators during 1986-96, 1997, No.14, table .54, p.64.

6-Report of the investment climate in Arab countries,1997

7- Central bank of libya, the economic bulletin,2008 ,vol.48.

8- Central bank of libya, the annual reports ,for 2004,2006 and 2007.

Table (35 ) The developing of General cost of living index in Tripoli City

year	*1964=100	**1970=100	**1974=100	**1975=100	*1980=100	**1984=100	***2003=100
1970	153.4	100	85.9	77.9	53.1	34.9	15.1
1971	149.7	97.6	83.9	76	51.8	34	14.7
1972	152.1	99.2	85.2	77.2	52.6	34.6	14.9
1973	170.4	111.1	95.5	86.5	58.9	38.7	16.7
1974	178.5	116.4	100	90.6	61.7	40.6	17.5
1975	197	128.4	110.4	100	68.1	44.8	19.3
1976	212.5	138.5	119	107.9	73.5	48.3	20.9
1977	219.3	143	122.9	111.3	75.9	49.9	21.5
1978	297.2	193.7	166.5	150.9	102.8	67.6	29.2
1979	256.9	167.5	143.9	130.4	88.9	58.4	26.2
1980	289.1	188.5	162	146.8	100	65.7	28.8
1981	321.3	209.5	180	163.1	111.1	73	31.6
1982	353.6	230.5	198.1	179.5	122.3	80.4	34.7
1983	391.1	255	219.1	198.5	135.3	88.9	38.4
1984	439.9	286.8	246.4	223.3	152.2	100	43.2
1985	480.1	313	269	243.7	166.1	109.1	47.1
1986	495.9	323.3	277.8	251.7	171.5	112.7	48.7
1987	517.5	337.4	289.9	262.7	179	117.6	50.8
1988	533.7	347.9	299	270.9	184.6	121.3	52.4
1989	540.6	352.4	302.9	274.4	187	122.9	53
1990	587.2	382.8	329	298.1	203.1	133.5	57.6
1991	656	427.6	367.5	333	226.9	149.1	64.4
1992	736.1	479.9	412.4	373.7	254.6	167.3	70.2
1993	793.9	517.5	444.8	403	274.6	180.5	77.2
1994	856.2	558.1	479.7	434.6	296.2	194.6	87.6
1995	923.5	602	517.4	468.8	319.4	209.9	97.1
1996	996	649.3	558	505.6	344.5	226.4	108
1997	1074.2	700.3	601.8	545.3	371.6	244.2	120.1
1998	1158.5	755.2	649	588.1	400.7	263.4	126.1
1999	1249.2	814.3	699.8	634.1	432.1	284	128
2000	1347.3	878.3	754.8	683.9	466	306.3	124.3
2001	1453.1	947.3	814.1	737.6	502.6	330.3	113
2002	1567.2	1021.6	878	795.5	542.1	356.3	102.2
2003	1690.3	1101.9	946.9	858	584.7	384.2	100
2004	1823	1188.4	1021.3	925.4	630.6	414.4	101
2005	1966.2	1281.7	1101.5	998.1	680.1	447	104
Average	700.8	456.8	392.6	355.7	242.4	159.3	61.3
CAGR	7.60%	7.60%	7.60%	7.60%	7.60%	7.60%	5.70%

sources: \*Central Bank of Libya , the economic bulletins:

(Jan/Mar 1978, No.1-3, table.22),(Apr/Jun 1982, No.4-6, vol.22)

(Jan/Mar 1986, No.1-3, vol.26),(Apr/Jun 1997, No.4-6, vol.37).

\*During 1980-1981 : estimated indexes , because of trade nationalization .

see to the research papers of symposium of consumption in the Libyan economy , Economic Research center , Benghazi, Libya , 1990, p.98.

\* During 1998-2006 : estimation , using the following exponential function :

$$Y = 129.35 e^{0.0756 t} \quad R^2 = \%98, \text{ where } t = \text{time}, e = 2.718$$

\*\*The General cost of living index of ( 1970=100, 1974=100, 1975=100,1980=100, 1984=100)were converted indexes from 1964=100 index.

\*\*\* Economic research centre, Total Economic , financial and demographic data in Libya during 1962-2006, Benghazi, Libya , July 2009.

Table ( 36 ) Annual growth rate of individual money/real income in Libya

years	per capita money income				per capita real income 1970=100			
	change value LYD/year	Annual growth rate %	Increasing Number compared to 1970	Increasing Number compared to 1974	change value LYD/year	Annual growth rate %	Increasing Number compared to 1970	Increasing Number compared to 1974
1970	-	-	-	0.4	-	-	-	0.5
1971	114.6	17.9	1.2	0.5	133.2	20.8	1.2	0.6
1972	41.3	5.5	1.2	0.5	29.1	3.8	1.3	0.6
1973	131.8	16.5	1.4	0.6	32.6	4.1	1.3	0.6
1974	583.6	62.8	2.4	1	463.3	55.4	2	1
1975	-141.2	-9.3	2.1	0.9	-231.3	-17.8	1.7	0.8
1976	307.9	22.5	2.6	1.1	144.4	13.5	1.9	0.9
1977	230.2	13.7	3	1.3	122.8	10.1	2.1	1
1978	-83.2	-4.4	2.8	1.2	-392.4	-29.4	1.5	0.7
1979	603.2	33	3.8	1.6	507.6	53.9	2.3	1.1
1980	818.2	33.7	5.1	2.1	272.5	18.8	2.7	1.3
1981	-733.4	-22.6	3.9	1.7	-522.7	-30.3	1.9	0.9
1982	-119.2	-4.7	3.7	1.6	-161.1	-13.4	1.6	0.8
1983	-217.8	-9.1	3.4	1.4	-185.2	-17.8	1.3	0.7
1984	-32.8	-1.5	3.3	1.4	-106.1	-12.4	1.2	0.6
1985	25	1.2	3.4	1.4	-54.6	-7.3	1.1	0.5
1986	-325.1	-15	2.9	1.2	-122.6	-17.7	0.9	0.4
1987	-386.2	-20.9	2.3	1	-138.3	-24.2	0.7	0.3
1988	1	0.1	2.3	1	-12.8	-3	0.7	0.3
1989	168.4	11.5	2.5	1.1	42.4	10.1	0.7	0.4
1990	85.5	5.3	2.7	1.1	-14.3	-3.1	0.7	0.3
1991	42.8	2.5	2.7	1.2	-36.9	-8.2	0.6	0.3
1992	35.2	2	2.8	1.2	-37.4	-9.1	0.6	0.3
1993	-4.6	-0.3	2.8	1.2	-28	-7.5	0.5	0.3
1994	105.8	5.9	3	1.3	-6.1	-1.8	0.5	0.3
1995	102.9	5.4	3.1	1.3	-7.6	-2.2	0.5	0.3
1996	220	11	3.5	1.5	9.7	2.9	0.5	0.3
1997	415.4	18.8	4.1	1.7	34.5	10.1	0.6	0.3
1998	-98	-3.7	4	1.7	-40.3	-10.7	0.5	0.3
1999	255	10.1	4.3	1.8	7	2.1	0.5	0.3
2000	647.5	23.2	5.4	2.3	48.8	14.3	0.6	0.3
2001	770.8	22.4	6.6	2.8	52.8	13.5	0.7	0.3
2002	1526.1	36.3	8.9	3.8	117.1	26.4	0.9	0.4
2003	1232.1	21.5	10.9	4.6	71	12.7	1	0.5
2004	1924	27.6	13.9	5.9	115.9	18.3	1.2	0.6
2005	3149.7	35.4	18.8	8	191.3	25.6	1.5	0.7

Average :

70-79	198.7	17.6	-	-	89.9	12.7	-	-
80-89	-80.2	-2.7	-	-	-98.9	-9.7	-	-
90-05	650.6	14	-	-	29.8	5.2	-	-
71-05	325.6	10.1	-	-	8.5	2.9	-	-

The results of this table were derived from table No.5

Table ( 37 ) Compensation of employees in the public sector in Libya ( LYD million )

years	compensation of employees	years	compensation of employees	years	compensation of employees	years	compensation of employees
1970	288.7	1980	2325.9	1990	2646.7	2000	5778.8
1971	415.5	1981	2485.8	1991	3193.2	2001	7224.9
1972	518.2	1982	2766.1	1992	3550.9	2002	8013.2
1973	625.9	1983	2770.7	1993	3600.9	2003	8878.1
1974	909.6	1984	2778.5	1994	3645.3	2004	9923.8
1975	1068.3	1985	2408.7	1995	3724	2005	11782
1976	1221.4	1986	2241.1	1996	4341.3	Average	3527.6
1977	1431.7	1987	2052.8	1997	5086.1	CAGR	11.2%
1978	1654.9	1988	2431.6	1998	5184		
1979	1929.4	1989	2839.6	1999	5255.4		

Sources :

- Planning secretariat , national accounts of 1971-75
- General people`s committee of palnning , the economic and social achievements during the nineteen years of the libyan revolution , January 1989 , Table 9 , p.13.
- Council of Arab Economic unity , General secretariat , Sectoral study for Libya , Part ( I ) , amman , p.74.
- General people`s committee of palnning ,focus on economic and social development in libya during 1970-78 , November 1978.
- Planning secretariat , Statistical collection , 1976, Table 5 , p.316.
- Planning secretariat , national accounts of 1975-80 , p.4.
- Planning secretariat , Statistical collection , 1976, Table 6 , p.317.
- General people`s committee of palnning , economy and trade , National accounts of 1980-92 from table 1-2 to 10-2 , pp.31-40.
- Central Bank of Libya , Economic bulletin , vol.37,No.4-6,1997.
- The national authority for information and documentation , statistical handbook,No.5,1998, Table 43, p.44.
- General people`s committee of palnning , national accounts of 1986 , December 1999, tables from 1-2 to 12-2 , pp.26-37.
- Economic research centre , Total Economic , financial and demographic data in Libya during 1962-2006, Benghazi, Libya , July 2009.

Table ( 38 ) GDP at current and constant prices in Libya ( LYD / million )

years	Gross domestic product at factors cost of production							
	at current prices	at constant prices						
		1964=100	1970=100	1974=100	1975=100	1980=100	1984=100	2003=100
1970	1288.3	839.8	1288.3	1499.8	1653.8	2426.2	3691.4	8531.8
1971	1586.5	1059.8	1625.5	1890.9	2087.5	3062.7	4666.2	10792.5
1972	1753	1152.5	1767.1	2057.5	2270.7	3332.7	5066.5	11765.1
1973	2182.3	1280.7	1964.3	2285.1	2522.9	3705.1	5639	13067.7
1974	3795.7	2126.4	3260.9	3795.7	4189.5	6151.9	9349	21689.7
1975	3674.3	1865.1	2861.6	3328.2	3674.3	5395.4	8201.6	19037.8
1976	4768.1	2243.8	3442.7	4006.8	4419	6487.2	9871.8	22813.9
1977	5612.7	2559.4	3925	4566.9	5042.9	7394.9	11247.9	26105.6
1978	5496.1	1849.3	2837.4	3301	3642.2	5346.4	8130.3	18822.3
1979	7603	2959.5	4539.1	5283.5	5830.5	8552.3	13018.8	29019.1
1980	10553.8	3650.6	5598.8	6514.7	7189.2	10553.8	16063.6	36645.1
1981	8798.8	2738.5	4199.9	4888.2	5394.7	7919.7	12053.2	27844.3
1982	8932.4	2526.1	3875.2	4509	4976.3	7303.7	11110	25741.8
1983	8511.7	2176.3	3337.9	3884.8	4288	6291	9574.5	22165.9
1984	7804.7	1774.2	2721.3	3167.5	3495.2	5127.9	7804.7	18066.4
1985	7852.1	1635.5	2508.7	2919	3222	4727.3	7197.2	16671.1
1986	6767.5	1364.7	2093.3	2436.1	2688.7	3946.1	6004.9	13896.3
1987	5933.2	1146.5	1758.5	2046.6	2258.5	3314.6	5045.2	11679.5
1988	6170.6	1156.2	1773.7	2063.7	2277.8	3342.7	5087.1	11776
1989	7094.7	1312.4	2013.3	2342.3	2585.5	3794	5772.7	13386.2
1990	7741.6	1318.4	2022.4	2353.1	2597	3811.7	5799	13440.3
1991	8426.2	1284.5	1970.6	2292.8	2530.4	3713.6	5651.4	13084.2
1992	8774.4	1192	1828.4	2127.6	2348	3446.3	5244.7	12499.1
1993	9287.5	1169.9	1794.7	2088	2304.6	3382.2	5145.4	12030.4
1994	9913.5	1157.8	1776.3	2066.6	2281.1	3346.9	5094.3	11316.8
1995	10592.5	1147	1759.6	2047.3	2259.5	3316.4	5046.5	10908.9
1996	11782.5	1183	1814.6	2111.6	2330.4	3420.2	5204.3	10909.7
1997	12888	1199.8	1840.4	2141.6	2363.5	3468.2	5277.6	10731.1
1998	12610.6	1088.5	1669.8	1943.1	2144.3	3147.1	4787.6	10000.5
1999	14075.2	1126.7	1728.5	2011.3	2219.7	3257.4	4956.1	10996.3
2000	17620.2	1307.8	2006.2	2334.4	2576.4	3781.2	5752.6	14175.5
2001	21868.5	1505	2308.5	2686.2	2964.8	4351.1	6620.8	19352.7
2002	30549.4	1949.3	2990.3	3479.4	3840.3	5635.4	8574.1	29891.8
2003	37604	2224.7	3412.7	3971.3	4382.8	6431.3	9787.6	37604
2004	48793.4	2676.5	4105.8	4777.6	5272.7	7737.6	11774.5	48310.3
2005	67048.3	3410	5231.2	6087	6717.6	9858.6	14999.6	64469.5
Average	12382.1	1732.2	2657	3091.8	3412.3	5007.8	7619.8	19701.1
CAGR	12.00%	4.10%	4.10%	4.10%	4.10%	4.10%	4.10%	5.90%

Column 1 : source , table 1. The remaining columns : the values were converted using the price index in table 4 .

Table ( 39 ) Tax on Agricultural income, ownership of livestocks and other items ( LYD/million )

years	tax on agricultural income	tax on the ownership of livestocks	total of agricultural , livestocks tax	*other items
1970	0	0	0	0.004
1971	0	0	0	0
1972	0	0	0	0
1973	0	0	0	0
1974	0	0	0	0
1975	0	0	0	0
1976	0	0	0	0
1977	0	0	0	0
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0	0	0
1982	0	0	0	0
1983	0.014	0	0.014	0
1984	0.035	0	0.035	0
1985	0.369	0	0.369	0
1986	0.506	0	0.506	0
1987	0.653	0	0.653	0
1988	0.463	0	0.463	0
1989	0.317	0	0.317	0
1990	0.291	0	0.291	0
1991	0.133	0	0.133	0
1992	0.124	0	0.124	0
1993	0.05	0	0.05	0
1994	0.148	0.001	0.149	0
1995	0.101	0.011	0.112	0
1996	0.129	0.001	0.13	0
1997	0.148	0.003	0.151	0
1998	0.143	0.001	0.144	0
1999	0.134	0.001	0.135	0
2000	0.109	0.001	0.11	0
2001	0.144	0	0.144	0
2002	0.197	0.01	0.207	0
2003	0.045	0	0.045	0
2004	0.056	0	0.056	0
2005	0.011	0	0.011	0
TOTAL	4.32	0.029	4.349	0.004
Average	0.12	0.001	0.121	-
CAGR	-1.1%	-	-1.1%	-

\*other items ( miscellaneous) include : military service fees and other deposits

source : the libyan tax authority , tripoli .

Table ( 40 ) Total of tax payments to the municipalities ( LYD/million )

years	tax payments to the municipalities
1970	0.902
1971	1.738
1972	2.341
1973	2.904
1974	7.643
1975	9.876
1976	14.104
1977	15.345
1978	26.377
1979	28.641
Total	109.871
Average	10.99
CAGR	46.8%

Total of tax payments to the municipalities include :  
 payments from income tax , real estate tax , Entertainment  
 tax , corporate tax , tax on free professions, Tax on trade  
 & industry and crafts , tax on vacant land.

Table ( 41 ) Direct taxes revenues in Libya ( LYD/ million )

year	T1	T2	T3	T4	T5	T6	T7	T8	T9	Total*
1970	0.41	5.145	7.257	0	0.004	12.816	0.061	0.902	2.327	16.106
1971	0.738	4.154	6.747	0	0	11.639	0.04	1.738	3.99	17.407
1972	0.83	8.27	5.424	0	0	14.524	0	2.341	5.869	22.734
1973	0.631	5.548	8.663	0	0	14.842	0.012	2.904	6.196	23.954
1974	0.896	15.951	21.054	0	0	37.901	0.012	7.643	12.904	58.46
1975	0.946	20.832	34.559	0	0	56.337	0.009	9.876	19.098	85.32
1976	1.196	30.289	41.58	0	0	73.065	0.013	14.104	24.745	111.927
1977	0.978	34.542	54.924	0	0	90.444	0.011	15.345	30.855	136.655
1978	0.583	54.938	61.227	0	0	116.748	0.01	26.377	33.274	176.409
1979	0.277	64.405	68.942	0	0	133.624	0.002	28.641	34.71	196.977
1980	0	119.035	82.78	0	0	201.815	0.237	0	68.652	270.704
1981	0	166.691	120.918	0	0	287.609	0.282	0	56.242	344.133
1982	0	183.34	131.91	0	0	315.25	0.304	0	55.413	370.967
1983	0	190.083	126.738	0.014	0	316.835	0.239	0	55.362	372.436
1984	0	153.09	251.815	0.035	0	404.94	0.212	0	54.431	459.583
1985	0	164.751	138.581	0.369	0	303.701	0.281	0	43.764	347.746
1986	0	154.555	128.493	0.506	0	283.554	0.196	0	39.57	323.32
1987	0	141.651	126.505	0.653	0	268.809	0.2	0	38.17	307.179
1988	0	132.097	129.496	0.464	0	262.057	0.327	0	37.629	300.013
1989	0	145.153	115.299	0.317	0	260.769	0.378	0	36.763	297.91
1990	0	92.654	157.629	0.291	0	250.574	0.813	0	49.257	300.644
1991	0	95.278	137.951	0.133	0	233.362	0.368	0	36.42	270.15
1992	0	143.046	138.133	0.124	0	281.303	0.211	0	62.891	344.405
1993	0	94.449	113.157	0.05	0	207.656	0.075	0	28.299	236.03
1994	0	421.812	186.203	0.148	0	608.163	0.091	0	54.199	662.453
1995	0	200.57	153.293	0.112	0	353.975	0.124	0	42.925	397.024
1996	0	239.44	149.441	0.13	0	389.011	0.403	0	51.488	440.902
1997	0	189.79	145.72	0.151	0	335.661	0.376	0	50.46	386.497
1998	0.018	220.732	155.727	0.144	0	376.621	0.286	0	59.942	436.849
1999	0.012	225.333	112.292	0.135	0	337.772	0.336	0	52.856	390.964
2000	0.033	177.547	159.027	0.11	0	336.717	0.158	0	54.515	391.39
2001	0.015	184.434	196.265	0.144	0	380.858	0.178	0	57.08	438.116
2002	0.016	267.12	238.703	0.207	0	506.046	0.297	0	67.372	573.715
2003	9.471	291.489	304.652	0.045	0	605.657	0.266	0	76.787	682.71
2004	7.662	327.304	262.451	0.056	0	597.473	0.455	0	82.523	680.451
2005	16.243	347.687	160.961	0.011	0	524.902	0.355	0	93.515	618.772
total	40.955	5313.205	4434.517	4.349	0.004	9793.03	7.618	109.871	1580.493	11491.012
Average	1.14	147.59	123.18	0.12	0	272.03	0.21	3.05	43.9	319.19
CAGR	11.1%	12.8%	9.3%	-1.1%	-	11.2%	5.2%	46.8%	11.1%	11.0%

source : The libyan tax Authority , tripoli . ; T6=T1+T2+T3+T4+T5 ; \* Total= T6+T7+T8+T9

T1 : Tax on real estate incomes .

T2: tax on Business incomes .

T3: tax on individuals incomes ( Includes : tax on the partner's income).

T4: tax on the agricultural incomes and the ownership of livestock.

T5: other items.

T9: The total deposits collected by tax authority for benefit of other parties .

T6: total income tax ( part 1 )

T7: Miscellaneous ( part 6 )

T8: Total tax payments to the municipalities

Medicine consumption fees and Tax of the blind are not included due to it was included in indirect taxes .

Table ( 42 ) The difference between the actual and estimated public revenues in Libya ( LYD/million )

years	(The difference=estimated values - actual values) <i>for:</i>					
	TD	TI	TJ	NOR	OR	PR
1970	-3.7	-10.5	9.2	-5	15.7	10.7
1971	-3.4	-16.2	-84.1	-103.7	-92.3	-196.1
1972	-5.5	-35.8	-90.4	-131.7	91.4	-40.3
1973	-2.9	-52.3	-109.7	-165.2	-318.5	-483.7
1974	-12.5	-68.6	-136.8	-217.9	-1333.5	-1551.4
1975	-51.8	-85.2	-9.6	-146.6	-1200.8	-1347.4
1976	-60.1	-34.8	-132.2	-227.1	-1962.3	-2189.5
1977	-76.7	-25.4	-187.7	-289.8	-2503.8	-2793.6
1978	-92.1	-15.2	-141.4	-248.8	-2063.5	-2312.3
1979	-114.5	-99.9	-251.6	-466	-3468.2	-3934.2
1980	-164.9	-158.2	258.9	-64.2	-6526.9	-6591.1
1981	-204.4	-148.1	482.2	129.7	-3420	-3290.3
1982	-196.2	-82.1	535.7	257.4	-4071.2	-3813.8
1983	-142.8	137.1	306.8	301.1	-2228.8	-1927.7
1984	-221.2	-94	349.9	34.7	-1835	-1800.3
1985	-124.3	126.4	90.3	92.4	-1691	-1598.6
1986	-49.1	88.4	125.9	165.2	-777	-611.8
1987	-32.9	0.2	163.5	130.9	-851.9	-721
1988	26	-258.4	187.5	-45	-741.3	-786.3
1989	26.6	-161.5	46.9	-88.1	-1084.8	-1172.9
1990	51.4	28	-265.4	-186	-346	-532
1991	69.5	23.5	-165	-72	-795	-867
1992	5.6	-89.2	-368.4	-452	17	-435
1993	0	-146.5	-570.9	-717.4	-1733.9	-2451.3
1994	-304.6	-83.3	473.3	85.4	109	194.4
1995	-122.4	-314.2	413.7	-22.9	-1676.4	-1699.3
1996	25.4	-193.8	398.1	229.7	-572	-342.3
1997	113.4	-177.5	-812.6	-876.7	104	-772.7
1998	70.6	-81.6	-1262.5	-1273.5	-188.3	-1461.8
1999	137.1	-216	-940.4	-1019.3	188.6	-830.7
2000	161.1	-158	-1202.1	-1199	0.5	-1198.5
2001	134.4	-224.1	-844.7	-934.4	0.5	-933.9
2002	-423.7	-230.4	39.8	-614.3	-0.1	-614.4
2003	-407.7	-512.8	-366.6	-1287.1	2231	943.9
2004	-371	-595	-902.8	-1868.8	-17850.7	-19719.5
2005	-192.6	-547	-977	-1716.6	-19223.6	-20940.2
Total	-2559.9	-4512	-5940.2	-13012.6	-75799.1	-88811.9
Average	-71.1	-125.3	-165	-361.5	-2105.5	-2467

where : TD: Direct taxes , TI: Indirect taxes , TJ: other non-oil revenues ,  
 NOR: Total non-oil revenues; OR : Oil revenues; PR: public revenues.

