External debt, economic growth and investment in Egypt, Morocco and Tunisia

A thesis submitted to the University of Gloucestershire in accordance with the requirements of the degree of Doctor of Philosophy in the Faculty of Business, Education and Professional Studies

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PhD

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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 part 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.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Lotfi Elhadi Mohamed Abuzaid

Signed ……...Date …….....

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Dedication

I owe an immeasurable debt of gratitude to my family for their moral support throughout my study. I view the years of graduate study as a family collective effort and the outcome as a shared achievement. This thesis is dedicated to my father Elhadi and my mother, Sasia, for her patience, prayers and spiritual support over the years.

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Abstract

Most developing countries are dependent on external borrowing to achieve economic growth. However, external borrowing requires fixed payments independent of the actual return on the invested funds. If a country either invests the money inefficiently or is subject to unexpected difficulties, it may not be able to meet contracted service payments. Potential debt servicing problems have existed for many years, and recently, the actual occurrence of service interruptions has become more frequent.

Despite the difficulty of servicing debt, it is optimal, in an economic sense, for selected Arab countries to borrow from abroad. Foreign capital goods are usually scarce in the selected countries, so their productivity is relatively high. External borrowing allows more imports of capital without forcing down consumption. As long as the productivity of the capital exceeds its cost, debt servicing problems should not arise.

A study of three Arab countries indicates that, real GDP growth can be increased through external borrowing. However, a higher level of debt raises the likelihood of debt servicing difficulties. Even when the use of debt is efficient, a heavier debt burden makes these selected Arab countries more susceptible to unexpected shocks. However, if GDP growth is not overly ambitious, the debt servicing burden stabilizes and may eventually begin to decline. The greatest danger arises when future debt servicing requirements are ignored. A sharp increase in external debt may allow high GDP growth in the short run, but eventually the resulting debt service will become unsustainable.

This study therefore, examines the impact of external debt on economic growth and external debt service on investment in three Arab countries from the middle income group in North Africa over the period 1982-2005. This study employs developed Chowdhury growth and investment models to determine the impact of external debt on economic growth during the period after the debt crisis. Moreover, a single equation model is inappropriate to analyze the relationship between external loans, economic growth, debt servicing and investment due to there being a circular relationship among them and other macroeconomic variables. Therefore, if only the output equation or investment equation are estimated, this is likely to understate the impact of external debt on economic growth. In addition, the relationship between external debt, investment and economic growth is not a simple one for a number of reasons. Firstly, the relationship between external debt, debt servicing, investment and economic growth, both indirectly and directly, must be viewed in terms of their impact on domestic savings and exports. Secondly, a complex relationship exists between external debt servicing and economic growth. Therefore, this study uses two equations to investigate the impact of external debt on economic growth and external debt service on investment in three Arab countries (Tunisia, Egypt and Morocco using a macro econometric model estimated for the period 1982-2005.

The empirical findings reveal that external debt does not affect growth directly. The results indicate that external debt affects investment positively and is statistically significantly indicating external debt in selected countries encourages investment rather than depresses it. The findings of this research are consistent with the economic theory that external loans stimulate economic growth in less developed countries. Therefore, investment plays a very important role in the growth of selected Arab countries' economies. Furthermore, the result

also confirms that there is no sign of a crowding out effect through which external debt service is hypothesized to affect investment. The important finding that external debt tends to have a relationship with investment and growth suggests that relying on external debt to enhance economic growth is a good policy. In addition, these countries need to supplement their lack of domestic saving with external loans and other forms of foreign capital such as foreign direct investment.