The results of this table were derived from table 25.

Table ( 43 ) The proportion of actual public revenues to the estimated public revenues in Libya.

years	(The proportion=actual values ÷ estimated values ) for:					
	TD	TI	TJ	NOR	OR	PR
1970	130%	126%	64%	106%	97%	98%
1971	124%	142%	527%	243%	116%	131%
1972	132%	195%	550%	276%	87%	105%
1973	114%	211%	803%	298%	212%	231%
1974	127%	171%	614%	229%	1047%	601%
1975	254%	163%	107%	147%	1075%	408%
1976	216%	117%	206%	159%	1806%	538%
1977	228%	111%	216%	163%	2152%	579%
1978	209%	105%	171%	143%	1820%	433%
1979	237%	134%	240%	184%	1721%	611%
1980	256%	145%	21%	108%	4056%	794%
1981	246%	135%	0%	88%	0%	413%
1982	212%	117%	0%	78%	5587%	404%
1983	162%	78%	18%	76%	865%	227%
1984	192%	117%	0%	97%	733%	225%
1985	154%	77%	67%	91%	1191%	233%
1986	118%	82%	60%	85%	362%	144%
1987	112%	100%	63%	88%	579%	158%
1988	92%	172%	53%	104%	573%	163%
1989	92%	147%	89%	108%	1222%	197%
1990	86%	92%	175%	117%	128%	123%
1991	80%	95%	139%	106%	155%	133%
1992	98%	127%	233%	147%	99%	119%
1993	100%	152%	328%	193%	341%	265%
1994	185%	116%	0%	94%	87%	91%
1995	144%	196%	1%	102%	233%	174%
1996	95%	141%	49%	87%	120%	107%
1997	77%	136%	188%	146%	97%	114%
1998	86%	113%	305%	172%	108%	135%
1999	74%	138%	263%	161%	95%	116%
2000	71%	136%	183%	149%	100%	126%
2001	77%	139%	161%	137%	100%	115%
2002	382%	136%	98%	125%	100%	107%
2003	248%	178%	118%	143%	64%	90%
2004	220%	199%	140%	159%	948%	475%
2005	145%	183%	155%	160%	227%	216%
Average	155%	137%	178%	141%	786%	256%
CAGR	0.3%	1.1%	2.6%	1.2%	2.5%	2.3%

where : TD: Direct taxes , TI: Indirect taxes , TJ: other non-oil revenues ,  
 NOR: Total non-oil revenues, OR : oil revenues , PR: public revenues.

The results of this table were derived from table 25.

Table ( 44 ) The difference between the estimated and actual expenditures in Libya

years	*Difference= ES - AC			Budget execution rate = AC ÷ ES					
	G <sub>s</sub>	G <sub>i</sub>	total	G <sub>s</sub>		G <sub>i</sub>		total	
				LYD	%	LYD	%	LYD	%
1970	-105.5	78.5	-27	1.58	158%	0.65	65%	1.07	107%
1971	-22.5	54	31.5	1.11	111%	0.82	82%	0.94	94%
1972	-22.9	45.6	22.7	1.1	110%	0.9	90%	0.97	97%
1973	-91.5	131.2	39.7	1.64	164%	0.76	76%	0.94	94%
1974	-180.5	50.2	-130.3	1.72	172%	0.95	95%	1.11	111%
1975	-136.2	201.5	65.3	1.31	131%	0.82	82%	0.96	96%
1976	-64	219.7	155.7	1.13	113%	0.84	84%	0.92	92%
1977	-86.3	225.3	139	1.15	115%	0.85	85%	0.93	93%
1978	0	405	405	1	100%	0.77	77%	0.84	84%
1979	0	-295.8	-295.8	1	100%	1.19	119%	1.13	113%
1980	0	-24.2	-24.2	1	100%	1.01	101%	1.01	101%
1981	0	82.2	82.2	1	100%	0.97	97%	0.98	98%
1982	-30	234.1	204.1	1.02	102%	0.91	91%	0.95	95%
1983	-47.3	273.7	226.4	1.03	103%	0.88	88%	0.94	94%
1984	-205.1	275.3	70.2	1.14	114%	0.87	87%	0.98	98%
1985	17.9	176.7	194.6	0.99	99%	0.9	90%	0.93	93%
1986	31.9	618.9	650.8	0.98	98%	0.64	64%	0.79	79%
1987	169	457	626	0.86	86%	0.68	68%	0.77	77%
1988	119	509.7	628.7	0.9	90%	0.62	62%	0.76	76%
1989	298	139.1	437.1	0.8	80%	0.85	85%	0.82	82%
1990	-28	70	42	1.02	102%	0.94	94%	0.98	98%
1991	-117	1193	1076	1.08	108%	0.36	36%	0.67	67%
1992	66	280	346	0.96	96%	0.66	66%	0.86	86%
1993	-523.2	79	-444.2	1.49	149%	0.84	84%	1.28	128%
1994	-138.8	0	-138.8	1.09	109%	1	100%	1.05	105%
1995	17.9	381.1	399	0.99	99%	0.46	46%	0.88	88%
1996	-583.2	139.1	-444.1	1.18	118%	0.83	83%	1.11	111%
1997	-0.007	360	359.993	1	100%	0.72	72%	0.93	93%
1998	-783.7	587.9	-195.8	1.33	133%	0.45	45%	1.06	106%
1999	668.1	338.9	1007	0.82	82%	0.7	70%	0.79	79%
2000	-711.6	224	-487.6	1.29	129%	0.87	87%	1.12	112%
2001	141.1	87	228.1	0.96	96%	0.95	95%	0.96	96%
2002	472.6	654.3	1126.9	0.9	90%	0.85	85%	0.88	88%
2003	-39.8	-246	-285.8	1.01	101%	1.09	109%	1.05	105%
2004	-1731.6	-1481	-3212.6	1.35	135%	1.28	128%	1.31	131%
2005	-2018.2	832	-1186.2	1.32	132%	0.93	93%	1.07	107%
**Total	-5.67	7.36	1.69	-	-	-	-	-	-
Average	-157.4	204.36	46.99	1.12	112%	0.83	83%	0.97	97%
CAGR	-	7.00%	-	-0.50%	-0.50%	1.00%	1.00%	0.00%	0.00%

\* in LYD/ Million ; \*\* in LYD/Milliard , ES: estimated expenditures , Ac : Actual expenditures

, G<sub>s</sub> : Administrative Expenditures , G<sub>i</sub> : Development Expenditures .The results were derived from table 32 .

Table ( 45 ) the ratio between the public expenditures and the public revenues in Libya . ( % )

years	A	B	C	D
1970	348%	32%	81%	123%
1971	131%	38%	58%	173%
1972	128%	64%	80%	126%
1973	94%	68%	76%	132%
1974	112%	59%	70%	143%
1975	124%	70%	84%	119%
1976	92%	57%	65%	154%
1977	89%	49%	58%	172%
1978	84%	63%	69%	145%
1979	75%	51%	56%	178%
1980	112%	38%	46%	215%
1981	114%	84%	90%	111%
1982	139%	57%	72%	139%
1983	169%	83%	106%	94%
1984	147%	86%	107%	93%
1985	124%	83%	97%	103%
1986	145%	101%	121%	83%
1987	115%	96%	105%	95%
1988	99%	94%	97%	103%
1989	97%	64%	81%	123%
1990	119%	69%	91%	110%
1991	117%	31%	62%	161%
1992	108%	43%	77%	130%
1993	108%	17%	51%	196%
1994	141%	118%	133%	75%
1995	260%	11%	76%	131%
1996	253%	19%	89%	113%
1997	125%	28%	72%	138%
1998	104%	19%	65%	153%
1999	110%	23%	61%	163%
2000	87%	70%	80%	124%
2001	104%	50%	77%	131%
2002	136%	57%	82%	122%
2003	84%	74%	79%	126%
2004	134%	34%	54%	186%
2005	181%	30%	48%	210%
Average	131%	56%	78%	136%
CAGR	<b>-1.8%</b>	<b>-0.2%</b>	<b>-1.5%</b>	<b>1.5%</b>

where :

A : proportion of current ( administrative ) expenditures to the non-oil revenues ( % )

B : proportion of investment ( development ) expenditures to the oil revenues ( % )

C : proportion of public expenditures to the public revenues . ( % )

D : proportion of public revenues to the public expenditures . ( % )

Source : table 34 .;

Table ( 46 ) The Libyan Non-oil Exports

years	NOX ( * )	NOX : X %	NOX : F %
1970	3	0.3551	0.2877
1971	1.7	0.1743	0.1387
1972	3.9	0.3909	0.2908
1973	5.3	0.4273	0.2977
1974	2.2	0.0884	0.0665
1975	2.6	0.1266	0.0838
1976	3	0.1041	0.0783
1977	3.4	0.0991	0.0748
1978	2.9	0.0974	0.0668
1979	2.6	0.0542	0.0408
1980	2.8	0.0432	0.033
1981	1.3	0.0282	0.0183
1982	2.1	0.0537	0.0348
1983	1.5	0.0415	0.0276
1984	2.5	0.0757	0.0486
1985	2.5	0.0686	0.0514
1986	0.2	0.0082	0.0053
1987	0.2	0.0084	0.0055
1988	0.4	0.021	0.0112
1989	0.4	0.0166	0.0103
1990	17.7	0.4726	0.3368
1991	17	0.539	0.3649
1992	55.5	1.8264	1.2441
1993	44.1	1.7799	1.0528
1994	34.3	1.1003	0.7448
1995	26.7	0.8287	0.5393
1996	7.2	0.2012	0.1311
1997	1150.3	33.4471	17.8777
1998	715.6	28.9998	13.9539
1999	595.8	17.657	10.2597
2000	2343.7	37.8896	26.4052
2001	1591	28.5992	15.4252
2002	6942.6	48.0983	27.2027
2003	6895.6	37.4114	23.5268
2004	7887.9	31.6817	20.8591
2005	9643	24.1345	16.9881
Total	38012.5	-	-
Average	1055.9	8.25	4.96
CAGR	26.0%	12.8%	12.4%

Where , ( \* ) in LYD/million .; NOX= Non-oil exports , X = total exports .

;F= total of the foreign trade (Exports+Imports).;NOX : X = the ratio of non-oil exports to total exports.;NOX : F = the ratio of non-oil exports to total of the foreign trade .

Sources :(1)G40The Secretariat of information(1989)," Libya's revolution in twenty years 1969-89", table 8-15, p.545.;

(2)Central Bank of Libya , the economic bulletin, vol .26 , No. 10-12 ,1986. and vol.27, No.4-6, 1987.;

(3)The planning secretariat , 1997, the economic & social indicators for 1962-96, table 1 , p.64. ;(4)Journal of Economic research (1991) , the national Authority of scientific research, vol.3,No.2.

(5) Economic research centre, Total Economic , financial and demographic data in Libya during 1962-2006, Benghazi, Libya , July 2009.

The columns 2 , 3 were derived from table 45.

Table 47 , Gross fixed capital formation in Libyan Economy  
at current prices ( Million LYD )

years	public sector		private sector		total
	value	%	value	%	
1970	122.6	51%	120.1	49%	242.7
1971	208.5	72%	79.4	28%	287.9
1972	338	77%	98.6	23%	436.6
1973	499.8	79%	136.4	21%	636.2
1974	780.4	80%	199	20%	979.4
1975	834.2	79%	220.5	21%	1054.7
1976	1029.6	84%	196.3	16%	1225.9
1977	1171.5	86%	196.8	14%	1368.3
1978	1284.4	84%	247.6	16%	1532
1979	1672.6	90%	182.7	10%	1855.3
1980	2556.3	93%	200.5	7%	2756.8
1981	2872.6	99%	27.7	1%	2900.3
1982	2365.9	85%	405.6	15%	2771.5
1983	2096.3	83%	428	17%	2524.3
1984	1834.7	86%	293	14%	2127.7
1985	1523.3	98%	34.8	2%	1558.1
1986	1117.1	81%	258.8	19%	1375.9
1987	788.4	83%	161.5	17%	949.9
1988	722.4	69%	327.4	31%	1049.8
1989	823.4	71%	333.4	29%	1156.8
1990	702	62%	433.3	38%	1135.3
1991	723.3	70%	311	30%	1034.3
1992	608.5	60%	399.3	40%	1007.8
1993	1317.8	88%	185.9	12%	1503.7
1994	1417.8	87%	204.6	13%	1622.4
1995	1023.9	82%	220.7	18%	1244.6
1996	1389.8	85%	249.9	15%	1639.7
1997	1443.2	86%	241.3	14%	1684.5
1998	1137.5	81%	259.1	19%	1396.6
1999	1254.9	82%	281.1	18%	1536
2000	1912	84%	369.2	16%	2281.2
2001	5702.9	85%	985.6	15%	6688.5
2002	7970	82%	1737.6	18%	9707.6
2003	8158.7	82%	1815.2	18%	9973.9
2004	8749.1	82%	1933.6	18%	10682.7
2005	11145	84%	2186.3	16%	13331.3
Total	79298.4	-	15961.8	-	95260.2
Average	2202.7	81%	443.4	19%	2646.1
CAGR	13.8%	-	8.6%	-	12.1%

Source : Economic research centre, Total Economic , financial and demographic data in Libya ,during 1962-2006, Benghazi, Libya , July 2009.

Table 48 . Individual tax burden in Libya during 1970-2005

US\$ / year\*

years	Direct taxes per capita*	Indirect taxes per capita*	Total taxes per capita*	Per capita income *	Total taxes per capita as percentage of percapita income
1970	22.57	70.36	92.92	1794.7	0.052
1971	24.79	77.57	102.36	2245.8	0.046
1972	31.44	101.19	132.63	2416.7	0.055
1973	34.47	142.69	177.16	3136.1	0.056
1974	78.77	222.17	300.95	5107.1	0.059
1975	107.63	277.27	384.9	4630.2	0.083
1976	133.29	289	422.29	5670	0.074
1977	157.15	303.64	460.79	6447.5	0.071
1978	198.1	344.93	543.03	6166.5	0.088
1979	213.45	424.49	637.95	8203.6	0.078
1980	281.47	529.42	810.89	10966.9	0.074
1981	332.31	555.66	887.96	8490	0.105
1982	336.07	500.01	836.08	8087.5	0.103
1983	322	421.54	743.54	7351.9	0.101
1984	427.92	607.1	1035.02	7241.1	0.143
1985	330.54	386.18	716.72	7325.6	0.098
1986	284.69	347.68	632.38	5854	0.108
1987	258.31	288.25	546.55	4906.8	0.111
1988	251.35	510.8	762.15	5102.5	0.149
1989	236.04	394.32	630.35	5519.7	0.114
1990	239.52	261.56	501.08	6051.9	0.083
1991	200.02	317.75	517.77	6161.8	0.084
1992	237.51	290.73	528.24	5999	0.088
1993	141.68	254.78	396.46	5540	0.072
1994	350.44	310.83	661.27	5232	0.126
1995	211.87	340.91	552.78	5641.4	0.098
1996	228.45	344.42	572.87	6098	0.094
1997	213.02	373.3	586.32	7101	0.083
1998	39.71	66.16	105.86	1146.3	0.092
1999	35.76	72.07	107.83	1287.5	0.084
2000	41.56	63.51	105.07	1871.1	0.056
2001	54.4	98.31	152.72	2715.5	0.056
2002	130.64	197.29	327.93	6956.2	0.047
2003	165	283.45	448.46	9088.5	0.049
2004	154.62	272.01	426.63	11087.6	0.038
2005	150.2	292.97	443.16	16274.8	0.027
total	6656.76	10634.	17291.07	214916.8	2.945
Average	184.91	295.39	480.308	5969.911	0.082
CAGR	5.6	4.2	4.6	6.5	-1.9

Source : calculated from Tables 5 , 9 in the statistical Appendix .

**Table 49 Country wise actual tax burden (%) for the period 2001 to 2007**

Row Labels	2001	2002	2003	2004	2005	2006	2007
Algeria	0.031792	12.012341	27.51929	26.902067	31.192759	32.670685	38.466114
Argentina	12.471706	16.91567	20.349873	22.897041	5.656288	5.436857	5.364426
Bahrain	7.212345	4.064861	3.775706	4.958383	4.425468	3.796001	2.252773
Bangladesh	7.596558	7.697519	8.071459	8.111346	8.220671	8.171811	8.102354
Bolivia	13.576129	16.853674	16.512665	18.88806	21.843895	24.726036	22.464401
Botswana	27.270147	24.742983	26.789635	26.40085	25.852863	27.137985	27.303905
Brazil	17.651958	18.012115	16.766218	16.783895	17.072186	17.235186	17.236263
Cameroon	13.686727	13.843985	12.599596	11.858821	13.547916	15.601912	15.068361
Chad	4.484373	5.145996	5.880974	7.771594	7.628527	15.043023	18.614681
Chile	18.13415	18.23601	17.41717	16.963388	20.021324	21.968588	21.383015
Colombia	13.282012	11.932579	13.775321	13.760815	15.275862	14.149672	18.56997
Congo.Rep	9.215447	8.361443	8.834661	8.639672	6.540304	44.372444	28.625027
Côte d'Ivoire	15.188678	15.729316	14.905635	15.179	14.512988	14.862528	9.622907
E.Guinea	25.484858	25.924707	25.714972	28.708267	34.137302	45.74077	9.41993
Ecuador	13.3	14.1	12.9	12.8	13	13.9	14.3
Egypt	14.317814	13.651623	13.34994	13.835978	14.068709	15.829529	15.635353
Emirates	2.119354	2.484143	3.082288	3.355062	2.400442	2.918935	2.890572
Ethiopia	8.436068	10.261254	9.79143	10.340407	9.512795	6.549066	5.36502
Ghana	0.001719	0.001749	0.001848	0.002175	0.002132	0.002023	22.969055
Guatemala	9.684139	10.630288	10.282289	10.135207	9.634597	10.157176	12.298756
Guyana	29.6	30.2	29.1	31	29.9	0	0
Indonesia	11.94906	11.826986	12.385516	12.330768	12.454429	12.258208	12.406836
Iran	7.654975	6.818464	7.396452	7.499545	9.169517	9.096462	8.611256
Kenya	17.55149	17.23379	15.678802	16.81273	18.28613	17.16629	16.420586
Kuwait	0.949351	2.227018	1.922267	1.637467	1.394777	1.186642	1.32076
Lesotho	36.73359	35.565372	36.720936	43.28481	44.43954	58.345688	56.943752
Libya	5.623833	4.714204	4.934305	3.847828	2.722998	2.198543	2.119238
Mauritania	17.711586	27.98593	28.407797	26.933998	22.330877	11.496599	12.133113
Nigeria	37.624767	31.661621	33.277954	0.280921	0.199369	0.148576	0.195455
Oman	7.388527	4.994882	2.554919	2.532577	2.842443	2.598632	3.410263
Peru	13.567223	12.258781	13.082763	13.386102	13.795555	15.276153	15.612721
Saudi	6.446744	6.633035	7.705233	6.635377	5.053573	5.182168	5.604231
T.Tobago	22.1213	20.4555	21.4333	27.406734	32.469467	35.21437	26.364662
Tunisia	21.634733	21.484762	20.59125	20.70501	20.622547	21.003298	21.255226
Venezuela	11.796312	10.950465	11.534121	0.01293	0.015596	0.006708	8.12177
Yemen	7.126002	10.022563	9.634499	9.368595	8.868667	7.094203	7.319877
Zambia	18.6214	17.516445	16.835152	17.516232	16.952333	16.295166	17.720976
Zimbabwe	24.6	25.1	26	21.18	16.36	9.56	3.809

*The table was calculated by the researcher.*

**Table 50 : Country wise estimated Taxable Capacity for the period 2001 - 2007**

Country	2001	2002	2003	2004	2005	2006	2007
Algeria	26.4634	28.3938	24.7588	24.2492	19.2068	19.7675	20.0946
Argentina	24.9838	27.599	20.5908	18.0695	14.2738	14.8823	15.115
Bahrain	4.8197	4.2673	6.4096	6.185	1.6801	2.6656	6.3624
Bangladesh	32.2497	28.795	25.9704	25.4729	22.11	24.9411	19.4516
Bolivia	50.3412	46.8612	45.6973	46.0203	38.0687	35.8285	31.9741
Botswana	14.0732	11.5755	16.9035	16.2319	16.2759	17.4047	17.6001
Brazil	23.131	22.9632	25.0408	23.3366	23.8786	24.889	19.2624
Cameroon	24.6197	23.0509	24.8269	22.8552	22.8994	23.6934	24.0236
Chad	26.8853	29.0045	30.7799	29.6541	28.1033	24.9849	26.342
Chile	9.3676	11.6981	10.5554	11.182	12.3751	12.444	13.6222
Colombia	27.9348	27.7567	26.8457	23.4366	20.6459	21.4293	20.8657
Congo.Rep	20.3149	21.1886	23.766	21.443	21.0472	18.9189	20.4804
Côte d'Ivoire	28.7171	29.8503	32.587	33.9655	33.5073	32.3503	31.3612
E.Guinea	20.1302	18.1005	23.6722	23.1098	23.4313	20.9196	23.1895
Ecuador	19.8201	18.6158	19.4398	17.8703	15.3182	17.2429	18.5536
Egypt	14.9666	18.482	19.9896	20.3379	19.3587	17.336	19.9199
Emirates	20.8735	17.7476	19.004	8.3103	5.7405	2.843	5.0435
Ethiopia	18.9255	17.4666	21.8001	27.1676	24.471	22.757	24.6374
Ghana	26.0528	22.7377	26.5741	25.727	23.4224	22.8185	16.7016
Guatemala	36.81	36.3233	36.6166	35.1976	33.4506	32.0582	31.6946
Guyana	23.7462	24.7917	20.9694	23.0743	26.071	25.9906	22.8817
Indonesia	18.9469	20.8823	21.6496	17.8118	17.3507	15.353	16.9073
Iran	2.686	1.9035	4.7364	4.75	11.376	7.5349	8.3849
Kenya	29.3163	30.559	30.8109	28.6107	28.3382	28.7075	28.1838
Kuwait	8.6003	7.2701	7.6944	8.1334	7.7512	9.0285	11.1263
Lesotho	11.8709	10.7355	12.9303	11.3511	14.4848	15.9245	13.833
Libya	2.4594	3.4753	3.6042	1.8909	1.2113	2.6463	0.2747
Mauritania	3.7961	9.6371	17.8339	22.398	22.512	20.2968	21.2201
Nigeria	37.8411	35.8209	34.8411	32.6905	29.8899	28.2717	33.788
Oman	2.4047	4.6148	1.0155	1.543	0.091	2.1815	6.855
Peru	37.5214	33.4677	34.5611	35.258	31.9098	31.527	31.4896
Saudi	10.8564	15.7225	12.4053	15.1681	17.0222	17.3785	14.6572
T.Tobago	22.1269	22.8213	22.8897	26.8424	28.7873	30.5453	29.5654
Tunisia	10.2624	12.0857	9.7286	8.7651	6.6932	9.7032	13.648
Venezuela	21.2518	23.6411	24.8105	17.5684	15.7295	14.6144	16.5053
Yemen	11.7957	15.1086	16.4385	17.5111	18.6183	18.091	19.8936
Zambia	33.1871	33.1922	29.8048	28.6972	28.539	29.5147	28.5937
Zimbabwe	18.8822	18.4702	20.8215	18.3829	17.5206	16.702	3.0895

*The table was calculated by the researcher.*

**Table 51 : Country wise estimated Tax effort for the period 2001 - 2007**

Country	2001	2002	2003	2004	2005	2006	2007	Average
Algeria	0.0012	0.42306	1.1115	1.1094	1.62405	1.65275	1.91425	1.119458571
Argentina	0.49919	0.61291	0.9883	1.26717	0.39627	0.36532	0.35491	0.640581429
Bahrain	1.49643	0.95256	0.58907	0.80168	2.63405	1.42407	0.35408	1.178848571
Bangladesh	0.23555	0.26732	0.31079	0.31843	0.37181	0.32764	0.41654	0.321154286
Bolivia	0.26968	0.35965	0.36135	0.41043	0.5738	0.69012	0.70258	0.481087143
Botswana	1.93774	2.13753	1.58486	1.62648	1.58841	1.55923	1.55135	1.712228571
Brazil	0.76313	0.78439	0.66956	0.71921	0.71496	0.69248	0.89481	0.748362857
Cameroon	0.55593	0.60058	0.5075	0.51887	0.59163	0.65849	0.62723	0.580032857
Chad	0.1668	0.17742	0.19107	0.26207	0.27145	0.60208	0.70665	0.339648571
Chile	1.93584	1.55889	1.65007	1.51703	1.61787	1.7654	1.56972	1.65926
Colombia	0.47546	0.4299	0.51313	0.58715	0.7399	0.6603	0.88998	0.613688571
Congo.Rep	0.45363	0.39462	0.37174	0.40291	0.31074	2.3454	1.39768	0.81096
Côte d'Ivoire	0.52891	0.52694	0.45741	0.44689	0.43313	0.45942	0.30684	0.451362857
E.Guinea	1.266	1.43226	1.08629	1.24226	1.45691	2.1865	0.40622	1.296634286
Ecuador	0.67104	0.75742	0.66359	0.71627	0.84866	0.80613	0.77074	0.747692857
Egypt	0.95665	0.73864	0.66784	0.68031	0.72674	0.9131	0.78491	0.78117
Emirates	0.10153	0.13997	0.16219	0.40372	0.41816	1.02671	0.57313	0.40363
Ethiopia	0.44575	0.58748	0.44915	0.38062	0.38874	0.28778	0.21776	0.393897143
Ghana	0.00007	0.00008	0.00007	0.00008	0.00009	0.00009	1.37526	0.196534286
Guatemala	0.26308	0.29266	0.28081	0.28795	0.28802	0.31684	0.38804	0.302485714
Guyana	1.24652	1.21815	1.38774	1.34349	1.14687	0	0	0.90611
Indonesia	0.63066	0.56636	0.57209	0.69228	0.71781	0.79842	0.73382	0.673062857
Iran	2.84995	3.58207	1.56162	1.57885	0.80604	1.20724	1.027	1.801824286
Kenya	0.59869	0.56395	0.50887	0.58764	0.64528	0.59797	0.58262	0.583574286
Kuwait	0.11039	0.30633	0.24983	0.20133	0.17994	0.13143	0.11871	0.185422857
Lesotho	3.09442	3.31288	2.83991	3.81327	3.06801	3.66389	4.11652	3.415557143
Libya	2.28667	1.35649	1.36904	2.03492	2.248	0.8308	7.71474	2.548665714
Mauritania	4.66573	2.90398	1.59291	1.20252	0.99195	0.56642	0.57177	1.78504
Nigeria	0.99428	0.88389	0.95513	0.00859	0.00667	0.00526	0.00578	0.408514286
Oman	3.07254	1.08236	2.51592	1.64133	31.23564	1.19121	0.49749	5.890927143
Peru	0.36159	0.36629	0.37854	0.37966	0.43233	0.48454	0.49581	0.414108571
Saudi	0.59382	0.42188	0.62112	0.43746	0.29688	0.29819	0.38235	0.435957143
T.Tobago	0.99975	0.89633	0.93637	1.02102	1.12791	1.15286	0.89174	1.003711429
Tunisia	2.10816	1.7777	2.11657	2.36221	3.08112	2.16457	1.55739	2.166817143
Venezuela	0.55507	0.4632	0.46489	0.00074	0.00099	0.00046	0.49207	0.282488571
Yemen	0.60412	0.66337	0.58609	0.53501	0.47634	0.39214	0.36795	0.51786
Zambia	0.5611	0.52773	0.56485	0.61038	0.59401	0.5521	0.61975	0.575702857
Zimbabwe	1.30281	1.35895	1.24871	1.15216	0.93376	0.57239	1.23289	1.114524286
Overall Average								1.039173346

*The table was calculated by the researcher.*

**Table 52 Country wise comparison with the overall average actual tax burden (%) for the period 2001 to 2007**

Country	2001	2002	2003	2004	2005	2006	2007	mean	Category
Algeria	0.031792	12.012341	27.51929	26.902067	31.192759	32.670685	38.466114	24.11358	High
Argentina	12.471706	16.91567	20.349873	22.897041	5.656288	5.436857	5.364426	12.72741	low
Bahrain	7.212345	4.064861	3.775706	4.958383	4.425468	3.796001	2.252773	4.35508	low
Bangladesh	7.596558	7.697519	8.071459	8.111346	8.220671	8.171811	8.102354	7.99596	low
Bolivia	13.576129	16.853674	16.512665	18.88806	21.843895	24.726036	22.464401	19.26641	High
Botswana	27.270147	24.742983	26.789635	26.40085	25.852863	27.137985	27.303905	26.49977	High
Brazil	17.651958	18.012115	16.766218	16.783895	17.072186	17.235186	17.236263	17.25112	High
Cameroon	13.686727	13.843985	12.599596	11.858821	13.547916	15.601912	15.068361	13.7439	low
Chad	4.484373	5.145996	5.880974	7.771594	7.628527	15.043023	18.614681	9.22417	low
Chile	18.13415	18.23601	17.41717	16.963388	20.021324	21.968588	21.383015	19.16052	High
Colombia	13.282012	11.932579	13.775321	13.760815	15.275862	14.149672	18.56997	14.39232	High
Congo.Rep	9.215447	8.361443	8.834661	8.639672	6.540304	44.372444	28.625027	16.36986	High
Côte d'Ivoire	15.188678	15.729316	14.905635	15.179	14.512988	14.862528	9.622907	14.28586	low
E.Guinea	25.484858	25.924707	25.714972	28.708267	34.137302	45.74077	9.41993	27.87583	High
Ecuador	13.3	14.1	12.9	12.8	13	13.9	14.3	13.47143	low
Egypt	14.317814	13.651623	13.34994	13.835978	14.068709	15.829529	15.635353	14.38414	High
Emirates	2.119354	2.484143	3.082288	3.355062	2.400442	2.918935	2.890572	2.75011	low
Ethiopia	8.436068	10.261254	9.79143	10.340407	9.512795	6.549066	5.36502	8.60801	low
Ghana	0.001719	0.001749	0.001848	0.002175	0.002132	0.002023	22.969055	3.28296	low
Guatemala	9.684139	10.630288	10.282289	10.135207	9.634597	10.157176	12.298756	10.40321	low
Guyana	29.6	30.2	29.1	31	29.9	0	0	21.4	High
Indonesia	11.94906	11.826986	12.385516	12.330768	12.454429	12.258208	12.406836	12.23026	low
Iran	7.654975	6.818464	7.396452	7.499545	9.169517	9.096462	8.611256	8.03524	low
Kenya	17.55149	17.23379	15.678802	16.81273	18.28613	17.16629	16.420586	17.0214	High
Kuwait	0.949351	2.227018	1.922267	1.637467	1.394777	1.186642	1.32076	1.51975	low
Lesotho	36.73359	35.565372	36.720936	43.28481	44.43954	58.345688	56.943752	44.57624	High
Libya	5.623833	4.714204	4.934305	3.847828	2.722998	2.198543	2.119238	3.73728	low
Mauritania	17.711586	27.98593	28.407797	26.933998	22.330877	11.496599	12.133113	20.99999	High
Nigeria	37.624767	31.661621	33.277954	0.280921	0.199369	0.148576	0.195455	14.76981	High
Oman	7.388527	4.994882	2.554919	2.532577	2.842443	2.598632	3.410263	3.76032	low
Peru	13.567223	12.258781	13.082763	13.386102	13.795555	15.276153	15.612721	13.85419	low
Saudi	6.446744	6.633035	7.705233	6.635377	5.053573	5.182168	5.604231	6.18005	low
T.Tobago	22.1213	20.4555	21.4333	27.406734	32.469467	35.21437	26.364662	26.49505	High
Tunisia	21.634733	21.484762	20.59125	20.70501	20.622547	21.003298	21.255226	21.0424	High
Venezuela	11.796312	10.950465	11.534121	0.01293	0.015596	0.006708	8.12177	6.06256	low
Yemen	7.126002	10.022563	9.634499	9.368595	8.868667	7.094203	7.319877	8.49063	low
Zambia	18.6214	17.516445	16.835152	17.516232	16.952333	16.295166	17.720976	17.3511	High
Zimbabwe	24.6	25.1	26	21.18	16.36	9.56	3.809	18.087	High
Overall average	13.99597	14.42769	14.93464	14.22799	14.01118	14.85258	14.08744		14.3625

*The table was calculated by the researcher.*

**Table 53 Country wise comparison with the overall average estimated taxable capacity (%) for the period 2001 to 2007**

Country	2001	2002	2003	2004	2005	2006	2007	Mean	Category
Algeria	26.4634	28.3938	24.7588	24.2492	19.2068	19.7675	20.0946	23.2763	High
Argentina	24.9838	27.599	20.5908	18.0695	14.2738	14.8823	15.115	19.35917	low
Bahrain	4.8197	4.2673	6.4096	6.185	1.6801	2.6656	6.3624	4.6271	low
Bangladesh	32.2497	28.795	25.9704	25.4729	22.11	24.9411	19.4516	25.5701	High
Bolivia	50.3412	46.8612	45.6973	46.0203	38.0687	35.8285	31.9741	42.11304	High
Botswana	14.0732	11.5755	16.9035	16.2319	16.2759	17.4047	17.6001	15.72354	low
Brazil	23.131	22.9632	25.0408	23.3366	23.8786	24.889	19.2624	23.21451	High
Cameroon	24.6197	23.0509	24.8269	22.8552	22.8994	23.6934	24.0236	23.70987	High
Chad	26.8853	29.0045	30.7799	29.6541	28.1033	24.9849	26.342	27.96486	High
Chile	9.3676	11.6981	10.5554	11.182	12.3751	12.444	13.6222	11.60634	low
Colombia	27.9348	27.7567	26.8457	23.4366	20.6459	21.4293	20.8657	24.13067	High
Congo.Rep	20.3149	21.1886	23.766	21.443	21.0472	18.9189	20.4804	21.02271	High
Côte d'Ivoire	28.7171	29.8503	32.587	33.9655	33.5073	32.3503	31.3612	31.76267	High
E.Guinea	20.1302	18.1005	23.6722	23.1098	23.4313	20.9196	23.1895	21.7933	High
Ecuador	19.8201	18.6158	19.4398	17.8703	15.3182	17.2429	18.5536	18.12296	low
Egypt	14.9666	18.482	19.9896	20.3379	19.3587	17.336	19.9199	18.62724	low
Emirates	20.8735	17.7476	19.004	8.3103	5.7405	2.843	5.0435	11.36606	low
Ethiopia	18.9255	17.4666	21.8001	27.1676	24.471	22.757	24.6374	22.46074	High
Ghana	26.0528	22.7377	26.5741	25.727	23.4224	22.8185	16.7016	23.43344	High
Guatemala	36.81	36.3233	36.6166	35.1976	33.4506	32.0582	31.6946	34.59299	High
Guyana	23.7462	24.7917	20.9694	23.0743	26.071	25.9906	22.8817	23.93213	High
Indonesia	18.9469	20.8823	21.6496	17.8118	17.3507	15.353	16.9073	18.41451	low
Iran	2.686	1.9035	4.7364	4.75	11.376	7.5349	8.3849	5.91024	low
Kenya	29.3163	30.559	30.8109	28.6107	28.3382	28.7075	28.1838	29.21806	High
Kuwait	8.6003	7.2701	7.6944	8.1334	7.7512	9.0285	11.1263	8.51489	low
Lesotho	11.8709	10.7355	12.9303	11.3511	14.4848	15.9245	13.833	13.01859	low
Libya	2.4594	3.4753	3.6042	1.8909	1.2113	2.6463	0.2747	2.22316	low
Mauritania	3.7961	9.6371	17.8339	22.398	22.512	20.2968	21.2201	16.81343	low
Nigeria	37.8411	35.8209	34.8411	32.6905	29.8899	28.2717	33.788	33.30617	High
Oman	2.4047	4.6148	1.0155	1.543	0.091	2.1815	6.855	2.67221	low
Peru	37.5214	33.4677	34.5611	35.258	31.9098	31.527	31.4896	33.67637	High
Saudi	10.8564	15.7225	12.4053	15.1681	17.0222	17.3785	14.6572	14.74431	low
T.Tobago	22.1269	22.8213	22.8897	26.8424	28.7873	30.5453	29.5654	26.22547	High
Tunisia	10.2624	12.0857	9.7286	8.7651	6.6932	9.7032	13.648	10.1266	low
Venezuela	21.2518	23.6411	24.8105	17.5684	15.7295	14.6144	16.5053	19.16014	low
Yemen	11.7957	15.1086	16.4385	17.5111	18.6183	18.091	19.8936	16.77954	low
Zambia	33.1871	33.1922	29.8048	28.6972	28.539	29.5147	28.5937	30.21839	High
Zimbabwe	18.8822	18.4702	20.8215	18.3829	17.5206	16.702	3.0895	16.26699	low
Overall average	20.50084	20.70203	21.29932	20.5334	19.55686	19.32069	19.13664		<b>20.14997</b>

*The table was calculated by the researcher.*

Table 54 The variables used in OLS , ORR , URR analysis during 1970-2000 in Libya .

*( in Million Libyan Dinars )*

years	Non-oil exports ( nox )	Tax penalties ( vp )	Oil revenue ( OilR )	Money supply ( Msp )	Total tax revenue ( T )	Gross domestic product ( Y )
1970	3	0.231	453	240.56	66.699	1288.3
1971	1.7	0.185	652.318	364.47	72.31	1586.5
1972	3.9	0.336	624.575	392.74	96.198	1753
1973	5.3	0.409	604.108	490.97	123.276	2182.3
1974	2.2	0.88	1474.279	753.84	223.669	3795.7
1975	2.6	0.931	1323.995	844.45	305.443	3674.3
1976	3	2.141	2077.336	1139.37	355.118	4768.1
1977	3.4	1.017	2625.846	1443.76	401.139	5612.7
1978	2.9	1.651	2183.483	1687.81	483.987	5496.1
1979	2.6	1.496	3682.176	2223.61	591.25	7603
1980	2.8	2.883	6691.9	2856.83	780.353	10553.8
1981	1.3	3.147	3420	3512.1	920.251	8798.8
1982	2.1	3.566	4145.4	11261.9	923.424	8932.4
1983	1.5	4.433	2520	2894.4	860.838	8511.7
1984	2.5	4.712	2125	2711.3	1115.558	7804.7
1985	2.5	4.527	1846	3492.2	768.246	7852.1
1986	0.2	3.888	1074	3041.4	731.061	6767.5
1987	0.2	2.289	1029.7	3438.6	660.884	5933.2
1988	0.4	3.355	898	3032.7	921.719	6170.6
1989	0.4	2.364	1181.5	3521.5	810.22	7094.7
1990	17.7	2.488	1600	4452.3	640.957	7741.6
1991	17	5.023	2230	4292.8	708.059	8426.2
1992	55.5	5.101	1267	4987.2	772.626	8774.4
1993	44.1	1.806	2451.852	4948.1	664.667	9287.5
1994	34.3	11.953	761	5132.6	1252.967	9913.5
1995	26.7	19.671	2940.4	5237.2	1037.89	10592.5
1996	7.2	23.911	3494	6382.4	1106.905	11782.5
1997	1150.3	23.773	3351	8007.7	1064.147	12888
1998	715.6	22.432	2551	7034.9	1164.649	12610.6
1999	595.8	19.785	3444.4	7385.4	1178.841	14075.2
2000	2343.7	17.615	2203	7278.9	989.416	17620.2

Tax penalties include income tax fines and customs tax fines.

Sources: Tables 1;7;22;28;31 and 46 , and The Libyan customs authority, Tripoli,2006.

Table 55 Selected Variables for Libya during 2001-2007

Variable	symbol	2001	2002	2003	2004	2005	2006	2007
Tax revenue (% of GDP)	Ty	5.6238334	4.7142039	4.9343049	3.8478278	2.7229982	2.1985432	2.1192383
Services, value added (% of GDP)	Ser	28.023041	28.715752	20.551438	28.40584	22.192693	19.495875	21.499256
Index of Fiscal Freedom	Fsf	53.6	51.3	53	32.3	47.1	52.2	81.7
Index of Business Freedom	Bf	40	40	40	40	40	20	20
Currency in Circulation % of GDP	Cir	14.256319	10.08451	8.7088743	6.2977872	5.9091477	5.575023	5.562544
Index of Trade Freedom	Tf	49	49	42.4	42.4	53.2	34.6	39.6
Agriculture, Added value (% of GDP)	Agr	7.699	5.2049085	4.335741	2.9919594	2.3393283	1.9860052	2.0826728
Foreign trade ( Imports+exports) % of GDP	Fy	71.690788	56.467885	57.552654	61.761632	62.777132	66.526053	77.879782
Annual Rates of Inflation (% growth)	Ari	-6.4	-9.89	-2.08	-2.21	2	3.4	6.65
index of Economic Freedom	Ef	34	35.4	34.6	31.5	32.8	33.2	37
Corruption Perceptions Index CPI	Cpi	2	2.2	2.1	2.5	2.5	2.7	2.5
Shadow Economy index	Sde	34.5	33.8	34.9	33.9	33.1	32	30.9

Source : see Table 6.12

Ty: Tax revenue (% of GDP)

Ser: Services, value added (% of GDP)

Fsf: Index of Fiscal Freedom

Bf: Index of Business Freedom

Cir: Currency in Circulation % of GDP

Tf: Index of Trade Freedom

Agr: Agriculture, Added value (% of GDP)

Fy: Foreign trade ( Imports+exports) % of GDP

Ari: Annual Rates of Inflation (% growth)