Table of Contents

Declaration……..ii
Acknowledgement iii
Dedication iv
Abstract 1
List of tables 5
List of figures 6
Chapter One: Background to the research area 7
1.1 Introduction 8
1.2 Statement of the Problem 11
1.3 Research question 11
1.4 Research objective 12
1.5 Limitations of the study 12
1.6 Significance of the study 12
Chapter Two: Origins of the Debt Crisis 14
2.1 Introduction……..15
2.2 External Factors and Creditors' Responsibility……15
2.2.1 Rising Real Interest Rate 16
2.2.2 Changes in the Price of Oil 17
2.2.3 The Deterioration of International Commercial Exchange Conditions: 19
2.2.4 The Effects of Economic Recession on the industrial Countries during the Seventies 20
2.2.5 Increasing Customs Protective Measures against the Exports of Developing Countries 21
2.3 Internal Factors and Debtors' Responsibility with Respect to the Aggravation of the Foreign Debt Crisis……21
2.3.1 Increasing Dependence on Foreign Funding: 22
2.3.2 Deficiency or Lack of Proper Policies for Development 25
2.3.3 Mismanagement 26
2.3.4 Capital Flight from the Developing Countries 27
2.3.5 Domestic Inflation and Deterioration of Exchange Rates: 27
2.4 Summary……..29
Chapter Three: Economic Growth and External Debt: a Review of Literature 31
3.1 Introduction……32
3.2 Economic Growth……32
3.2.1 The Harrod-Domar Growth Model 33
3.2.2 The Neoclassical Growth Model 34
3.2.3 Endogenous Growth Models 36
3.3 External Debt……...38
3.3.1 The Early Stages 39
3.3.2 The Debt Crisis 40
3.3.3 Debt Overhang 41
3.3.4 Highly Indebted Countries 42
3.4 Empirical studies related to external debt and economic growth……44
3.5 Summary……..58
Chapter Four: Types of External Debt and Their Role in Financing Arab Economic Development 60
4.1 Definitions of External Debt……61

4.2 Types and Components of External Loans……..62
4.2.1 Source of Loans..... 64
4.2.2 Purpose of Loans..... 67
4.2.3 Provisions of Loans..... 68
4.2.4 Loans Period 69
4.3 The Role of Foreign Debt in Financing Arab Economic Development……...69
4.3.1 The Concept of Economic Development 70
4.3.2 Impediments to Economic Development in Arab Countries 73
4.4 The Status of Foreign Finance of Economic Development in Arab Countries……77
4.4.1 Coercive (compulsory) External Borrowing..... 77
4.4.2 Optional External Borrowing..... 77
4.5 The Role of Foreign Debt in Financing Economic Development in Arab Countries..78
4.6 The Effective UtiliZation of Foreign Loans……79
4.7 Summary……...83
Chapter Five: Characteristics of Arab Countries' Economies 84
5.1 Introduction..... 85
5.2 One world, different countries 86
5.3 Economic features of the Arab World 88
5.4 Domestic savings and investment in the selected counties..... 89
5.5 The exports, imports and gap resources for selected Arab countries..... 123
5.6 The external debt and debt service in three Arab countries during the period 1982 to 2005..... 127
5.7 Gross domestic product, consumption and savings in three Arab countries 132
5.8 Summary 138
Chapter Six: Methodology, Method, Data Sources and Econometrical Tools of the Study ..... .139
6.1 Introduction……140
6.2 Model specification……....142
6.3 Data description……146
6.4 variables……..147
6.5 Econometrical Tools……...153
6.5.1 Panel data analysis ..... .153
6.5.2 Instrumental variables:..... 156
6.5.2.1 Ordinary Least Squares Method (OLS): 157
6.5.2.2 Two-Stage Least Squares (2SLS): 157
6.5.3 Multicolinearity..... 158
Chapter Seven: Empirical Results and Finding..... 160
7.1 Introduction……...161
7.2 Empirical Results……...161
7.2.1 Statistical Tools for Aggregate output equation..... 162
7.2.2 Statistical Tools for investment equation..... 172
Chapter Eight: Conclusion and recommendations..... 184
8.1 Introduction……...185
8.2 Limitations of the study……191
8.3 Contribution of study……192
8.4 Recommendations……..192
8.5 Further study……..193