Ef: index of Economic Freedom

Cpi: Corruption Perceptions Index CPI

Sde: Shadow Economy index

## Figures Appendix

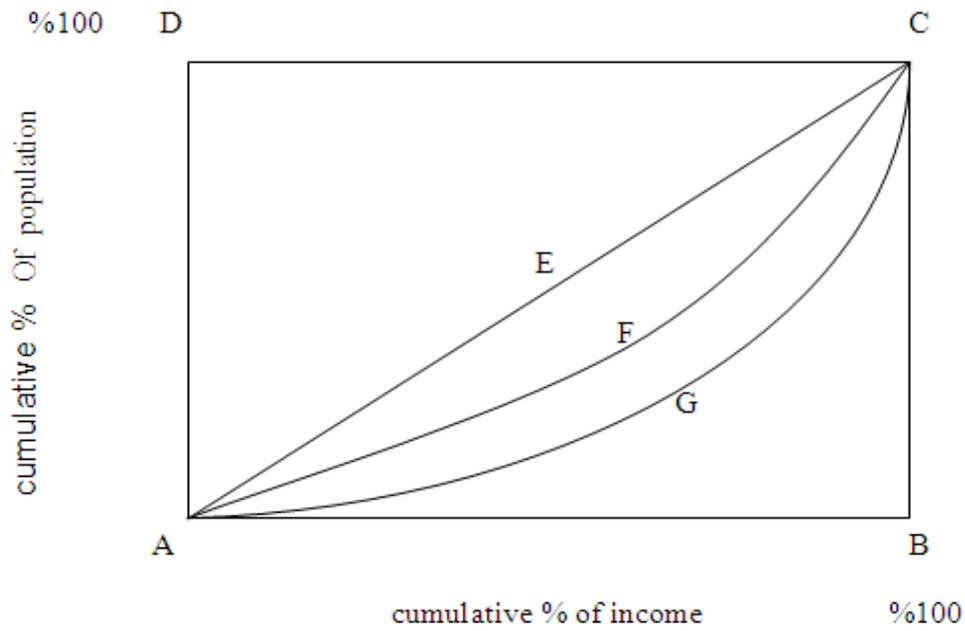


Figure ( 2.1 ) Lorenz curve

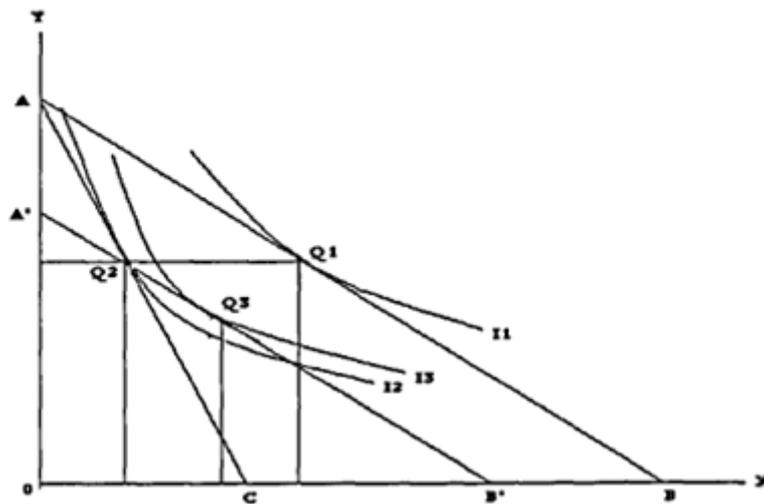


Figure 2.2 Effects of selective tax and Lump-sum Tax on consumer behavior

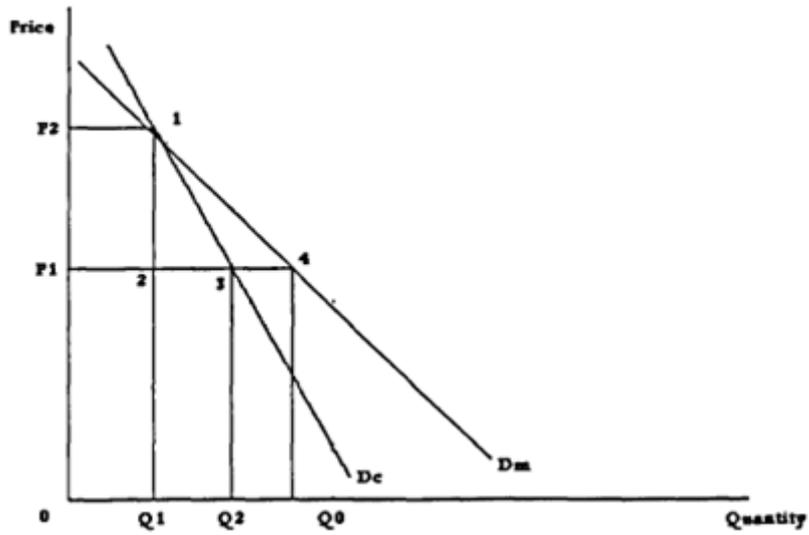


Figure 2.3 The analysis of excess burden

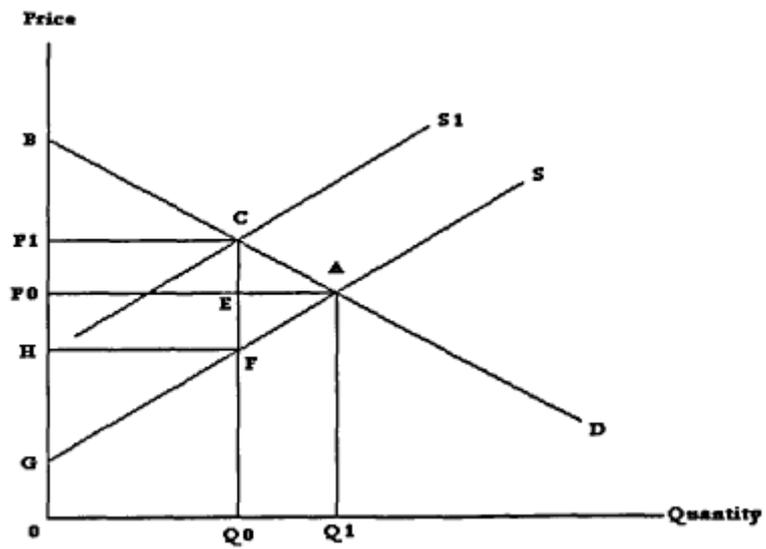


Figure 2.4 Total Efficiency Loss of Economy

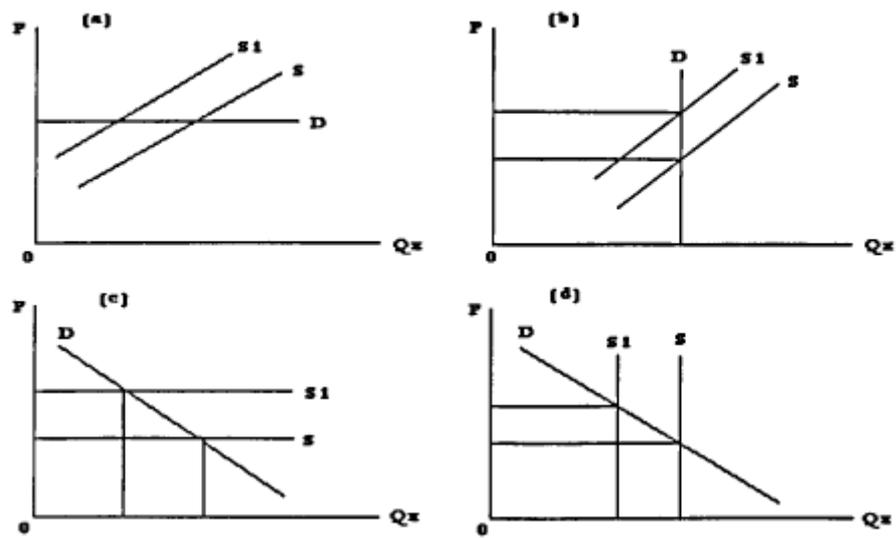


Figure 2.5 Tax effects in product market and the role of price elasticity in burden distribution

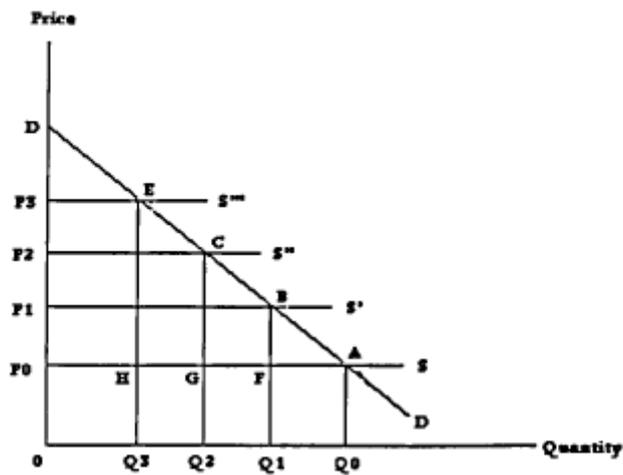


Figure 2.6 Effects of tax rates on total revenue and excess burden

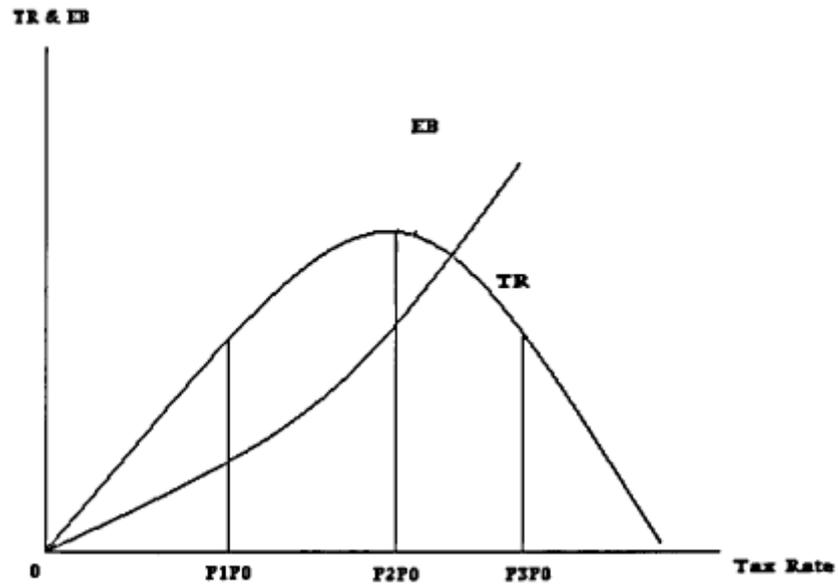


Figure 2.7 Growth direction of tax revenue and excess burden

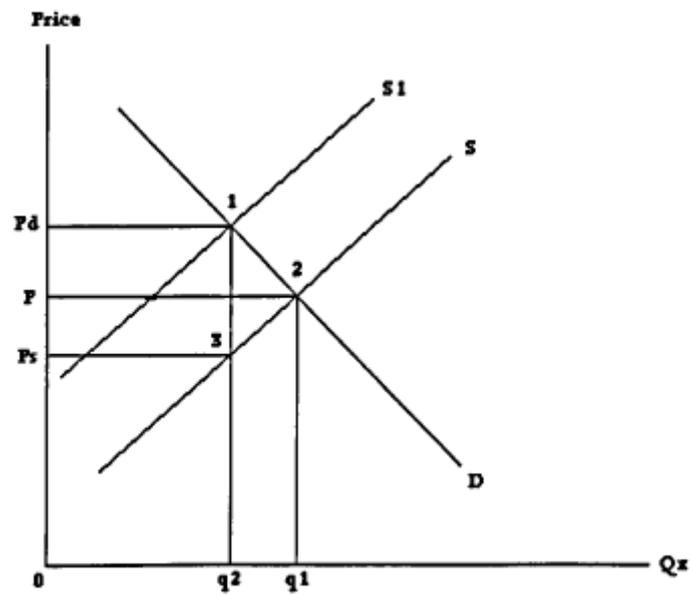


Figure 2.8 Rent seeking cost

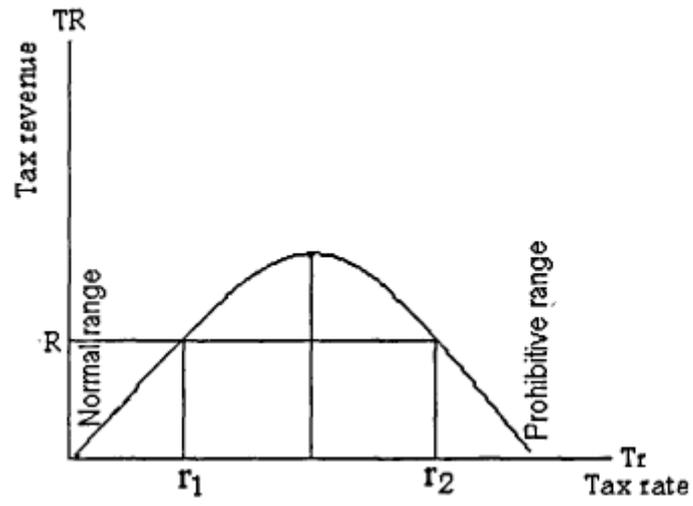


Figure 2.9 Laffer curve

## Appendix to Chapter Five

### Durbin Watson Test

When the error term in one time period is positively correlated with the error term in the previous time period, we face the problem of (positive first-order) autocorrelation. This is common in time-series analysis and leads to downward-biased standard errors (and, thus, to incorrect statistical tests and confidence intervals).

The presence of first-order autocorrelation is tested by utilizing the table of the Durbin-Watson statistic at the 5 or 1% levels of significance for  $n$  observations and  $k$  explanatory variables.

$$d = \frac{\sum_{t=2}^n (e_t - e_{t-1})^2}{\sum_{t=1}^n e_t^2}$$

Where 'e' is OLS residuals.

If the calculated value of  $d$  from above equation is smaller than the tabular value of  $d_L$  (lower limit), the hypothesis of positive first-order autocorrelation is accepted. The hypothesis is rejected if  $d > d_U$  (upper limit), and the test is inconclusive if  $d_L < d < d_U$  (Salvatore & Reagle, 2002).

The null hypothesis of Durbin-Watson test is :

$$H_0: \rho = 0$$

Or  $H_0$  : the (error terms)  $e$ 's are not autocorrelated with a first-order scheme.

This hypothesis is tested against the alternative hypothesis:

$$H_1: \rho \neq 0$$

Or  $H_1$  : the (error terms)  $e$ 's are autocorrelated with a first-order scheme.

It can be shown that the value of  $d$  lies between 0 and 4, and that when  $d=2$  then  $\rho = 0$ , which is equivalent to testing  $H_0 : d = 2$ .

If there is no autocorrelation  $\hat{\rho} = 0$  and  $d=2$ . Thus, if from the sample data we find  $d^* \approx 2$ , we accept that there is no autocorrelation in the function (Koutsoyiannis, 1992).

### The autocorrelation solution

One method to correct positive first-order autocorrelation (the usual type) involves first regressing  $Y$  on its value lagged one period, the explanatory variable of the model, and the explanatory variable lagged one period (Salvatore & Reagle, 2002):

$$Y_t = b_0 (1 - \rho) + \rho Y_{t-1} + b_1 X_t - b_1 \rho X_{t-1} + \dots + v_t$$

Where  $\rho$  is the autocorrelation coefficient.

The second step involves using the value of  $\rho$  found in the above equation to transform all the variables of the original OLS model.

To avoid losing the first observation in the differencing process, Kadiyala has suggested the following transformation of the first observation of  $Y$  and  $X$ , respectively (cited in Koutsoyiannis, 1992).

$$Y_1^* = Y_1 \sqrt{1 - \rho^2}$$

$$X_{j1}^* = X_{j1} = X_{j1} \sqrt{1 - \rho^2} \quad (j = 1, 2, 3, \dots, k)$$

For the other observations, Aitken's Generalised least square can be used:

$$Y_t^* = Y_t - \hat{\rho} Y_{t-1}$$

$$X_{jt}^* = X_{jt} - \hat{\rho} X_{j(t-1)} \quad (j = 1, 2, \dots, k)$$

## Appendix to Chapter Six

- Fiscal freedom Index (Fsf) is a measure of freedom from the burden of government from the revenue side. Technically, Fsf includes freedom from both the tax burden in terms of the top income tax rate (on corporations and individuals, taken separately) and the overall amount of tax revenue as a percentage of a nation's GDP (Cebula, 2011).

The fiscal freedom component is composed of three quantitative factors : top tax rate on individual income (  $f_1$  ); top tax rate on corporate income (  $f_2$  ); total tax revenue as a percentage of GDP (  $f_3$  ) (Heritage Foundation , 2009) .

In general,  $Fiscal\ Freedom_{ij} = 100 - \alpha (factor_{ij})^2$

So that this indicator can be calculated as the following :-

$$Fsf = \frac{(f_1 + f_2 + f_3)}{3}$$

- Business freedom index (Bf), reflects the individual's right and ability to freely conduct entrepreneurial activities, e.g. starting and operating a business firm without government interference (Cebula, 2011).

Business freedom is a quantitative measure of the ability to start, operate, and close a business that represents the overall burden of regulation, as well as the efficiency of government in the regulatory process. The business freedom score for each country is a number between 0 and 100, with 100 equaling the freest business environment. The score is based on 10 factors, all weighted equally : Starting a business-procedures (number); Starting a business-time (days); Starting a business-cost (% of income per capita); Starting a business-minimum capital (% of income per capita); Obtaining a license-procedures (number);

Obtaining a license-time (days); Obtaining a license-cost (% of income per capita); Closing a business-time (years); Closing a business-cost (% of estate); and Closing a business-recovery rate (cents on the dollar).

Each of these raw factors is converted to a scale of 0 to 100, after which the average of the converted values is computed. The result represents the country's business freedom score. Each factor is converted to a 0 to 100 scale using the following equation:

$$\text{Factor Score}_i = 50 \times \text{factor}_{\text{average}} / \text{factor}_i$$

which is based on the ratio of the country data for each factor relative to the world average, multiplied by 50 ( Heritage Foundation , 2009).

- Narrow money supply = currency in circulation + demand deposits  
(Zoryan, 2005 ) .

Then : Currency in circulation = narrow money supply - demand deposits

- Trade freedom (TF). Trade freedom reflects the openness of an economy to imports of goods and services from other nations and the ability of the citizens of that economy to freely interact as sellers and/or purchasers of goods and services in the international marketplace (Cebula, 2011).

Trade freedom is a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services. The trade freedom score is based on two inputs: The trade-weighted average tariff rate; and Non-tariff barriers (NTBs).

Different imports entering a country can, and often do, face different tariffs. The weighted average tariff uses weights for each tariff based on the share of imports for each good. Weighted average tariffs are a purely quantitative

measure and account for the basic calculation of the score using the following equation:

$$\text{Trade Freedom}_i = (((\text{Tariff}_{\max} - \text{Tariff}_i) / (\text{Tariff}_{\max} - \text{Tariff}_{\min})) * 100) - \text{NTB}_i$$

where  $\text{Trade Freedom}_i$  represents the trade freedom in a country  $i$ ,  $\text{Tariff}_{\max}$  and  $\text{Tariff}_{\min}$  represent the upper and lower bounds for tariff rates (%), and  $\text{Tariff}_i$  represents the weighted average tariff rate (%) in country  $i$ . The minimum tariff is naturally zero percent, and the upper bound was set as 50 percent (Heritage Foundation, 2009).

---

Sources:

*Cebula, Richard J., 2011, Economic Growth, Ten Forms of Economic Freedom, and Political Stability., Journal of Private Enterprise. Association of Private Enterprise Education. Volume: 26. Issue: 2.*

*Zoryan, Hakob., 2005, The Measurement of Co-circulation of Currencies and Dollarization in the Republic of Armenia. Università Carlo Cattaneo., The European Journal of Comparative Economics. Volume: 2. Issue: 1.*

*Heritage Foundation, 2009, Methodology for the 10 Economic Freedoms, Index of Economic Freedom.*

---

ORR method for period 1970-2000. Program: NCSS 2007

### Ridge Regression Report

Page/Date/Time 1 29/02/2012 07:18:35  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p17.S0  
 Dependent LnTy

#### Descriptive Statistics Section

Variable	Count	Mean	Standard Deviation	Minimum	Maximum
Lnnox	31	1.936736	2.410845	-1.609438	7.759486
LnvP	31	1.101341	1.347665	-1.6874	3.174339
LnOilR	31	7.484972	0.6575881	6.115892	8.808653
LnMsp	31	7.854831	1.000366	5.48297	9.329181
LnTy	31	-2.470264	0.2899662	-3.079114	-1.903809

#### Correlation Matrix Section

	Lnnox	LnvP	LnOilR	LnMsp	LnTy
Lnnox	1.000000	0.566703	0.291712	0.433032	-0.235235
LnvP	0.566703	1.000000	0.573246	0.888370	0.543761
LnOilR	0.291712	0.573246	1.000000	0.636981	0.224461
LnMsp	0.433032	0.888370	0.636981	1.000000	0.604152
LnTy	-0.235235	0.543761	0.224461	0.604152	1.000000

#### Least Squares Multicollinearity Section

Independent Variable	Variance Inflation	R-Squared Vs Other X's	Tolerance
Lnnox	1.5263	0.3448	0.6552
LnvP	5.8823	0.8300	0.1700
LnOilR	1.6839	0.4061	0.5939
LnMsp	5.5423	0.8196	0.1804

Since all VIF's are less than 10, multicollinearity is not a problem.

#### Eigenvalues of Correlations

No.	Eigenvalue	Incremental Percent	Cumulative Percent	Condition Number
1	2.738141	68.45	68.45	1.00
2	0.736788	18.42	86.87	3.72
3	0.430644	10.77	97.64	6.36
4	0.094427	2.36	100.00	29.00

All Condition Numbers less than 100. Multicollinearity is NOT a problem.

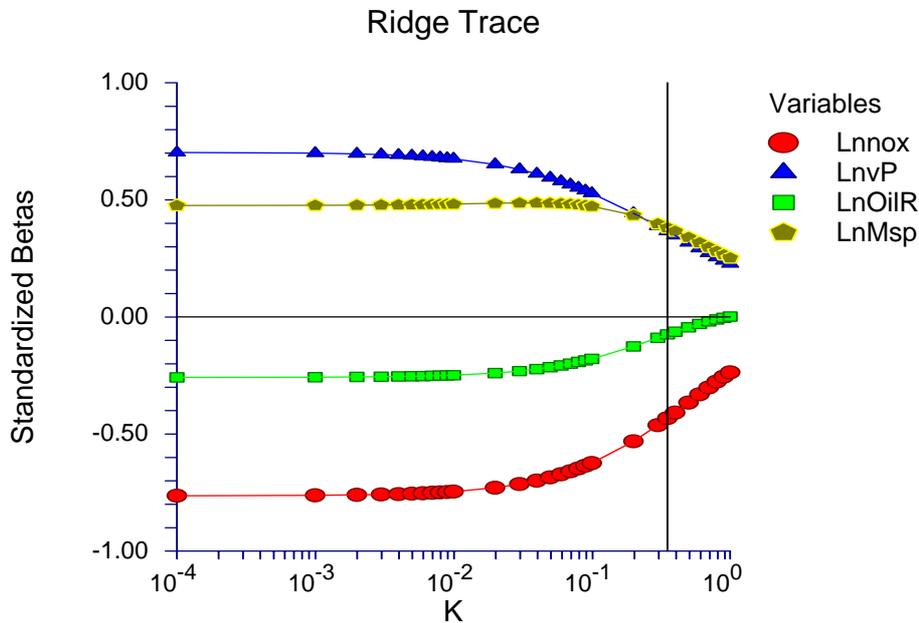
#### Eigenvector of Correlations

No.	Eigenvalue	Lnnox	LnvP	LnOilR	LnMsp
1	2.738141	-0.400081	-0.565995	-0.457844	-0.556744
2	0.736788	-0.822085	-0.039416	0.534957	0.190901
3	0.430644	-0.378959	0.414124	-0.705960	0.431871
4	0.094427	-0.143183	0.711757	0.076294	-0.683433

**Ridge Regression Report**

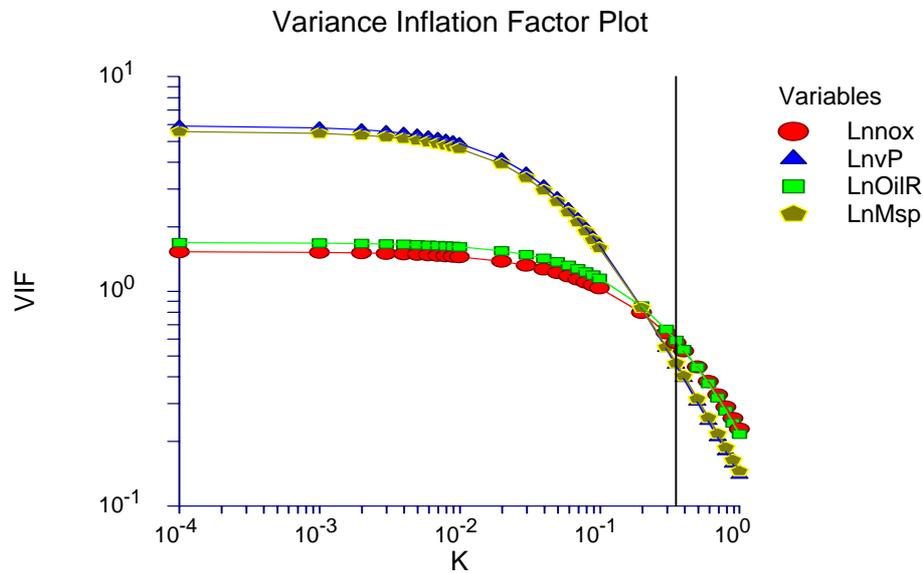
Page/Date/Time 2 29/02/2012 07:18:35  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p17.S0  
 Dependent LnTy

**Ridge Trace Section**



**Ridge Regression Report**

Page/Date/Time 3 29/02/2012 07:18:35  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p17.S0  
 Dependent LnTy



### Ridge Regression Report

Page/Date/Time 4 29/02/2012 07:18:35  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p17.S0  
 Dependent LnTy

#### Standardized Ridge Regression Coefficients Section

<b>k</b>	<b>Lnnox</b>	<b>Lnvp</b>	<b>LnOilR</b>	<b>LnMsp</b>
0.000000	-0.7637	0.7019	-0.2582	0.4758
0.001000	-0.7619	0.6990	-0.2572	0.4765
0.002000	-0.7601	0.6961	-0.2563	0.4772
0.003000	-0.7583	0.6933	-0.2554	0.4779
0.004000	-0.7565	0.6905	-0.2545	0.4785
0.005000	-0.7547	0.6877	-0.2535	0.4791
0.006000	-0.7530	0.6850	-0.2526	0.4797
0.007000	-0.7512	0.6824	-0.2517	0.4802
0.008000	-0.7495	0.6797	-0.2508	0.4807
0.009000	-0.7477	0.6772	-0.2499	0.4812
0.010000	-0.7460	0.6746	-0.2490	0.4817
0.020000	-0.7295	0.6508	-0.2400	0.4850
0.030000	-0.7140	0.6299	-0.2313	0.4865
0.040000	-0.6993	0.6111	-0.2229	0.4866
0.050000	-0.6853	0.5941	-0.2148	0.4857
0.060000	-0.6720	0.5786	-0.2071	0.4840
0.070000	-0.6593	0.5644	-0.1996	0.4817
0.080000	-0.6471	0.5512	-0.1924	0.4790
0.090000	-0.6354	0.5390	-0.1856	0.4759
0.100000	-0.6242	0.5275	-0.1790	0.4725
0.200000	-0.5312	0.4426	-0.1258	0.4342
0.300000	-0.4623	0.3874	-0.0893	0.3978
0.352658	-0.4325	0.3648	-0.0747	0.3806
0.400000	-0.4087	0.3473	-0.0634	0.3664
0.500000	-0.3658	0.3164	-0.0445	0.3399
0.600000	-0.3307	0.2917	-0.0302	0.3172
0.700000	-0.3013	0.2713	-0.0192	0.2976
0.800000	-0.2764	0.2541	-0.0107	0.2805
0.900000	-0.2551	0.2393	-0.0039	0.2655
1.000000	-0.2366	0.2265	0.0015	0.2522

### Ridge Regression Report

Page/Date/Time 5 29/02/2012 07:18:35  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p17.S0  
 Dependent LnTy

#### Variance Inflation Factor Section

<b>k</b>	<b>Lnnox</b>	<b>Lnvp</b>	<b>LnOilR</b>	<b>LnMsp</b>
0.000000	1.5263	5.8823	1.6839	5.5423
0.001000	1.5177	5.7685	1.6762	5.4369
0.002000	1.5093	5.6582	1.6685	5.3348
0.003000	1.5010	5.5513	1.6609	5.2357
0.004000	1.4929	5.4475	1.6534	5.1396
0.005000	1.4849	5.3468	1.6459	5.0463
0.006000	1.4770	5.2490	1.6386	4.9557
0.007000	1.4693	5.1541	1.6313	4.8678
0.008000	1.4617	5.0619	1.6241	4.7824
0.009000	1.4543	4.9723	1.6169	4.6994
0.010000	1.4469	4.8852	1.6098	4.6187
0.020000	1.3794	4.1344	1.5424	3.9224
0.030000	1.3206	3.5543	1.4805	3.3837
0.040000	1.2683	3.0962	1.4232	2.9578
0.050000	1.2213	2.7277	1.3698	2.6147
0.060000	1.1784	2.4265	1.3200	2.3338
0.070000	1.1389	2.1770	1.2733	2.1007
0.080000	1.1024	1.9677	1.2295	1.9048
0.090000	1.0683	1.7902	1.1881	1.7384
0.100000	1.0364	1.6383	1.1491	1.5957
0.200000	0.7960	0.8404	0.8527	0.8397
0.300000	0.6390	0.5419	0.6639	0.5509
0.352658	0.5759	0.4525	0.5903	0.4630
0.400000	0.5274	0.3927	0.5348	0.4038
0.500000	0.4442	0.3051	0.4419	0.3161
0.600000	0.3802	0.2481	0.3727	0.2583
0.700000	0.3297	0.2083	0.3195	0.2175
0.800000	0.2891	0.1791	0.2775	0.1873
0.900000	0.2559	0.1568	0.2438	0.1641
1.000000	0.2283	0.1392	0.2163	0.1457

### Ridge Regression Report

Page/Date/Time 6 29/02/2012 07:18:35  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p17.S0  
 Dependent LnTy

#### K Analysis Section

k	R2	Sigma	B'B	Ave VIF	Max VIF
0.000000	0.7908	0.1425	1.3689	3.6587	5.8823
0.001000	0.7894	0.1429	1.3623	3.5998	5.7685
0.002000	0.7881	0.1434	1.3557	3.5427	5.6582
0.003000	0.7867	0.1438	1.3492	3.4872	5.5513
0.004000	0.7854	0.1443	1.3427	3.4333	5.4475
0.005000	0.7840	0.1447	1.3364	3.3810	5.3468
0.006000	0.7827	0.1452	1.3301	3.3301	5.2490
0.007000	0.7814	0.1456	1.3239	3.2806	5.1541
0.008000	0.7801	0.1461	1.3177	3.2325	5.0619
0.009000	0.7787	0.1465	1.3116	3.1857	4.9723
0.010000	0.7774	0.1469	1.3056	3.1402	4.8852
0.020000	0.7647	0.1511	1.2486	2.7447	4.1344
0.030000	0.7524	0.1550	1.1966	2.4348	3.5543
0.040000	0.7407	0.1586	1.1488	2.1864	3.0962
0.050000	0.7295	0.1620	1.1046	1.9834	2.7277
0.060000	0.7186	0.1652	1.0635	1.8147	2.4265
0.070000	0.7082	0.1683	1.0250	1.6725	2.1770
0.080000	0.6981	0.1711	0.9890	1.5511	1.9677
0.090000	0.6884	0.1739	0.9551	1.4463	1.7902
0.100000	0.6790	0.1765	0.9232	1.3549	1.6383
0.200000	0.5997	0.1971	0.6824	0.8322	0.8527
0.300000	0.5396	0.2113	0.5299	0.5989	0.6639
0.352658	0.5133	0.2173	0.4706	0.5204	0.5903
0.400000	0.4921	0.2220	0.4260	0.4647	0.5348
0.500000	0.4535	0.2303	0.3514	0.3768	0.4442
0.600000	0.4212	0.2370	0.2959	0.3148	0.3802
0.700000	0.3939	0.2425	0.2533	0.2688	0.3297
0.800000	0.3703	0.2472	0.2198	0.2333	0.2891
0.900000	0.3497	0.2512	0.1929	0.2051	0.2559
1.000000	0.3315	0.2547	0.1709	0.1824	0.2283

#### Ridge vs. Least Squares Comparison Section for k = 0.352658

	Regular Ridge	Regular L.S.	Stand'zed Ridge	Stand'zed L.S.	Ridge Standard Error	L.S. Standard Error
Intercept	-3.076228	-2.689835				
Lnnox	-5.20E-02	-9.19E-02	-0.4325	-0.7637	1.25E-02	1.33E-02
Lnvp	7.85E-02	0.1510201	0.3648	0.7019	1.98E-02	4.68E-02
LnOilR	-3.29E-02	-	-0.0747	-0.2582	4.63E-02	5.13E-02
LnMsp	0.1103327	0.137908	0.3806	0.4758	2.70E-02	

OLS : R-Squared = 0.7908, sigma = 0.1425, F-ratio = 24.571, dw = 2.0256, MSE = 0.02029537  
 Ridge : R-Squared = 0.5133, sigma = 0.2173, F-ratio = 6.86, dw = 1.51, MSE = 0.04721358

### Ridge Regression Report

Page/Date/Time 7 29/02/2012 07:18:35  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p17.S0  
 Dependent LnTy

#### Ridge Regression Coefficient Section for $k = 0.352658$

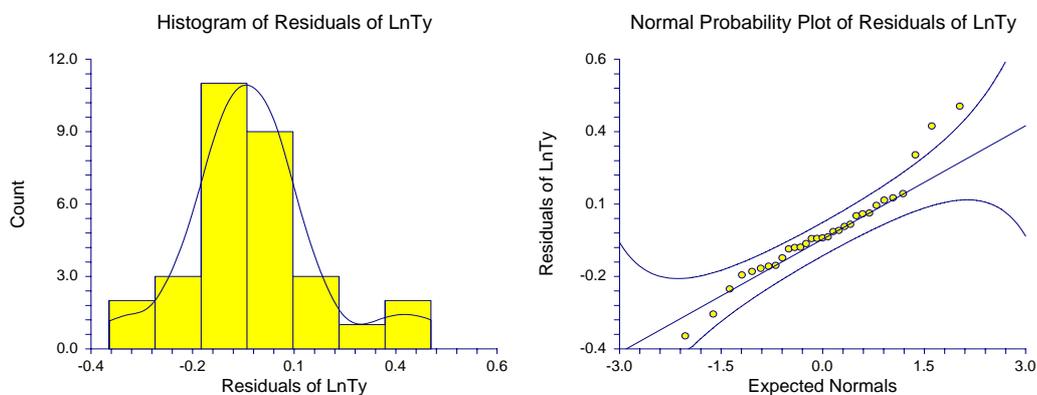
Independent Variable	Regression Coefficient	Standard Error	Stand'zed Regression Coefficient	VIF
Intercept	-3.076228			
Lnnox	-5.202131E-02	1.248744E-02	-0.4325	0.5759
Lnvp	7.850109E-02	1.980104E-02	0.3648	0.4525
LnOilR	-3.291741E-02	4.634993E-02	-0.0747	0.5903
LnMsp	0.1103327	2.698462E-02	0.3806	0.4630

#### Analysis of Variance Section for $k = 0.352658$

Source	DF	Sum of Squares	Mean Square	F-Ratio	Prob Level
Intercept	1	189.1683	189.1683		
Model	4	1.294859	0.3237148	6.8564	0.000659
Error	26	1.227553	4.721358E-02		
Total(Adjusted)	30	2.522412	8.408041E-02		

Mean of Dependent -2.470264  
 Root Mean Square Error 0.2172869  
 R-Squared 0.5133  
 Coefficient of Variation -8.796099E-02

#### Residual Plots Section



Period 1970-2000	Independent variables				
	Intercept	Lnnox	Lnvp	LnOilR	LnMsp
Regular Ridge Coeff's	-3.07623	-0.05202	0.078501	-0.03292	0.110333
Regular OLS Coeff's	-2.68984	-0.09186	0.15102	-0.11384	0.137908
Standardized Ridge Coeff's		-0.4325	0.3648	-0.0747	0.3806
Standardized OLS Coeff's		-0.7637	0.7019	-0.2582	0.4758
Ridge standard Error		0.012487	0.019801	0.04635	0.026985
OLS standard Error		0.013329	0.046809	0.051327	0.06121
t-test OLS		-6.892	3.226	-2.218	2.253
t-test Ridge		-4.16589	3.964493	-0.71019	4.088725
OLS VIF		1.5263	5.8823	1.6839	5.5423
Ridge VIF		0.5759	0.4525	0.5903	0.463

ORR method for peroid 70-2005 , program : NCSS 2007

### Ridge Regression Report

Page/Date/Time 1 29/02/2012 07:57:23  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p13.S0  
 Dependent LnTy

#### Descriptive Statistics Section

Variable	Count	Mean	Standard Deviation	Minimum	Maximum
Lnnox	36	2.867836	3.251167	-1.609438	9.173987
LnvP	36	1.262129	1.357912	-1.6874	3.469199
LnOilR	36	7.712045	0.9029535	6.115892	10.44517
LnMsp	36	8.041989	1.042292	5.48297	9.548818
LnTy	36	-2.567117	0.3757098	-3.611918	-1.903809

#### Correlation Matrix Section

	Lnnox	LnvP	LnOilR	LnMsp	LnTy
Lnnox	1.000000	0.569830	0.612920	0.595401	-0.599775
LnvP	0.569830	1.000000	0.541436	0.854263	0.179786
LnOilR	0.612920	0.541436	1.000000	0.693832	-0.397826
LnMsp	0.595401	0.854263	0.693832	1.000000	0.070835
LnTy	-0.599775	0.179786	-0.397826	0.070835	1.000000

#### Least Squares Multicollinearity Section

Independent Variable	Variance Inflation	R-Squared Vs Other X's	Tolerance
Lnnox	1.8389	0.4562	0.5438
LnvP	3.9427	0.7464	0.2536
LnOilR	2.2826	0.5619	0.4381
LnMsp	5.1442	0.8056	0.1944

Since all VIF's are less than 10, multicollinearity is not a problem.

#### Eigenvalues of Correlations

No.	Eigenvalue	Incremental Percent	Cumulative Percent	Condition Number
1	2.941459	73.54	73.54	1.00
2	0.539496	13.49	87.02	5.45
3	0.401752	10.04	97.07	7.32
4	0.117292	2.93	100.00	25.08

All Condition Numbers less than 100. Multicollinearity is NOT a problem.

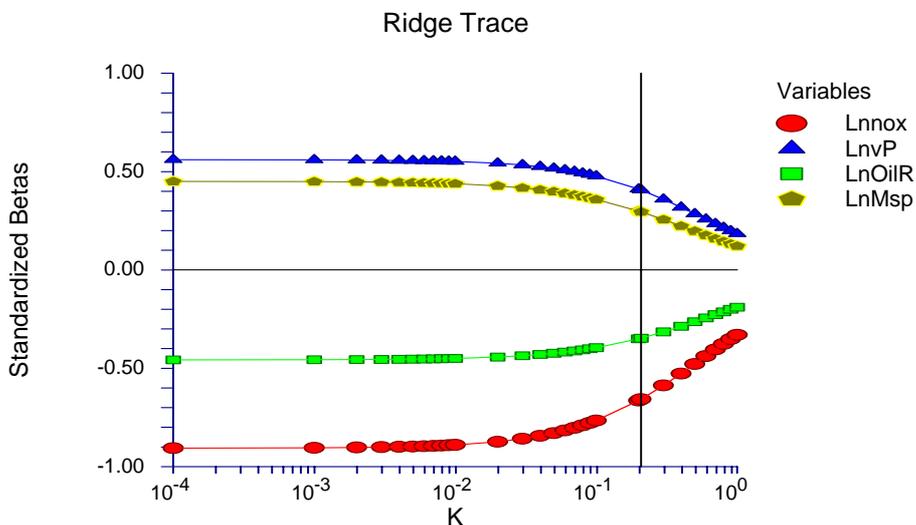
#### Eigenvector of Correlations

No.	Eigenvalue	Lnnox	LnvP	LnOilR	LnMsp
1	2.941459	-0.466887	-0.508757	-0.482013	-0.539302
2	0.539496	-0.578478	0.574631	-0.451552	0.362302
3	0.401752	-0.665018	-0.207992	0.702702	0.143879
4	0.117292	-0.071635	0.606386	0.264526	-0.746452

### Ridge Regression Report

Page/Date/Time 2 29/02/2012 07:57:23  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p13.S0  
 Dependent LnTy

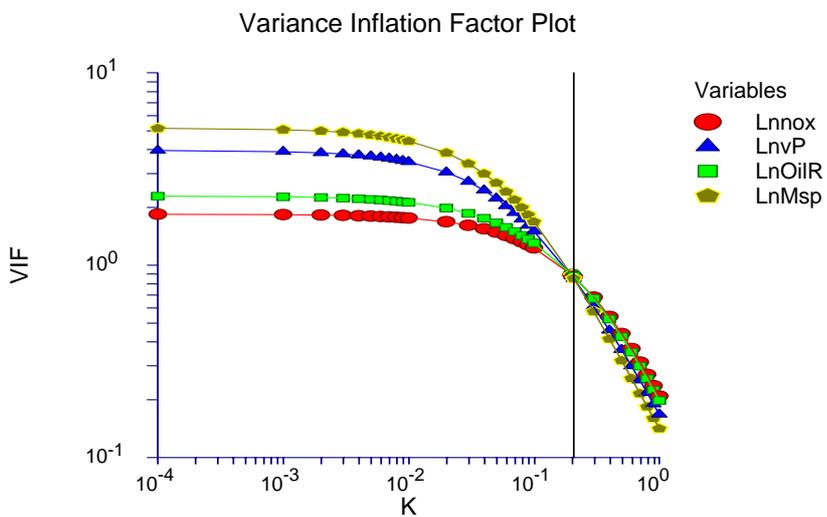
#### Ridge Trace Section



Ridge

#### Regression Report

Page/Date/Time 3 29/02/2012 07:57:23  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p13.S0  
 Dependent LnTy



### Ridge Regression Report

Page/Date/Time 4 29/02/2012 07:57:23  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p13.S0  
 Dependent LnTy

#### Standardized Ridge Regression Coefficients Section

<b>k</b>	<b>Lnnox</b>	<b>LnvP</b>	<b>LnOilR</b>	<b>LnMsp</b>
0.000000	-0.9060	0.5597	-0.4575	0.4495
0.001000	-0.9043	0.5589	-0.4567	0.4483
0.002000	-0.9026	0.5580	-0.4560	0.4471
0.003000	-0.9010	0.5571	-0.4552	0.4459
0.004000	-0.8993	0.5562	-0.4545	0.4447
0.005000	-0.8977	0.5553	-0.4538	0.4436
0.006000	-0.8961	0.5544	-0.4530	0.4424
0.007000	-0.8944	0.5535	-0.4523	0.4412
0.008000	-0.8928	0.5526	-0.4516	0.4401
0.009000	-0.8912	0.5518	-0.4509	0.4390
0.010000	-0.8896	0.5509	-0.4501	0.4378
0.020000	-0.8738	0.5421	-0.4431	0.4269
0.030000	-0.8586	0.5333	-0.4364	0.4167
0.040000	-0.8439	0.5247	-0.4299	0.4070
0.050000	-0.8297	0.5162	-0.4237	0.3979
0.060000	-0.8160	0.5079	-0.4177	0.3892
0.070000	-0.8027	0.4998	-0.4119	0.3809
0.080000	-0.7899	0.4919	-0.4063	0.3730
0.090000	-0.7776	0.4841	-0.4009	0.3655
0.100000	-0.7656	0.4766	-0.3956	0.3582
0.200000	-0.6641	0.4105	-0.3503	0.2989
0.207709	-0.6574	0.4060	-0.3473	0.2951
0.300000	-0.5872	0.3588	-0.3151	0.2558
0.400000	-0.5270	0.3178	-0.2868	0.2230
0.500000	-0.4785	0.2846	-0.2635	0.1970
0.600000	-0.4384	0.2571	-0.2440	0.1759
0.700000	-0.4049	0.2342	-0.2273	0.1586
0.800000	-0.3763	0.2147	-0.2130	0.1440
0.900000	-0.3517	0.1980	-0.2004	0.1316
1.000000	-0.3302	0.1835	-0.1894	0.1210

### Ridge Regression Report

Page/Date/Time 5 29/02/2012 07:57:23  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p13.S0  
 Dependent LnTy

#### Variance Inflation Factor Section

<b>k</b>	<b>Lnnox</b>	<b>LnvP</b>	<b>LnOilR</b>	<b>LnMsp</b>
0.000000	1.8389	3.9427	2.2826	5.1442
0.001000	1.8304	3.8870	2.2650	5.0630
0.002000	1.8219	3.8327	2.2477	4.9838
0.003000	1.8135	3.7797	2.2307	4.9065
0.004000	1.8052	3.7280	2.2140	4.8311
0.005000	1.7969	3.6774	2.1976	4.7576
0.006000	1.7887	3.6281	2.1815	4.6858
0.007000	1.7806	3.5798	2.1656	4.6157
0.008000	1.7726	3.5327	2.1499	4.5473
0.009000	1.7646	3.4867	2.1345	4.4805
0.010000	1.7566	3.4416	2.1194	4.4152
0.020000	1.6806	3.0417	1.9800	3.8377
0.030000	1.6101	2.7167	1.8591	3.3723
0.040000	1.5445	2.4484	1.7528	2.9913
0.050000	1.4833	2.2239	1.6583	2.6753
0.060000	1.4260	2.0338	1.5735	2.4102
0.070000	1.3722	1.8711	1.4968	2.1854
0.080000	1.3217	1.7305	1.4271	1.9931
0.090000	1.2741	1.6080	1.3633	1.8271
0.100000	1.2293	1.5004	1.3047	1.6828
0.200000	0.8918	0.8793	0.8998	0.8883
0.207709	0.8720	0.8509	0.8777	0.8542
0.300000	0.6814	0.6082	0.6711	0.5741
0.400000	0.5406	0.4582	0.5251	0.4140
0.500000	0.4413	0.3637	0.4250	0.3195
0.600000	0.3684	0.2990	0.3528	0.2581
0.700000	0.3131	0.2523	0.2989	0.2153
0.800000	0.2702	0.2170	0.2572	0.1840
0.900000	0.2360	0.1895	0.2244	0.1602
1.000000	0.2084	0.1676	0.1979	0.1415

### Ridge Regression Report

Page/Date/Time 6 29/02/2012 07:57:23  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p13.S0  
 Dependent LnTy