References **194**
Appendix **213**

List of tables

Table 1: the Heavily Indebted Poor Countries (As of October 1999)..... 43
Table 2: Average per capita GDP at current prices in $ US during the period 1995-200587
Table 3: investment and savings in the three Arab countries during the period 1982 -2005, Figures in Millions of US Dollars 120
Table 4: Exports and imports in the three Arab countries during the period 1982-2005, Figure in Millions of US Dollars 124
Table 5: Total External Debt and Debt Service for Selected Arab Countries for 1982- 2005 (in Millions of Dollars)..... 128
Table 6: Gross domestic product, consumption and domestic saving in the Tunisia, Egypt and Morocco during the period 1982-2005, figures in Million $US 134
Table 7 : Correlation matrix between the predictor variables of aggregate model. Notice the value between parentheses represent p-value. 163
Table 8: Hausman test 164
Table 9: Estimation of investment equation..... 165
Table 10: Estimation of the main equation 166
Table 11: Estimation of the final equation 167
Table 12: Correlation matrix between the predictor variables of investment model. Notice the value between parentheses represent p-value. 173
Table 13: Hausman test 174
Table 14: Estimation of real income equation 175
Table 15: Estimation of the main equation 176
Table 16: Estimation of the final equation 177

List of figures

Figure 1: Types of External Loan..... 63
Figure 2: Domestic Savings and Investment in Tunisia for 1982 to 2005..... 121
Figure 3: Domestic Savings and Investment in Egypt for 1982 to 2005 121
Figure 4: Domestic Savings and Investment in Morocco for 1982 to 2005 121
Figure 5: Exports and imports in Tunisia during the period 1982 -2005 Million of US Dollars 125
Figure 6: Exports and imports in Egypt during the period 1982 -2005 Million of US Dollars 125
Figure 7: Exports and imports in Morocco during the period 1982 -2005 Million of US Dollars 125
Figure 8: External Debt and Debt Service in Tunisia between 1982- 2005..... 129
Figure 9: External Debt and Debt Service in Egypt between 1982- 2005..... 129
Figure 10: External Debt and Debt Service in Morocco between 1982- 2005..... 129
Figure 11: Gross domestic product, consumption and savings in Tunisia..... 135
Figure 12: Gross domestic product, consumption and savings in Egypt..... 135
Figure 13: Gross domestic product, consumption and savings in Morocco 135
: Gross domestic product (GDP) in three Arab countries14 Figure..... 136
: Total consumption (C) in three Arab countries15 Figure..... 136
: Total savings (S) in three Arab countries16 Figure 136

Chapter One: Background to the research area

1.1 Introduction

Most developing countries have been accumulating external debt since the 1960s (Ronald, 1983). Amin and Audu (2006) asserted that many developing countries took advantage of abundant availability of international loans resulting from the oil boom in the early 1970s (James, 1996). The lack of domestic savings, high current account deficit, sharp losses in the terms of trade, the oil price shocks of 1973-74 and 1978-79, a rise in public expenditure by African governments following increases in commodity price during the early 1970s, recession in the industrialized nations and rises in real interest rate are the main reasons why developing countries have been importing capital to augment domestic resources (Were, 2001; Leta, 2002; Suma, 2007).

External borrowing is considered a common phenomenon for all developing countries in their early stages of development, as they are often faced with limited domestic resources for development and growth, and can therefore borrow from the developed nations to bridge the domestic resource and achieve high sustained economic growth. However, the problem of borrowing cannot be limited to heavily indebted countries, as there are many Arab countries in North Africa with limited domestic resources and therefore have to borrow from abroad to cover their resource gap. This study focuses on three such Arab Countries (Tunisia, Egypt and Morocco) from the middle income countries as categorised by the Arab Countries League. There is a lack of research that considers these North African together and a few that study each individually. One notable characteristic of these countries is that the governments are the main borrowing agents and the lion's share of these countries' external debt is either public or publicly guaranteed. In addition, these countries are Arab and non-oil exporting countries, they are nearly at the same stage of technological development and are mainly exporters of a few raw materials, and these three countries also all import food and many manufactuing products.

This is the financing gap problem, which is based on the Harrod Domar growth model (Todaro and Smith, 2009; Adegbite et al., 2008; Hamed, Ashraf & Chaudhary, 2008). According to this model, in which the economic growth rate depends solely on investment, the key to enhance economic growth is to invest more (Martin and Artadi, 2002). Developing countries, however, may not be able to save enough to finance the desired level of investment (Hunt,

2007). Essentially, there will be a gap between domestic saving and the desired level of investment (Root, 1990; Amin and Audu, 2006; Okafor, 2008). Many countries seek to borrow on the assumption that the rate of return on investment will be greater than the cost of borrowing the foreign funds (Ajayi and Khan, 2000). The increase in investment financed by external resources can boost economic growth in the recipient economy (Kllza, 2007).