#### K Analysis Section

k	R2	Sigma	B'B	Ave VIF	Max VIF
0.000000	0.8578	0.1505	1.5454	3.3021	5.1442
0.001000	0.8563	0.1513	1.5396	3.2613	5.0630
0.002000	0.8548	0.1521	1.5339	3.2215	4.9838
0.003000	0.8532	0.1529	1.5282	3.1826	4.9065
0.004000	0.8517	0.1537	1.5225	3.1446	4.8311
0.005000	0.8502	0.1545	1.5169	3.1074	4.7576
0.006000	0.8487	0.1553	1.5113	3.0710	4.6858
0.007000	0.8472	0.1561	1.5057	3.0354	4.6157
0.008000	0.8457	0.1568	1.5001	3.0006	4.5473
0.009000	0.8442	0.1576	1.4946	2.9666	4.4805
0.010000	0.8427	0.1583	1.4891	2.9332	4.4152
0.020000	0.8281	0.1655	1.4359	2.6350	3.8377
0.030000	0.8139	0.1722	1.3856	2.3896	3.3723
0.040000	0.8003	0.1784	1.3379	2.1843	2.9913
0.050000	0.7872	0.1842	1.2927	2.0102	2.6753
0.060000	0.7745	0.1896	1.2498	1.8609	2.4102
0.070000	0.7622	0.1947	1.2090	1.7314	2.1854
0.080000	0.7503	0.1995	1.1702	1.6181	1.9931
0.090000	0.7388	0.2040	1.1332	1.5181	1.8271
0.100000	0.7276	0.2084	1.0980	1.4293	1.6828
0.200000	0.6326	0.2420	0.8216	0.8898	0.8998
0.207709	0.6264	0.2440	0.8048	0.8637	0.8777
0.300000	0.5602	0.2647	0.6384	0.6337	0.6814
0.400000	0.5031	0.2814	0.5107	0.4845	0.5406
0.500000	0.4569	0.2942	0.4181	0.3874	0.4413
0.600000	0.4187	0.3044	0.3488	0.3196	0.3684
0.700000	0.3866	0.3127	0.2956	0.2699	0.3131
0.800000	0.3592	0.3196	0.2538	0.2321	0.2702
0.900000	0.3356	0.3254	0.2204	0.2025	0.2360
1.000000	0.3149	0.3304	0.1932	0.1788	0.2084

#### Ridge vs. Least Squares Comparison Section for k = 0.207709

	Regular Ridge	Regular L.S.	Stand'zed Ridge	Stand'zed L.S.	Ridge Standard Error	L.S. Standard Error
Intercept	-2.231929	-2.297353				
Lnnox	-7.60E-02	0.1046944	-0.6574	-0.906	1.18E-02	1.06E-02
Lnvp	0.1123406	0.1548695	0.406	0.5597	2.80E-02	3.72E-02
LnOilR	-0.1445199	-0.190353	-0.3473	-0.4575	0.042796	4.26E-02
LnMsp	0.1063716	0.162028	0.2951	0.4495	3.66E-02	5.54E-02

OLS : R-Squared 0.8578 ,Sigma 0.1505 ,F-ratio 46.768 ,dw = 1.765 ,MSE0.02265554  
 Ridge : R-Squared 0.6264 ,Sigma 0.2440 ,F-ratio 12.9927 ,dw = 1.103 ,MSE0.05954538

### Ridge Regression Report

Page/Date/Time 7 29/02/2012 07:57:23  
 Database E:\WD SmartWare.swstor\ABIHO ... ori mori\My Documents\p13.S0  
 Dependent LnTy

#### Ridge Regression Coefficient Section for $k = 0.207709$

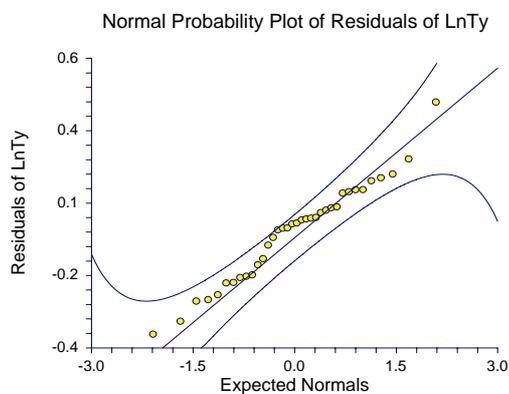
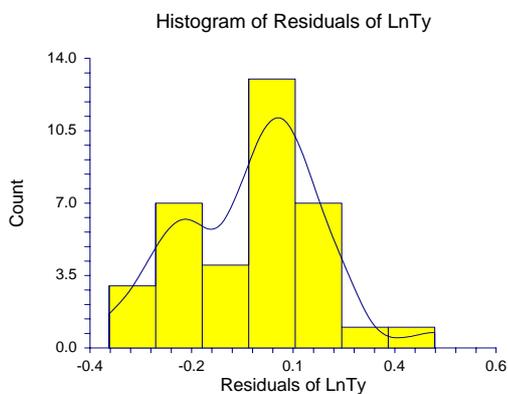
Independent Variable	Regression Coefficient	Standard Error	Stand'zed Regression Coefficient	VIF
Intercept	-2.231929			
Lnnox	-7.597106E-02	1.184732E-02	-0.6574	0.8720
LnvP	0.1123406	2.802013E-02	0.4060	0.8509
LnOilR	-0.1445199	0.042796	-0.3473	0.8777
LnMsp	0.1063716	3.657521E-02	0.2951	0.8542

#### Analysis of Variance Section for $k = 0.207709$

Source	DF	Sum of Squares	Mean Square	F-Ratio	Prob Level
Intercept	1	237.2432	237.2432		
Model	4	3.094619	0.7736546	12.9927	0.000003
Error	31	1.845907	5.954538E-02		
Total(Adjusted)	35	4.940525	0.1411579		

Mean of Dependent -2.567117  
 Root Mean Square Error 0.2440192  
 R-Squared 0.6264  
 Coefficient of Variation -9.505574E-02

#### Residual Plots Section





$(x'x+kI)^{-1}$	3.82E-12	-0.01549	0.108094	0.015734	-0.09348
	6.03E-12	-0.02128	0.015734	0.063763	-0.04475
	-8.05E-13	-0.00285	-0.09348	-0.04475	0.140337

$x'y$	2E-09
	-20.9921
	6.292506
	-13.9239
	2.479239

$x'y+kI$	0.207709
	-20.7844
	6.500215
	-13.7162
	2.686948

var	0.004780728	-1.5E-12	6.62E-13	1.04E-12	-1.4E-13
	-1.47154E-12	0.008971	-0.00268	-0.00368	-0.00049
	6.61562E-13	-0.00268	0.018711	0.002723	-0.01618
	1.04401E-12	-0.00368	0.002723	0.011037	-0.00775
	-1.39346E-13	-0.00049	-0.01618	-0.00775	0.024292

#### Betas

	0.005736596	var(b0)	0.004781
nox	-0.893628839	var(b1)	0.008971
vp	0.557565332	var(b2)	0.018711
oilR	-0.450279029	var(b3)	0.011037
Msp	0.442322617	var(b4)	0.024292

s(b0)	0.069143	t(b0)	0.082967
s(b1)	0.094715	t(b1)	-9.43488
s(b2)	0.136788	t(b2)	4.076124
s(b3)	0.105059	t(b3)	-4.28597
s(b4)	0.155859	t(b4)	2.83796

standardized

year	Lnnox	LnvP	LnOilR	LnMsp	LnTy
1970	-0.54418	-2.00857	-1.7677	-2.455186658	-1.03642
1971	-0.71888	-2.17211	-1.36387	-2.056570035	-1.36275
1972	-0.46348	-1.73264	-1.412	-1.984897596	-0.88713
1973	-0.36914	-1.58786	-1.4489	-1.770720259	-0.83918
1974	-0.63958	-1.0236	-0.46084	-1.359321786	-0.70028
1975	-0.5882	-0.98211	-0.57991	-1.250421937	0.208146
1976	-0.54418	-0.36884	-0.08107	-0.963030897	-0.09734
1977	-0.50568	-0.91705	0.17843	-0.735862824	-0.2075
1978	-0.55461	-0.56023	-0.02588	-0.586018934	0.363841
1979	-0.5882	-0.63283	0.552869	-0.321505427	0.042774
1980	-0.5654	-0.14971	1.214469	-0.081092237	-0.09734
1981	-0.8014	-0.08519	0.471067	0.117030397	0.833947
1982	-0.65389	0.00686	0.6841	1.234962601	0.78276
1983	-0.75738	0.16713	0.132864	-0.068557147	0.73057
1984	-0.60026	0.212078	-0.05595	-0.131255167	1.656082
1985	-0.60026	0.182582	-0.21183	0.111578717	0.650314
1986	-1.37713	0.070524	-0.81167	-0.02102716	0.908928
1987	-1.37713	-0.31962	-0.85832	0.09673882	0.981853
1988	-1.16393	-0.03806	-1.00988	-0.02377555	1.76548
1989	-1.16393	-0.29588	-0.70602	0.119594829	1.052834
1990	0.001762	-0.25823	-0.37021	0.344612292	0.208146
1991	-0.01065	0.259147	-0.00253	0.309610935	0.240022
1992	0.353272	0.270495	-0.62865	0.453462663	0.363841
1993	0.282552	-0.49415	0.102502	0.445911066	-0.17027
1994	0.205252	0.897594	-1.19321	0.48103434	1.319219
1995	0.128209	1.264454	0.303733	0.500390395	0.650314
1996	-0.2749	1.408199	0.494774	0.690123501	0.539396
1997	1.285675	1.403936	0.448494	0.907777952	0.208146
1998	1.139679	1.361178	0.146404	0.783513188	0.482155
1999	1.083325	1.268709	0.47894	0.830161946	0.240022
2000	1.504583	1.183156	-0.01602	0.816225992	-1.39208
2001	1.385436	0.946975	0.528795	0.938793902	-0.83918
2002	1.8386	1.625341	1.190901	0.987972306	-1.3055
2003	1.836511	-0.22921	0.624723	1.022966644	-1.19459
2004	1.877864	1.185411	2.424533	1.171093291	-1.87126
2005	1.939658	0.142124	3.026875	1.445687835	-2.78087

y <sup>^</sup>	E	E2	DE	DE2	TAX EFFORT
-0.9179	-0.11852	0.014047			1.129119
-0.85848	-0.50426	0.254279	-0.385741326	0.148796	1.587384
-0.78831	-0.09882	0.009766	0.405438294	0.16438	1.125359
-0.68054	-0.15863	0.025164	-0.059809386	0.003577	1.233095
-0.38719	-0.31308	0.098021	-0.154451891	0.023855	1.808598
-0.30819	0.51634	0.266607	0.829423092	0.687943	-0.67537
-0.10309	0.005743	3.3E-05	-0.510596355	0.260709	0.944287
-0.45952	0.252021	0.063515	0.246277694	0.060653	0.451553
-0.05857	0.422413	0.178433	0.170392337	0.029034	-6.21181
-0.21264	0.255409	0.065234	-0.167004037	0.02789	-0.20116
-0.1552	0.057853	0.003347	-0.197555952	0.039028	0.627228
0.514042	0.319905	0.102339	0.262051511	0.068671	1.622332
0.832111	-0.04935	0.002435	-0.369255352	0.13635	0.940692
0.68559	0.04498	0.002023	0.094330896	0.008898	1.065608
0.627528	1.028554	1.057924	0.983573765	0.967417	2.639056
0.788682	-0.13837	0.019146	-1.166922251	1.361708	0.824558
1.631877	-0.72295	0.522656	-0.584581234	0.341735	0.556983
1.487443	-0.50559	0.25562	0.217360216	0.047245	0.660095
1.468849	0.29663	0.08799	0.802219615	0.643556	1.201948
1.251693	-0.19886	0.039545	-0.495488802	0.245509	0.841128
0.179313	0.028833	0.000831	0.227691417	0.051843	1.160798
0.297833	-0.05781	0.003342	-0.086644253	0.007507	0.805894
0.324503	0.039338	0.001547	0.097148905	0.009438	1.121225
-0.3712	0.20093	0.040373	0.16159218	0.026112	0.458702
1.072833	0.246386	0.060706	0.04545619	0.002066	1.229659
0.680751	-0.03044	0.000926	-0.27682316	0.076631	0.955289
1.119031	-0.57963	0.335977	-0.549197824	0.301618	0.482021
-0.16081	0.368956	0.136128	0.948590554	0.899824	-1.29436
0.026875	0.45528	0.20728	0.086323976	0.007452	17.94048
-0.10342	0.343444	0.117954	-0.111835224	0.012507	-2.32079
-0.31086	-0.52831	0.279112	-0.871755409	0.759957	2.699488
-0.52718	-0.31199	0.097339	0.216319024	0.046794	1.591809
-0.83029	-0.47521	0.225827	-0.163220753	0.026641	1.572345
-1.59204	0.397452	0.157968	0.872665115	0.761544	0.75035
-1.58515	-0.28611	0.081862	-0.683567292	0.467264	1.180497
-2.37183	-0.40904	0.167314	-0.12292573	0.015111	1.172458
		4.968563		8.739266	
		DW	1.758912195		

URR method for 1970-2000

Period 1970-2000	Independent variables				
	Intercept	Lnnox	LnvP	LnOilR	LnMsp
Regular Ridge Coeff's	3.076228	0.052021	0.078501	0.03292	0.110333
Regular OLS Coeff's	2.689835	0.091856	0.1510201	0.1138411	0.137908

k	0.352658				
kJ	0.224605				
	0.224605				
	0.224605				
	0.224605				
	0.224605				
x'x	31	-8.87807	-3.6706437	-7.79583	-5.56651
	-8.87807	19.03869	13.5629536	6.958652	10.83991
	-3.67064	13.56295	29.98357	13.3528	26.04518
	-7.79583	6.958652	13.3528042	17.87152	14.75677
	-5.56651	10.83991	26.0451789	14.75677	28.63464
x'x+Kip	31.35266	-8.87807	-3.6706437	-7.79583	-5.56651
	-8.87807	19.39135	13.5629536	6.958652	10.83991
	-3.67064	13.56295	30.336228	13.3528	26.04518
	-7.79583	6.958652	13.3528042	18.22417	14.75677
	-5.56651	10.83991	26.0451789	14.75677	28.9873
(x'x+kIp)-1	0.041527	0.021908	0.02027133	0.016468	0.009612
			-		
	0.021908	0.088187	0.05280848	-0.00125	0.019312
	-0.02027	-0.05281	0.17726296	-0.00384	-0.14146
			-		
	0.016468	-0.00125	0.00384195	0.101185	-0.04443
	0.009612	0.019312	-0.1414603	-0.04443	0.178843

x'y		7.991403				
		-6.32742				
		11.54871				
		1.775159				
		11.99057				
x'y+kl		8.344061				
		-5.97476				
		11.90137				
		2.127817				
		12.34323				
Betas		0.128039				
		-0.73687				
		0.501792				
		-0.23397				
		0.394204				
var		0.006608	0.003486	-0.0032258	0.002621	0.00153
				-		
		0.003486	0.014033	0.00840347	-0.0002	0.003073
		-0.00323	-0.0084	0.02820806	-0.00061	-0.02251
				-		
		0.002621	-0.0002	0.00061137	0.016102	-0.00707
				-		
		0.00153	0.003073	0.02251074	-0.00707	0.028459
	Betas	0.128039	var(b0)	0.006608		
nox		-0.73687	var(b1)	0.014033		
vp		0.501792	var(b2)	0.028208		
oilR		-0.23397	var(b3)	0.016102		
Msp		0.394204	var(b4)	0.028459		
s(b0)	0.081291		t(b0)	1.575067		
s(b1)	0.118462		t(b1)	-6.22024		
s(b2)	0.167953		t(b2)	2.987702		
s(b3)	0.126892		t(b3)	-1.84386		
s(b4)	0.168699		t(b4)	2.336728		

standardized

year	Lnnox	LnvP	LnOilR	LnMsp	LnTy
1970	-0.54418	-2.00857	-1.7677	-2.45519	-1.036423614
1971	-0.71888	-2.17211	-1.36387	-2.05657	-1.362745466
1972	-0.46348	-1.73264	-1.412	-1.9849	-0.887134283
1973	-0.36914	-1.58786	-1.4489	-1.77072	-0.839175713
1974	-0.63958	-1.0236	-0.46084	-1.35932	-0.700276618
1975	-0.5882	-0.98211	-0.57991	-1.25042	0.208145658
1976	-0.54418	-0.36884	-0.08107	-0.96303	-0.097344139
1977	-0.50568	-0.91705	0.17843	-0.73586	-0.207496215
1978	-0.55461	-0.56023	-0.02588	-0.58602	0.363840837
1979	-0.5882	-0.63283	0.552869	-0.32151	0.04277393
1980	-0.5654	-0.14971	1.214469	-0.08109	-0.097344139
1981	-0.8014	-0.08519	0.471067	0.11703	0.833947098
1982	-0.65389	0.00686	0.6841	1.234963	0.782760354
1983	-0.75738	0.16713	0.132864	-0.06856	0.730569885
1984	-0.60026	0.212078	-0.05595	-0.13126	1.656082344
1985	-0.60026	0.182582	-0.21183	0.111579	0.650313695
1986	-1.37713	0.070524	-0.81167	-0.02103	0.908927511
1987	-1.37713	-0.31962	-0.85832	0.096739	0.981853405
1988	-1.16393	-0.03806	-1.00988	-0.02378	1.765479741
1989	-1.16393	-0.29588	-0.70602	0.119595	1.052834375
1990	0.001762	-0.25823	-0.37021	0.344612	0.208145658
1991	-0.01065	0.259147	-0.00253	0.309611	0.240021831
1992	0.353272	0.270495	-0.62865	0.453463	0.363840837
1993	0.282552	-0.49415	0.102502	0.445911	-0.170270033
1994	0.205252	0.897594	-1.19321	0.481034	1.319219375
1995	0.128209	1.264454	0.303733	0.50039	0.650313695
1996	-0.2749	1.408199	0.494774	0.690124	0.539396453
1997	1.285675	1.403936	0.448494	0.907778	0.208145658
1998	1.139679	1.361178	0.146404	0.783513	0.482154921
1999	1.083325	1.268709	0.47894	0.830162	0.240021831
2000	1.504583	1.183156	-0.01602	0.816226	-1.39208

Y^	e	e2	de	de2	tax effort
-1.03311	-0.00331	1.0962E-05			1.003205
-0.92379	-0.43896	0.19268308	-0.43565	0.189787	1.47517
-0.85195	-0.03519	0.00123802	0.403771	0.163031	1.0413
-0.75575	-0.08342	0.00695926	-0.04824	0.002327	1.110383
-0.34234	-0.35794	0.12811907	-0.27452	0.075359	2.045563
-0.2886	0.496741	0.24675145	0.854678	0.730475	-0.72124
-0.01672	-0.08063	0.00650059	-0.57737	0.333353	5.822744
-0.29134	0.08384	0.00702919	0.164466	0.027049	0.712222
0.030634	0.333207	0.11102688	0.249367	0.062184	11.87707
-0.01219	0.054959	0.00302054	-0.27825	0.077422	-3.51023
0.153421	-0.25077	0.06288324	-0.30572	0.093468	-0.63449
0.61173	0.222217	0.04938036	0.472982	0.223712	1.36326
0.940076	-0.15732	0.02474828	-0.37953	0.144045	0.832656
0.711879	0.018691	0.00034935	0.176007	0.030978	1.026256
0.638117	1.017965	1.03625252	0.999274	0.998549	2.595263
0.755514	-0.1052	0.01106705	-1.12316	1.261499	0.860757
1.359804	-0.45088	0.20328959	-0.34568	0.119492	0.668425
1.221372	-0.23952	0.05736905	0.211358	0.044672	0.803894
1.193512	0.571968	0.32714718	0.811486	0.65851	1.479231
1.049563	0.003271	1.0702E-05	-0.5687	0.323416	1.003117
0.219631	-0.01149	0.00013192	-0.01476	0.000218	0.947706
0.388566	-0.14854	0.02206551	-0.13706	0.018785	0.617711
0.329299	0.034542	0.00119316	0.183087	0.033521	1.104896
-0.17633	0.006058	3.6698E-05	-0.02848	0.000811	0.965644
0.896004	0.423216	0.17911164	0.417158	0.174021	1.472337
0.794251	-0.14394	0.02071782	-0.56715	0.321662	0.818777
1.193515	-0.65412	0.42787091	-0.51018	0.260285	0.451939
0.138069	0.070077	0.00491072	0.724195	0.524458	1.507547
0.245887	0.236268	0.05582235	0.166191	0.027619	1.960877
0.181598	0.058424	0.00341336	-0.17784	0.031628	1.321722
-0.61433	-0.77775	0.60489046	-0.83617	0.699182	1.366
		3.79598995		7.651519	
			2.015685		

## **Research Bibliography**

Aaron, Henry J. and Pechman, Joseph A. (1981), *How Taxes Affect Economic Behaviour*, Washington: Brooking Institution.

Abd El-Salam, M. El-Fallah, 2011, A Modification of the Ridge Type Regression Estimators, *American Journal of Applied Sciences* 8 (1): 97-102.

Abdulmagid M. Mayet, 2009, *The Tax System in Libya*, Libyan British Business Council available in :  
<http://www.lbbc.org.uk/Portals/0/O%20&%20G%20Presentation%202.d oc> , Accessed 10.06.2009 .

Abidar, Ali .; Laytimi, Ahmed.; 2005, national agriculture policy – Libya, MEDFROL project , market and trade policies for Mediterranean agriculture, sixth framework programme priority 8.1.

ABRIGGS; Libya Business; available in :  
[http://www.abriggs.com/visas/1/libya\\_visa.php](http://www.abriggs.com/visas/1/libya_visa.php) ; accessed 20.06.2009 )

Abu-Hammour, M. N. (1997), *The Measurement of Taxable Capacity in Jordan*, Ph.D thesis, University of Surrey.

Adanu, Kwami., Sun, Lili .," On the relationship between the tax burden and income convergence : some further results ", department of Economics , university of Victoria , working paper EWP0205 , September 2002 , Canada.

African Economic Outlook; *Public Resource Mobilisation and Aid in Africa*. Retrieved 25 January 2011, from  
<http://www.africaneconomicoutlook.org/en/in-depth/public-resource-mobilisation-and-aid/the-state-of-public-resource-mobilisation-in-africa/tax-effort/>.

African Economic outlook, 2010, *public resource mobilization and aid in Africa* , part two , AFDB/OECD .

Agbeyegbe, T.; J. Stotsky.; and A. WoldeMariam.; 2004 , *Trade liberalization, exchange rate changes and tax revenue in sub-saharan Africa*, working paper No.04/178, International Monetary Fund, Washington, DC.

Ajam, Maithem ; " The public finance - applied study on the Libyan economy", the National Authority for Scientific Research and the Arab

Development Institute, 1992.

Al Mutawkel, Mustafa Husain (2000), *Determinants of Taxable Capacity in Developing Countries: Case Study Yemen*, Emirates Centre for Strategic Researches and Studies, Abu Dhabi, United Arab Emirates.

Al-Ali, Adel; Sulaiman, abd al-Hamid ; "The impact of public revenues on the development of current expenditures ", *Journal of Development of Rafidain*, No.25, 1988.

Alison Al-Baddawy ,  
[http://www.animaweb.org/en/pays\\_libye\\_pourquoiinvestir\\_en.php](http://www.animaweb.org/en/pays_libye_pourquoiinvestir_en.php),  
 retrieved 15.06.2009 ).

Allan, Charles M. (1971), *The theory of Taxation*, Harmondsworth, Penguin.

Alwaily, Y.M.S.( 2006 ), *Fiscal Policy in the Sultanate of Oman : Examination of the Role of the Taxation System in Financing Budget Deficit by Measurements of Taxable Capacity during 1981-2000*, PhD thesis, university of Exter, 2006.

Amin, Aloysius Ajab,(2008 ),*Developing a sustainable economy in Cameroon .*, African Books Collective .

ANIMA , investment network, *How to invest in Libya* , available in [http://www.animaweb.org/en/pays\\_libye\\_pourquoiinvestir\\_en.php](http://www.animaweb.org/en/pays_libye_pourquoiinvestir_en.php) ,  
 retrieved 16.06.2009 .

Arabic Hellenic chamber of commerce & development ; country profile Libya , available : ; accessed 10.06.2009 ) ; accessed 10.06.2009.<http://www.arabgreekchamber.gr/en/arabworldFIXmore.asp?ArWID=14>

Askari, Hossein, Cummings, G. Thomas and Glover, M. (1982), *Taxation and Tax Policies in the Middle East*, London; Butterworth Scientific.

Atrostic, B. K., Nunns, James R. (1991). *Measuring Tax Burden: A Historical Perspective*. In Berndt, Ernst R. and Triplett, Jack E (Eds.), *Fifty Years of Economic Measurement: The Jubilee of the Conference on Research in Income and Wealth*. University of Chicago Press.

Auerbach, Allan J, 1985 , 'The Theory of Excess Burden and Optimal Taxation' in Alan J. Auerbach and Martin Feldsten (eds) *Hand Book of Public Economics*, Volume 1, Amsterdam: Elsevier Science Publishers.

Baer, Werner. Galvao, Antonio. (2005), " Tax burden, Government expenditure and Income distribution in Brazil .", CIBER series papers .

Bahl, R.; Tumennasan, B. (2002), How should revenues from natural resources be shared in Indonesia? , Georgia state university.

Bahl, Roy W, 'A Regression Approach to Tax Effort and Tax Ratio Analysis' IMF Staff Papers, Vol. 18, September 1971, pp. 570-608.

Bahl, R.W, 1972," A Representative tax system Approach to Measuring tax Effort in developing countries",I.M.F staff papers, vol(XIX),No:1, March,pp:87-124.

Barth, Richard.; Hemphil, William .; Angnina, Irina .( 2000 ) , Financial programming and policy: The case of Turkey ., International Monetary Fund .

Basdas , Ulkem,2009 , lead-lag relationship between the spot index and futures price for the turkish derivatives exchange; Middle East Technical University, Department of Business Administration , Ankara, Turkey.

Batah, Feras .; and Gore S. Damodar .,( 2009), ridge regression estimator: combining unbiased and ordinary ridge regression methods of estimation., Surveys in Mathematics and its Applications., Volume 4 , pp.), 99 – 109.

Begum, Lutfunnahar, 2007, A panel study on tax effort and tax buoyancy with special reference to Bengladesh, Bengladesh Bank , WP 0715.

Berglof, Erik., Vaitilingam, Romesh.( 2000 )., Stuck in transit : rethinking Russian economic reform., Centre for Economic Policy Research.

Bird, Richard M., and Oldman, Oliver ,1990. Taxation in Developing Countries. Baltimore: The Johns Hopkins University Press.

Bird, Richard M.; Martinez-Vazquez , Jorge., and Torgler, Benno .,( 2007 ) ., Tax effort : the Impact of Corruption, Voice and Accountability, University of Toronto , Canada , ITP Paper 0702.

Black, John (1997), Oxford Dictionary of Economics, Oxford University Press.

Brown, C. V. and Dawson, D. A. (1969), Personal Taxation, Incentive and tax reforms, Political and Economic Planning (PEP) .

Buchanan, J., and Lee, D., " Tax Rates and Tax Revenues in Political Equilibrium:

Burke, Orlaith; 2010; More Notes for Least Squares ; Department of Statistics ; University of Oxford.

Burkhead, Jess. Miner, Jerry. (2007)., Public Expenditure ., Transaction publishers .

Burt, Oscar R.; Frank, Michael D.; Beattie, Bruce R.; 1987, Prior Information and Heuristic Ridge Regression for Production Function Estimation, Western Journal of Agricultural Economics, Western Agricultural Economics Association, 12(2): 135-143.

Carvalho,S.P.; Cruz, C.D. 1996., Diagnosis of multicollinearity: Assessment of the condition of correlation matrices used in genetic studies.; Brazillian journal of Genetics, 19, 3,479-484.

Charles-Coll, Jorge A. (2011); Understanding income inequality: concept, causes and measurement. International Journal of Economics and Management Sciences Vol. 1, No. 3.

Chelliah ,Raja J. ; Bass , Hassel J. and Kelly ,Margeret R. , `` Tax Ratios and Tax Effort in Developing countries 1969-71 `` , I.M.F , Staff papers , vol : XXII , No :1 , March 1975.

Chelliah, Raj , 'Trends in Taxation in Developing Countries' IMF Staff Papers, Vol. 18, July 1971, pp254-327.

Clark,B. Political Economy: A Comparative Approach, 2nd ed. (Westport, CT: Praeger, 1998) , p.xi, Questia, Web, 20 Apr. 2011.

Cliffsnotes , 2011 , [http://www.cliffsnotes.com/study\\_guide/Consumer-Surplus.topicArticleId-9789,articleId-9756.html](http://www.cliffsnotes.com/study_guide/Consumer-Surplus.topicArticleId-9789,articleId-9756.html); accessed 16.07.2011.

Connolly, S. and Munro, A. "Economics of the public sector ", 1st edition , 1999 , pearson Education Ltd , England .

Constantin,T .; Carmen, M.; Liana ,S.; Luminita, P. (2010) .; Equity and income tax redistribution ;. University of Oradea, Annals of Faculty of Economics, vol. 1, issue 2.

Corden, W. Max (1997) , Trade Policy and Economic Welfare, Clarendon Press. ,Oxford. Publication.

Country Commercial Guide; 2008, available in:  
[http://libya.usembassy.gov/uploads/images/Ctlb\\_B9GaiYq1ai9cp4AQ/](http://libya.usembassy.gov/uploads/images/Ctlb_B9GaiYq1ai9cp4AQ/)

021108\_-\_2008\_Country\_Commercial\_Guide.pdf; retrieved 18.06.2009.

Creedy , John , 2000 , Measuring welfare changes and tax excess burden of taxation , Blackwell publishers Ltd , Oxford , UK .

Creedy, John. 2004 , The Excess Burden of Taxation, The Australian Economic Review, vol. 37, no. 4, pp. 454–64.

Creedy , John. 2006 , How to Calculate Welfare Measures Using Only Marshallian Demand Functions., The Australian Economic Review, vol. 39, no. 3, pp. 340–6.

Crouse,Robert H.; Jin , Chun ,( 1995 ), Unbiased ridge estimation with prior information and ridge trace ., Communications in statistics – theory and methods , vol.24, No.9, pp. 2341-2354.

Crown ,William H.,1998,Statistical Models for the Social and Behavioral Sciences:Multiple Regression and Limited-Dependent Variable Models., Praeger Publishers ., Westport, CT.

Cullis, John G. and Jones, Philip (1992), Public finance and public choice: analytical perspectives, London: McGraw-Hill.

Cunningham, Stephen. TOWARDS THE INCREASED POLICY RELEVANCE OF FISHERIES RESEARCH , FAO , Circular No. 964 , Italy, 22-24 February 1999.

Currie, J M .; Murphy, J A .; Schmitz A .; The concept of economic surplus and its use in economic analysis .; The economic journal , December 1971, No.324; Vol.LXXXI.

Dalton, Hugh (1961), Principles of Public Finance, London; Routledge.

Danielson, Anders.; The Economic Surplus: Theory, Measurement, Applications ; praeger publishers; Westport, CT. ; 1994.

Datta,G., ( 1977 ), " Tax Ratios and tax structures in O.E.C.D countries "

Davoodi, Hamid R.; Grigorian, David A., 2007, Tax potential vs. tax effort : A cross-country analysis of Armenia's stubbornly low tax collection, working paper No.07/106, International Monetary Fund, Washington, DC.

Daxon, T., Enevoldsen, D J.," State and local tax burdens – how Oklahoma compares , fiscal year 1995 " , Oklahoma Office of state

- Finance , December 1998 , USA . Available from :  
<[www.state.ok.us/osfdocs/taxbrd99.pdf](http://www.state.ok.us/osfdocs/taxbrd99.pdf). > [ Accessed 16 May 2009 ].
- De Santis, Roberta, Mercuri, M.Cristina., Vicarelli, Claudio. (2001 ),  
Taxes and location of foreign direct investment., Institute for studies and  
Economic Analysis ( ISAE ), Rome.
- Deepashree (2006), Microeconomics and Macroeconomics Environment  
for CA PE- I ., McGraw Hill Education.
- Dhamija, A. Kumar, 2010, The impact of corporate Governance on the  
financial performance, Indian institute of technology.
- Dirk Vandewalle, Libya since Independence: Oil and State-Building  
(Ithaca, NY: Cornell University Press, 1998) , p.13, Questia, Web, 9 July  
2011.
- Dornfest, Alan S., 2004, comparative tax potential : tax burden in Idaho  
and the united sates , Idaho state tax commission.
- Dorugade, A. V. ; Kashid, D. N., 2010 , Alternative Method for  
Choosing Ridge Parameter for Regression, Applied Mathematical  
Sciences, Vol. 4, 2010, no. 9, 447 – 456.
- Dougherty, Christopher, 2007, Introduction to econometrics, Oxford  
university press.
- Doviak, Eric, 2010, Income inequality and health insurance, PhD  
dissertation, the city university of New York, ProQuest LLC.
- Economic research centre, Total Economic , financial and demographic  
data in Libya during 1962-2006, Benghazi, Libya , July 2009.
- Economic Report of the President, 2004, Tax Incidence: Who Bears the  
Tax Burden? , The annual report of the council of economic advisers, the  
Congress of the United States.
- Edward H. Crane, and David Boaz, eds., Cato Handbook for Congress:  
Policy Recommendations for the 108th Congress (Washington, DC:  
Cato Institute, 2003) , p.244, Questia, Web, 19 June 2011.
- Egyptian Export Promotion Center; Libyan country profile taxation trade  
issues, available in : [http://www.eepc.gov.eg/fita/fiscalite\\_92.html](http://www.eepc.gov.eg/fita/fiscalite_92.html) ,  
retrieved 15.07.2009 .
- El-Dereny, M. ; Rashwan ,N. I., 2011, solving multicollinearity problem

using ridge regression models , Tanta University, Faculty of Commerce, Egypt , Int. J. Contemp. Math. Sciences, Vol. 6, 2011, no. 12, 585 - 600

El neihom , some features of Libyan income tax law , available in [www.libyantaxadvisor.com](http://www.libyantaxadvisor.com) , retrieved 29.05.2007 .

Eltony, M. N. (2002). The Determinants Of Tax Effort In Arab Countries. Arab Planning Institute, Working Paper No.207: pp.1-20.

Emporiki Bank ; country trading profile ; available in : <http://emporikitrade.com/uk/countries-trading-profiles/libya/market-access> ; accessed 20.06.2009 .

Encyclopedia of the Nations ; Libya - Customs and duties ; available in : <http://www.nationsencyclopedia.com/Africa/Libya-CUSTOMS-AND-DUTIES.html>; accessed 25.06.2009 )

Entin, Stephen J., 2004, " Tax incidence, Tax burden, and tax shifting: who really pays the tax? " , institute for research on the economics of taxation , USA,September , Also available from :<[www.iret.org/pub/BLTN-88.PDF](http://www.iret.org/pub/BLTN-88.PDF) > [ Accessed 16 May 2009 ] .

Ethington ,Bunty , 2011 , Statistical Methods Applied to Education (II) , Chapter 18: Multiple Linear Regression (Cont.), The University of Memphis .; Counseling, Educational Psychology, & Research.

Farhoud, Mohammed Said, (1994), Principle of Public Finance, University of Halab, Syria.

Field, D. B. and Stanbury, W. T, 'Incentives, Disincentives and the income Tax; Further empirical evidence' Public Finance, Vol. 25, 1970, pp381-415.

Flemming, J. and Oppenheimer, P, 'Are Government Spending and Taxes Too High (or Too Low)? National Institute Economic Review, 1996; 157; 58-76.

Foreign Affairs and International Trade Canada; available in [http://www.international.gc.ca/trade-agreements-accords-commerciaux/goods-produits/ac\\_link.aspx?lang=eng](http://www.international.gc.ca/trade-agreements-accords-commerciaux/goods-produits/ac_link.aspx?lang=eng); accessed 16.07.2009.

Foster, John Bellamy.; Monopoly Capital and the New Globalization. ; Monthly Review. January 2002; Volume: 53. Issue: 8.

freedom house , countries at the crossroads 2007 , country report, libya ;

available in :

<http://www.freedomhouse.org/modules/publications/ccr/modPrintVersion.cfm?edition=8&ccrpage=37&ccrcountry=160> , accessed 20.06.2009 )

Fullerton, Don, 'On the Possibility of an Inverse Relationship between Tax rates and Government Revenues' *Journal of Public Economic*, Vol. 19,1982, pp. 3-22.

FXwords , 2011 , <http://www.fxwords.com/e/economic-surplus.html> ; accessed 16.07.2011.

Gale, Thomson, 2007; Taxation Libya; Worldmark Encyclopedia of the Nations ;2007. Encyclopedia.com; available in <http://www.encyclopedia.com/doc/1G2-2586700107.html#TAXATION> Libya ; retrieved 5 Jun. 2009 .

Getis A, Griffith D A, 2002, "Comparative Spatial Filtering in Regression Analysis", *Geographical Analysis*, vol. **34**, 130-140.

Ghadban Khalaf and Ghazi Shukur , " Regression Analysis and Time Series Choosing Ridge Parameter for Regression Problems , *Communications in Statistics—Theory and Methods*, 34: 1177–1182, 2005.

Ghanem, Shokri; “Oil and the Libyan economy”, Arab Development Institute, Beirut, 1985.

Gidirin, Vladimir (2011), *The 2011 global executive – individual tax, social security and immigration.*, EYGM limited.

Gillis, Malcolm (Edt.) ,1989, *Tax Reform in Developing Countries*, Duke University Press, Durham, NC.

Goode, Richard. (1984)., *Government finance in developing countries* , Brookings institution press.

Govinda, Rao M.; Choudhury, Mita and Anand, Mukesh , (2005) . “Resource Devolution from the Centre to States: Enhancing the Revenue Capacity of States for Implementation of Essential Health Interventions” ; National Institute of Public Finance & Policy, MPRA Paper No. 24387.

Gravelle, Jane G. ; Shvedov, Maxim; 2004 , *Distribution of the Tax Burden Across Individuals: An Overview*; The Library of Congress , Order Code RL32693.

Green, W. H., 2002, LIMDEP version 8.0 econometric modelling Guide , Plainview , NY. Econometric software, Inc., pp.E14-9 – E14-11, vol.1.

Greene, William, "Econometric analysis of panel data " , Neww York university , Leonard N. stern school of Business . <http://goo.gl/OT1y1>, accessed 02.02.2012.

Griffiths A. and Wall, S. (2001) Applied Economics (9th edn), Harlow: Pearson Education Ltd.

Gruber, Jonathan, " Public finance and public policy". New York, NY: Worth Publishers, c2005, 2004.

Guiar, C.N, 1987, Using Ridge Regression in systematic pointing error corrections, TDA progress report, 42-92.

Gujarati, Damodar N. (2004), "Basic Econometrics" , McGraw-Hill companies ; fourth edition .

Gupta, Abhijit Sen ; 2007 ; Determinants of Tax Revenue Efforts in Developing Countries ; IMF working paper, wp/07/184.

Gupta, J.R.,( 2007 )., Public Economics In India , Theory and Practice., Atlantic publishers.

Gupta, Jarak Raj. (2001 )., Fiscal deficit of states in India ., Atlantic publishers .

Hana Polackova Brixi , Christian M. A. Valenduc , Zhicheng Li Swift , "Tax Expenditures--Shedding Light on Government Spending through the Tax System: Lessons from Developed and Transition Economies" , October 2003 by World Bank.

Harly.H.Hinrich,"determinants of government revenue shares among Less-developed countries ",the Economic journal, Vol. 75, No. 299, September, 1965, pp. 546-556.

Harney, Theodore., 2007, The global human right to health, MacDonald Radcliffe publishing .

Haughwout, Andrew .; Inman, Robert .; Craig, Steven.; and Luce, Thomas .; 2004, Local revenue hills: evidence from four U.S. cities.; Harvard College and the Massachusetts Institute of Technology.; The Review of Economics and Statistics, May 2004, 86(2): 570–585.

Haykl,Abdalaziz; "Encyclopedia of statistical and economic terms," al nahda alarabia Publishing House, 1980.

- Heady, C. (1996). "Optimal Taxation as a Guide Tax Policy". *The Economics of Tax Policy*. M. P. Devereux (ed.). New York, Oxford University Press Inc. pp.23-54.
- Heady, C., "The Structure of Income and Commodity Taxation", pp. 186-216 in P. G. Hare (ed.), *Surveys in Public Sector Economics*, Oxford: Basil Blackwell, 1988.
- Heady, C, 'Optimal Taxation as A guide to Tax Policy: A Survey' *Fiscal Studies*, Vol. 14, No. 1, 1993, pp 15-41.
- Henry J. Aaron, and Harvey Galper, *Assessing Tax Reform* (Washington, DC: Brookings Institution, 1985), p.20, Questia, Web, 9 July 2011.
- heritage foundation, 2009 index of Economic freedom; available in <http://www.heritage.org/Index/Country/Libya>; accessed 11.06.2009)
- Hintze, Jerry L (ed.), 2007, Ridge regression, Number Cruncher Statistical System, NCSS user's Guide III, available from [www.NCSS.com](http://www.NCSS.com), Accessed 10.04.2010.
- Hiti, A.; Khalaf, F.; Altai, O., 2008, The inflation in the Iraqi economy in the period 1990-2007, department of Banking and finance, university of Mosul, Iraq.
- Hoek, van der., Peter, M. (2008), *Enlarging the European Union: Taxation and Corruption in the New Member States*. Published in: *Taxation and Public Finance in Transition and Developing Economies*, pp. 11-23.
- Hoek, V. D., 2008, Corruption in post-Communist Europe: Does it affect taxation and FDI?, *Bulletin of the Transilvania university, Romania*, vol.1, No.50.
- Hope, K Ronald, (1996), *Development in the Third World: From Policy Failure to Policy Reform*, M. E. Sharpe, and Armonk, NY.
- Howard, Michael.; *Public Sector Economics for Developing Countries* (Barbados: University Press of the West Indies, 2001), Questia, Web, 25 Apr. 2011.
- Howard, Michael; *Public Finance in Small Open Economies: The Caribbean Experience* (Westport, CT: Praeger Publishers, 1992), Questia, Web, 24 Apr. 2011.
- Hsing, Yu (1996). "Estimating the laffer curve and policy implications".

Journal of Socio-Economics, vol.25, No.3, pp 395-401.

INDEVELOPMENT; industrialization & related policies; March, 2006.

Jahufer, Aboobacker.; Jianbao , Chen., 2008, Assessing global influential observations in modified ridge regression , Department of Mathematical Sciences, Faculty of Applied Sciences, South Eastern University of Sri Lanka, Sri Lanka.

James, .S and Nobes, C , " The economics of taxation , principles , policy and practice ",7th edition ,2004/2005, pearson Education Ltd , England.

James, Simon and Nobes, Christopher (1996), The Economic of Taxation, Deddington: Philip Allan.

Janakiraman. T., 1980, MRR. a new approach to ridge regression using SAS, Miles Laboratories, Inc. , Lawrence Marsh, University of Notre Dame.

Javad Khalizadeh-shirazi and Anwar Shah, "Tax policy in developing Countries ", the world Bank, A world Bank Symposium, Washington, D.C., 1991.

Joseph P. Crockett, The Federal Tax System of the United States: A Survey of Law and Administration (New York: Columbia University Press, 1955), Questia, Web, 20 Apr. 2011.

Kamoche, Ken N. ; Debrah , Yaw A.; Horwitz, Frank M.; Muuka , Gerry Nkombo (editors), 2003, Managing Human Resources in Africa. New York. P.172.

Kataneh ,Kayri ; " the tax income trends in Jordan and the factors affecting them " , Al-shabab printing press , Jordan , Oman, 1998 .

Kestens,Yan ., 2004, Land use, accessibility and household profiles: their effects on residential choice and house values , PhD thesis , Faculty of architecture, planning and visual arts, Laval university , Quebec , Canada.

Kiefer, Donald W, 'An Economic Analysis of the Kemp/Roth tax Cut Bill H. R. 8333; A Description, an Examination of its Rational and Estimate of its economic effects' in Arthur B. Laffer and Jan P. Seymour, (eds), The Economics of the Tax Revolt; A Reader, 1978, pp13-27.

Kohli , Atul.; Chung-In Moon .; Sørensen ,George .; 2003 ; States,

Markets, and Just Growth: Development in the Twenty-First Century.; United Nations University Press. Place of publication: New York.

Koutsoyiannis A., 1992, Theory of Econometrics – An introduction exposition of econometric methods, Macmillan.

Kumar, P. C. Internal Sources of Development Finance: Concepts, Issues, and Strategies (Westport, CT: Quorum Books, 1994), Questia, Web, 25 Apr. 2011.

Kutner, Nachtsheim, Neter, Applied Linear Regression Models, 4th edition, McGraw-Hill Irwin, 2004

Layachi ,Azzedine (editor) , 1998, Economic Crisis and Political Change in North Africa, Praeger Publishers; Westport, CT.