Whereas, borrowing from abroad have both benefits and costs to the debtor countries. However, in the trend of the debt crisis, the costs of foreign borrowing seem to exceed the benefits for many developing countries (Suma, 2007). The main benefit of foreign borrowing is that it makes resources available to debtor countries for the promotion of economic growth and development, while the cost is linked to debt-service obligation. Debt-service is the successive payment of the principal plus the accumulated interest, which is also referred to as amortization through the life of the loan. The burden of debt-service is determined by the size of the debt and the interest rate. As the volume of the debt grows or the interest rate rises, so does the debt-service burden (Shuanglin and Kim, 2001; Suma, 2007).

Borrowing in general, and external borrowing in particular, have long been under discussion, and economic theorists have different opinions on the merits of borrowing. However, if a country accepts foreign borrowing as an economic policy, one would expect two main reasons for external borrowing (Pattillo, Poirson& Ricc, 2002). A country may borrow externally for investment or consumption targets. To expand the country's productive capacity policymakers may decide to borrow to finance investment projects, and at the same time make a repayment plan according to future expected returns from these projects (Ayadi et al., 2008). On the other hand, a country may seek external borrowing to shelter current consumption from fluctuations in income as a result of internal or external shocks (Edo, 2002). In this case, the country will pay back its debt in a future period where higher proceeds or returns are expected. Whereas, when the country's future proceeds are insufficient to service its external debt, than were expected, debt service difficulties will arise and a debt crisis may eventually outbreak (Ajaya and Khan, 2000). In addition, an unexpected decline in exports or an increase of import price could reduce the foreign exchange available for servicing the debt. An unexpected decline in foreign exchange would not create a servicing problem if borrowing was unlimited since maturing debt and interest could continually be repaid through new borrowing.

In the literature, many researchers argue that external debt is one of the main reasons for the slowdown in economic growth of developing countries (Freed, 2005), in this regard, the debt overhang hypothesis of Krugman (1988) and Sachs (1989) is the most common argument used to establish a negative relationship between external debt and economic growth. According to the debt overhang hypothesis, when countries accumulate external debt, investors expect a higher tax rate to finance the external debt service payments. This will be adversely affected investment and growth. However, if the borrowed fund is utilized for productive purposes, some level of debt accumulation may affect growth favourably. In other words, if the external debt borrowing is used to finance investment, it will help boost the borrowing countries economic growth. This is true when the marginal productivity of investment is higher than, or equal to, the marginal costs of the principal and interest repayment (Cline, 1995). However, since the external debt must be paid back, the debt service payments take resources away from domestic use. The high external debt-service depleted the savings and foreign exchange earnings that could have been used in domestic investments and in the provision of social services for the growing population (Kar and Cartwright-Smith, 2006). By investing less in social infrastructure and investing less in human resource development and social infrastructure means that the foreign debt burden has undermined some of the crucial conditions for sustainable economic growth. In the case of external debt, the debt service payments require an increase in taxes or reduction in government expenditure.

The main objective of this study is to analyze the effect of foreign borrowing on economic growth. In order to achieve the objective the model will be estimated for selected Arab countries during the period after the debt crisis from 1982-2005, adapting from Chowdhury (1994) a structure equation model was set up consisting of two equations, growth equation and investment. The data are collected from different publications and institutions depending on availability.

Determining the actual total external debt of Arab World is difficult and could be misleading. Therefore, one should be careful when dealing with aggregation of external debt of Arab countries. Arab states comprise 22 heterogeneous countries, their external debt accumulated for different reasons. Some of the countries resorted to the foreign borrowing to ease liquidity problem they were facing. While other countries decided to borrow externally as part of managing their portfolio of investments.

The Arab Countries League divides the Arab countries in four groups. The first two groups are oil-exporting countries; one contains highly populated countries, Algeria and Iraq, while the other is the low population group, which comprises five countries namely, Kuwait, Libya, Qatar, Saudi Arabia and Unite Arab Emirates. On the other hand, the second two groups are non-oil exporting countries, the middle income and the lower income groups. The middle-income group comprises Bahrain, Egypt, Jordan, Lebanon, Morocco, Oman, Syria and Tunisia, while the low-income group consists of seven countries, namely Comoros, Djibouti, Mauritania, Somalia, Sudan, West Bank and Gaza and Yemen.