Le Minh,Tuan., Blanca, Moreno-Dodson., and Rojchaichanthorn, Jeep., "Expanding taxable capacity and reaching revenue potential: cross-country analysis", The world Bank , March 2008 , policy Research working , paper No.4559, pp.1-36.

Leuthold, J .H ,(2002), " Tax effort in China ", [online]. Available from:

<<http://www.business.uiuc.edu/leuthold/resume/Presentations/Tax%20Effort%20in%20China.pdf> > [Accessed 29 October 2008].

Leuthold, J. H. (1991). "" Tax Shares in Developing Economies: A panel Study ". Journal of Development Economics, Elsevier Science publishers B.V. , North-Holland , vol.35: 173-185.

Leuthold, Jane H, 'Tax Shares in Developing Countries; A Panel Study' Journal of Development Economics, Vol. 35, Issue 1, January 1991, pp. 173-185.

Libya tax resources, 2009, <http://countrycodes.boomja.com/Libya-Tax-Resources-4253.html>; retrieved 15.07.2009.

Libyan Arab Republic (1974), Ministry of Planning and Research, National Accounts for the period (1971-73).

Libyan British Business Council; Building Business Bridges with Libya; available in : [www.lbbc.org.uk/Portals/0/DOING\\_BUSINESS\\_IN\\_LIBYA.doc](http://www.lbbc.org.uk/Portals/0/DOING_BUSINESS_IN_LIBYA.doc) - ; accessed 16.07.2009 .

Libyan stock market , 2010 , <http://lsm.ly/English/managment/Pages/History.aspx> , accessed

25.01.2010.

Lindsay, C. M, 'Two Theories of Tax Deductibility' National Tax Journal, Vol. 25, Issue 1, March 1972, pp. 43-52.

Lindsey, B. Lawrence. 1987. Individual taxpayer response to tax cuts: 1982-84: With implications for the revenue maximizing tax rate. Journal of Public Economics 33:173-206.

Lotz,J.R and E.R.Morss,1967,"Measuring tax Effort in developing countries ", I.M.F staff papers,vol:14,pp:478-499.

Lotz,J.R and E.R.Morss,1970," A theory of tax level Determinants for developing countries ",Economics development and cultural change, vol:18,April,pp:328-341.

Lymer, A. and Hancock, D. (2002) Taxation; Policy and Practice, London: Thomson Learning.

MacDonald, Theodore Harney., (2007), The global human right to health., Radcliffe publishing .

Mahmud, M , B ; "Accounting and the economic development of the oil and Gaz sector in Libya : Historical review, theoretical analysis and empirical investigation " ; PhD thesis ; the university of Dundee ; 1997.

Malik, Anas.( 2010 ), Political Survival in Pakistan ., Taylor&Francis publishers .

Malki, A (1978), Dispensing with Official Foreign Resources in Jordan: A Disaggregated Projection Model, Ph. D Thesis, University of Leeds, School of Economic Studies, Leeds.

Mankiw, N. Gregory (2003), Macroeconomic, Worth Publishers, Fifth Edition.

Marar, Faisal and El-hindi , Adnan , 1980, " Principles of the public financial management and its economics – part one " Jordanian printing press , first edition .

Mariolis, I.G. and Dermatas, E.S., 2001, Automatic quality control of seam puckers based on shadow detection, The General secretariat of Research and Technology and ELKEDE, project No. 3049.

Maroun, Warren.,(2010).," Does capital tax add to or detract from the fairness of south African tax system?", University of Witwatersrand, South Africa .

- Martin, Alison., and Lewis, W. Arthur .,(1956)," Patterns of public Revenue and expenditure" , The Manchester school of Economic and social studies , September , vol. XXIV, pp.203-44.
- Mattoon, Richard H.; Testa, William A.; "New Developments in State Business Taxation: a Conference Summary," Chicago Fed Letter , Issue: 240a ,2007 .
- Mertens , Jo Beth ( 2003 ) , “Measuring Tax Effort in Central and Eastern Europe,” Department of Economics , Hobart and William Smith Colleges, Public Finance and Management , Vol.3, No.4.
- Mirrlees , James .; and others ,( 2010 ) , DIMENSIONS OF TAX DESIGN , Institute for Fiscal Studies , oxford university press.
- Montgomery,D.C.; Peck, E.A. 1981. Introduction to Linear Regression Analysis. John Wiley&Sons, New York.
- Musgrave, R., and Musgrave P.,( 1989 )., Public Finance in Theory and Practice, Fifth Edition, McGraw-Hill, U. S. A.
- Musgrave, Richard A. (1959), " The theory of public finance : A study in public Economy " , international student Edition , McGraw-Hill Book Company , INC. New York, spring , pp.211-217.
- Muslim countries trade network; Libya; customs taxation; 2009, available at [http://www.muslimtrade.net/tradeguideline/libya/#\\_Toc413609644](http://www.muslimtrade.net/tradeguideline/libya/#_Toc413609644); accessed 10.06.2009.
- Myers, Jerome L.; Well, Arnold D.; 1995; Research Design and Statistical Analysis. Lawrence Erlbaum Associates. Hillsdale, NJ.
- Nasser, Alan G .; The Tendency to Privatize; Monthly Review. Volume: 54. Issue: 10; March 2003.
- Nation Master, 2005 , [http://www.nationmaster.com/graph/eco\\_gdp-economy-gdp&date=2005](http://www.nationmaster.com/graph/eco_gdp-economy-gdp&date=2005) , accessed 25.01.2010.
- Nedret Billor & R. M. Loynes,” An application of the local influence approach to ridge regression" , Journal of Applied Statistics, Vol. 26, No. 2, 1999, p.177.
- Newlyn, W. T, 'Measuring Tax Effort in Developing Countries' Journal of Development Studies, Vol. 21, Issue 3, April 1985, pp390-405.

Niblock , Tim .,2001, *Pariah States & Sanctions in the Middle East: Iraq, Libya, Sudan.*; Lynne Rienner.; Boulder, CO. Publication .

Nisticò , Sergio.; Tosato , Domenico . ed ; *Competing Economic Theories: Essays in Memory of Giovanni Caravale*; Routledge; London;2002.

Okech, Timothy C.; Mburu, Peter G., 2011, analysis of responsiveness of tax revenue to changes in national income in kenya between 1986 - 2009., *International Journal of Business and Social Science Vol. 2 No. 21 (Special Issue )* November.

O'Leary, Brendan.; Lustick, Ian S. ; Callaghy ,Thomas., 2001, *Rightsizing the State: The Politics of Moving Borders.* ,Oxford University Press.

Oshima, Harry, (1957), " Share of Government in Gross National Product for Various countries ", *American Economic Review* , June, pp.381-90.

Palanisamia K.; and others .; *Evaluation of Watershed Development Programmes in India Using Economic Surplus Method*; *Agricultural Economics Research Review* ;Vol. 22 July-December 2009.

Patrick Honohan , " *Taxation of Financial Intermediation: Theory and Practice for Emerging Economies*" Oxford University Press, June 2003.

Pestieau, Pierre, 2006, *The Welfare State in the European Union: Economic and Social Perspectives.* Oxford University Press, Oxford, England.

Piancastelli, Marcelo, 2001, *Measuring the tax effort of developed and developing countries*, The institute for applied economic research IPEA, work paper No. 818 .

Pindyck, Robert S. and Rubinfeld, Daniel L. (1997), *Microeconomics*, London: Fourth edition, Prentice Hall.

Plasschaert,S.,(1962),"Taxable capacity in developing countries", *International Bank for reconstruction and development* , Report No.EC-103, Washington.

Polhemus, Neil W.,( 2005 ), *How To: Deal with Multicollinearity When Fitting a Regression Model Using STATGRAPHICS Centurion* ,

StatPoint, Inc.

Pollack, Sheldon D., 1996, *The Failure of U.S. Tax Policy: Revenue and Politics*. , Pennsylvania State University Press, University Park, PA.

Prest, A.R., (1978), "The taxable capacity of a country ", in *Taxation and Economic development*, Edited by Toye , J . Frank Cass & Co. Ltd, chapter ( 1 ) , pp.13-31.

Radian, Alex, (1980)., *Resource mobilization in poor countries* ., Transaction publishers.

Rahuma, Ali , 1978 , *Application and evaluation of ridge regression to selected empirical economic models*, Department of Agricultural and Resource Economics , Oregon State University.

Rajagopalachar, K. (1993 )., *Business Economics*., Atlantic publishers .

Ramanujam, T.C.A., (2006), "How near is India to its taxable capacity?" , *Business Line*.

Ravestein, Van A. and Vijibrief, H, 'Welfare Cost of Higher Tax Rates: An Empirical Laffer Curve for the Netherlands' *De Economist*, Vol. 136, Issue 2, July 1988, pp. 205-219.

Rice, Steven J, "Introduction to Taxation", South-Western Educational Publishing SOUTH WESTERN EDUC PUB, Dec 1994.

Roberti, P. (1992). *Measures of Tax Effort Revisited: from Summary to Decomposable Tax Ratios*. *Rivista di politica Economic*, No.6, June, pp.91-123.

Rohde, Nicholas. (2007); *Derivation of Theil's Inequality Measure from Lorenz Curve.*; The university of Queensland, Australia.

Rosen, Harvey S, 'Taxes in a Labour Supply Model with Joint Wage-Hour Determination' *Econometrica*, Vol. 44, No. 3 (May, 1976), pp 485-507.

Rosen, Harvey S. "Public finance ", Edition: 7th ed. , Boston : London : McGraw-Hill, 2004.

Rutherford, Donald., 1995, *Routledge Dictionary of Economics*, Routledge, London and New York .

Rutherford, Donald, (2002) , *Routledge Dictionary of Economics* , Second edition , Routledge; Taylor & Francis Group . , London and New

York.

Ryan, Curtis R., 2002, *Jordan in Transition: From Hussein to Abdullah*, Lynne Rienner , Boulder, CO.

Salmore, B. G., Salmore , S. A., 2008, *New jersey politics and Government*, Rutgers university press.

Salvatore, Dominick.; Reagle, Derrick , 2002, *theory and problems of statistics and econometrics* , second edition , Schaum's outline series, McGraw-Hill .

Sandmo, A, 'Optimal Taxation: An Introduction to the literature' *Journal of Public Economics*, Vol. 6, 1976, pp. 37-54.

Sarojini, M, 'Federal Transfers and Tax Effort', *Indian Journal of Economics*, Vol. 73, Issue No. 289, October 1992, pp. 145-158.

Shamsub, H., Akoto, J.B., 2004, *State and local fiscal structures and fiscal stress*, *Journal of public budgeting*, vol.16, issue.1.

Shin, Kilman, 'International Difference in Tax Ratio' *The Review of Economics and Statistics*, Vol. 51, No. 2, May 1969, pp. 213-220.

Shome, P .; " Tax reform in Latin America ", *Journal of Finance and Development*, March 1995, Vol (32), No.1.

Snider, Lewis W.( 1996 ) , *Growth, Debt, and Politics: Economic Adjustment and the Political Performance of Developing Countries.* , Westview Press. , Boulder, CO. Publication Year: 1996.

'Some Simple Analytics', *Economic Inquiry*, Vol. 20 (July 1982), pp. 344-54.

Sookram, Sandra; Saridakis, George ( 2009 ).; *The Effect of Economic Factors on the Tax Ratio in Trinidad and Tobago* , *The Journal of Developing Areas*; Vol. 42. No. 2. Spring 2009.

Stiglitz, J.E.(1999), " *Economics of the public sector* " , (3.ed), New York : ww. Norton & Company Ltd.

Stiglitz, Joseph E. .; Ocampo, Antonio, Spiegel, Shari .; French-Davis, Ricardo .; Nayyar, Deepak .; 2006, *Stability with Growth: Macroeconomics, Liberalization and Development*. Oxford University Press, New York.

Stotsky, J. G., Asegedech, WoldeMariam (1997). "Tax Effort In Sub-Saharan Africa." International Monetary Fund (IMF) Working Paper No:107,september.

Stuart, Charles E, 1981. "Swedish Tax Rates, Labor Supply, and Tax Revenues," Journal of Political Economy, University of Chicago Press, vol. 89(5), pages 1020-38, October.

Sultan, Abdussalam; how to do business in Libya; available in <http://www.sat.ly/business.htm> , retrieved 30.06.2009 ).

Szarowska, Irena, 2010. "Changes in taxation and their impact on economic growth in the European Union," In : School of Business Administration , MPRA Paper 32354, University Library of Munich, Germany.

Tait, Alan A. and Eichengreen, `Two Alternative Approaches to the International Comparison of Taxation" IMF Department Memorandum 78/73,1978, Washington: IMF.

Tait, Allan, 'Not So General Equilibrium and Not So Optimal Taxation' Public Finance, Vol. 44, No. 2,1989, pp. 169-182.

Tait,Gratz and Eichengreen,"international comparisons of Taxation for selected Developing countries ,1972-1976", I.M.F , staff papers ,vol(26),No(1),March1979 pp.123-56.

Tanzi, Vito and Zee, Howell, 'Tax Policy for Developing Countries' Economic Issues, No. 27, IMF, March 2001.

The Business Environment, from: <http://www.abdc-ly.com/ourbusiness.htm> , retrieved 6.07.2009 .

The General people's committee of planning, "Economic and social achievements 19 " , January 1989.

The international Economics Study Centre, 2011, <http://internationalecon.com/Trade/Tch90/T90-6A.php>; accessed 16.07.2011

The planning secretariat, spotlights on the economic & social development in Libya during 1970- 78, November 1978.

The planning secretariat, spotlights on the economic & social development in Libya during 1970-78 , November 1978.

The Secretariat of information (1989),' the Achievements of Libya's

revolution during 1969-84”.

Thimmaiah, G. , " Inter-State Tax Effort: A Comment " , Economic and Political Weekly, Vol. 11, No. 37 (Sep. 11, 1976), pp. 1513-1516.

Tosun , Mehmet Serkan., and Abizadeh , Sohrab.,( 2005 ) ; Economic growth and tax components: an analysis of tax changes in OECD; Taylor & Francis group ; Applied Economics, 37, 2251–2263.

Townsend, Ian. “The burden of taxation”, London, House of Commons Library, 2003.

Toye, J.F.J ; 1978 , " Taxation and economic development " , frank cass & Co.Ltd .

Transport Canada; Preliminary Estimates of the Financial Costs and Revenues of Rail Transportation in Canada in 2000 , Full Cost Investigation – Phase 1; Economic Analysis Directorate; May 18, 2005.

Travel Document system, TDS ; Libya ; 2009, available in : <http://www.traveldocs.com/ly/customs.htm> ; accessed 25.06.2009.

Truong, Tham V., Gash, Dennis N.," Less-Developed Countries' Taxable Capacity and Economic Integration: A Cross-Sectional Analysis", The Review of Economics and Statistics, 1979, vol. 61, issue 2, pages 312-16.

Tutor2u, 2011, <http://tutor2u.net/economics/revision-notes/as-markets-consumer-surplus.html>; accessed 16.07.2011.

Uhl , Matthias W., 2011 , Nowcasting Private Consumption with TV Sentiment , Swiss federal institute of Technology, Zurich, Switzerland, KOF working papers , No. 293.

UK trade & investment; available in [https://www.uktradeinvest.gov.uk/ukti/appmanager/ukti/countries?\\_nfls=false&\\_nfpb=true&\\_pageLabel=CountryType1&navigationPageId=/libya](https://www.uktradeinvest.gov.uk/ukti/appmanager/ukti/countries?_nfls=false&_nfpb=true&_pageLabel=CountryType1&navigationPageId=/libya) ; accessed 20.06.2009

US department of the Treasury, Integration of the Individual and Corporate Tax Systems: Taxing Business Income Once, Report of January 1992. Available from: <<http://www.treas.gov/offices/tax-policy/library/integration-paper/>. > [Accessed 16 May 2009].

Wahid, Abu N. M.; Frontiers of Economics: Nobel Laureates of the Twentieth Century; Greenwood Press; Westport, CT.; 2002.

Walker, Mary Beth.; Sennoga, Edward B., (2007), "Does tax evasion influence the composition of tax instruments? Examining the effect of tax evasion on tax structure. The African Econometrics Society, 12th Annual conference on Econometrics Modelling for Africa.

Wanniski, Jude (1978), *The Way the World Works; How Economies fail and Succeed*, Basic Books, New York.

Wayne Thirsk, "Tax Reform in Developing Countries", World Bank, Regional and sectoral studies, Washington, D.C, December 1997.

Weiss, Steven J, 'Factors Affecting the Government Revenue Share in Less Developing Countries', *Social and Economic Studies*, Vol, 18, 1969, pp. 348-364.

Williams, Marion V. (2001)., *Managing public finance in a small developing economy : the case of Barbados* ., Greenwood publishing group .

Williamson, J.G., (1961), " Public Expenditure and Revenue : An International comparison " , *The Manchester School of Economic and social studies*, January, vol. XXIX , pp.43-56

Wooldridge, Jeffrey, 2002, *Econometric Analysis of Cross Section and Panel Data* (MIT Press, Cambridge, Massachusetts).

Wooldridge, J., 2002, *Econometric Analysis of cross-section and panel data* , MIT press, pp. 130, 279, 420-449.

World Bank, "LESSONS OF TAX REFORM", the world Bank publication, Washington, D.C, September 1991.

World Bank, " Urban Property Tax Reform: Guidelines and Recommendations " , January 1996 .

World Bank , "Costs of taxation and the benefits of public goods : the role of income effects " , 2005/09/01 , Vol. 1 of 1

World Bank, " Socialist people's Libyan Arab Jamahiriya – Country Economic Report " , world Bank , Report No.30295-LY , July 2006.

Xu, Jianwen .; Yang, Hu., 2011, Preliminary test almost unbiased ridge estimator in a linear regression model with multivariate Student-t errors, Faculty of Mathematics and Computer Science, University of Tartu, Estonia, *Acta et commentationes universitatis tartuensis de mathematica*, Volume 15, Number 1, 2011.

Yaffee, Robert, 2003, A primer for panel data analysis, New York university. In <http://www.nyu.edu> accessed 23.03.2012.

Yeniay , A.; Gaokta, A., 2002, a comparison of partial least squares regression with other prediction methods, Hacettepe Journal of Mathematics and Statistics , Volume 31 , 99(111).

Zaki, Ramzi , 1992 , " Intellectual and social conflict on the public budget deficit in the third world " ; Dar Sina publishing house , Cairo , Egypt .

## Glossary

**Rentier economy:** an economy that relies heavily on external sources of income (Ryan, 2002). Rentier states differ from non-rentier states whose income depends on domestic taxation (O'Leary, Lustick, & Callaghy, 2001). Over-dependence on oil has also helped to create a group of “rentier states,” which, in a number of cases, have failed to translate the benefits of oil to generate a level of industrialization compatible with other parts of the developing world (Kohli; Chung-In Moon; Sørensen, 2003).

**Tax effort:** is defined as the is the exertion a country puts into collecting its tax revenue, given the tax handles available to the country ( Leuthold, 2002). This means that the tax effort is the extent to which a country utilises its taxable capacity (Gillis, 1989).

**Tax effort index:** An indicator can be measured by dividing the tax burden by the taxable capacity (Le Minh et al., 2008).

**Tax burden:** is the burden to which an entire society is subjected in terms of tax cost(Black, 1997).

**Taxable capacity:** is the maximum limit up to which people can normally pay taxes, (Deepashree, 2006, p.28). In other words, it is the optimal size of tax revenues. According to Howard (2001, p. 162) “taxable capacity can be interpreted as the amount of tax which could be justly or fairly imposed on a country ”.

**Excess burden:** (Also called Deadweight-loss) is an allocative inefficiency, which can be described as the sum of all losses in productivity caused by excessive taxation in a society (Auerbach, 1985). More clearly, excess burden it refers to the loss in revenue brought about by a distortionary tax relative to a lump-sum tax for the same reduction in utility." (Pestieau, 2006, p. 159).

**Tax basis:** (Also called tax base or tax handle) .That which is taxed, e.g. income, wealth, property, expenditure or consumption. A government can raise its total tax revenue by using several tax bases. Originally little was taxed because of problems of valuation and collection; gradually, there has been a movement from indirect taxes on imports and various types of consumption to income tax and property tax (Rutherford, 1995).

**Tax basis size:** The quantity or amount (value) of the tax basis.

**Vertical tax equity:** Fairness in the tax system is defined by economists in terms of horizontal and vertical equity. Vertical equity refers to the relative amounts of taxes paid by people with different incomes. The rate structure of our income tax reflects the adoption of a principle of vertical equity called *progressivity*, which means that as one's income rises the *proportion* of income that one pays as a tax rises. (Pollack, 1996). This means that vertical tax equity concerns the way taxes are distributed among taxpayers with different abilities to pay.

**Horizontal equity:** this principle holds that people similarly situated should be taxed alike, which is translated under an income tax into the principle that people with the same income (properly defined) should pay the same tax (Pollack, 1996) . This means that horizontal tax equity

concerns the way taxes are distributed among taxpayers with the same ability to pay.

**Tax avoidance:** A taxpayer's careful arrangement of his/her activities and business affairs to minimize liability to taxation (Rutherford, 1995).

**Tax evasion:** Reduction of one's tax burden by inaccurate statements of income and other circumstances relevant to tax liability. The amount of evasion depends on the probability of being detected in such conduct and the penalties for such offences (Rutherford, 1995).

**Tax reform:** A change in a tax system which attempts to improve allocation, efficiency and **equity**. Tax reform usually takes the form of reducing the number of separate rates of tax and abolishing many tax allowances (Rutherford, 1995).

**The compensating variation, CV,** is the amount of money that must be given to a loser, or taken from a gainer, in order to keep the individual on the initial indifference curve (Creedy, 2006).

**The equivalent variation, EV,** (also called extortionary variation), is the amount that the individual would be prepared to pay, in the new situation, to avoid the price change (Creedy, 2006).

**The statutory taxpayer:** the identity of the person upon whom the law officially imposes the tax (Economic Report of the President, 2004). In other words, **it is** the statutory taxpayer who physically pays the tax.

**The economic taxpayer:** the identity of the person who bears the final burden of the tax because of the shifting of tax burden (Economic Report of the President , 2004).

**Jihad tax:** Is a symbolic tax, meant to the purposes of defense, and it was payable under Law 44 of 1970 and levied on personal incomes and

corporation profits (The Business Environment, 2009). In other words, jihad tax is withheld monthly from earned income. It is imposed on gross income less the Social Unity Fund contribution and the employee's social security contribution at the following rates: 1% if monthly income does not exceed LD 50.; 2% if monthly income does not exceed LD 100.; 3% if monthly income exceeds LD 100 (Gidirin, 2011).