The empirical analysis in this study focuses on three Arab countries from the middle income group according to the availability of data for all the selected period. There is a lack of studies on these countries both individually and in combination as a comparative study, there are also relatively few studies that focus on countries from North Africa exclusively. Data for specific countries is available in some sources, whereas other Arab countries' data is not available. The access to full data is a primary driver for the selection of countries in this study.

1.2 Statement of the Problem

Before exploring the problem of external debt that it is necessary to conceptualize external debt "External debt may be broadly defined as the outstanding amount of those actual current, and not contingent liabilities that require payment(s) of principal and or interest by the debtor at some point(s) in the future and that are owed to non-residents by residents of an economy" (IMF, 2003. p. 7). The issue of the Third World debt has been on the centre stage in international discussion for the past three decades. The external debt crisis of the Third World has imposed enormous costs on the debtor countries, most notably, low economic growth and the crowding out of public investment.

1.3 Research question

What are the impacts of external debt and debt services on growth and investment in the selected Arab countries?

1.4 Research objective

1- To find the impact of external debt on economic growth, in Egypt, Morocco and Tunisia between 1982 and 2005.

2- To find the impact of external debt service on investment in Egypt, Morocco and Tunisia between 1982 and 2005.

1.5 Limitations of the study

It is therefore essential to discuss the source and nature of the data because the success of any econometric analysis ultimately relies on the availability of appropriate and accurate data. The study was conducted using secondary data from foreign sources. The availability of published data for all variables involved in the model was the decisive factor in the choice of a time period. The results of this study may have been affected by the quality of the data available, and it should be acknowledged that, different publications reported different figures in the same period for the same variable. Different publications showed different figures in the same period for the same variable. Data obtained from Arabic Monterey fund are not consistent with the data from the World Bank (World Debt Tables) or Global Development Finance. Therefore, some important variables are missing as a result; sources are used jointly as discussed in the methodology chapter to resolve these issues if possible. These limitations arise from the problem of inconsistency of data as reported by different institutions. Even data from the same institution shows different figures for the same year. As mentioned, difficulties in obtaining quality data mean that more than one source was sometimes employed in the research. Whilst every effort has been made, it is important to note this issue and it may also help explain why pervious work on these particular countries has been limited.

1.6 Significance of the study

The majority of studies in this area examine only a few explanatory variables whilst attempting to establish a statistically significant relationship between debt and growth and external debt services and investment. Nevertheless, when statistical tests are carried out the relation between debt and growth, economic theory does not supply a sufficient specification of which variables must be held constant. This study seeks to investigate the same growth and external debt problem facing three selected Arab countries from the middle income group in

North Africa because no joint work on Tunisia, Egypt and Morocco has yet been undertaken on the role of external debt in these countries. Therefore, this study used number of explanatory variables in two equations showing the effect of independent variables on dependent variables which are in this study the real income and investment.

The remaining chapters of this study begin by detailing the origins of the debt crisis to review the factors exacerbating the problem of debt in developing countries. This starts by examining the history of external debt since 1973 in chapter two. It is then followed by a review of the literature relevant to the topic, focusing on external debt and economic growth, and then moves on to consider the relationship between the two, with particular attention on empirical studies, to shed light on theories linked to this study and provide an overview of empirical studies related to external debt and economic growth. In chapter three, evidence from several developing countries is also presented in terms of the relationship between external debt and debt service to lay a foundation for examining the results of this study. Chapter four examines types of external debt and its role in financing Arab economic development, which are most relevant to explaining the factors associated with the accumulation of external debt to understand the kinds of loans undertaken, how they are used in Arab countries – this is done to answer the main questions in the empirical chapter. To show the fluctuation in important variables, the characteristics of individual selected Arab countries are examined in chapter five. Chapter six details the methodology, method, data sources and econometrical tools applied in the study to capture if there any adverse effects of high levels of debt on growth and investment in the selected countries. The empirical results, findings and discussion are presented in chapter seven and lastly the conclusion, contributions and the recommendations of the study are outlined in chapter eight.

The next chapter therefore outlines the origins of the debt crisis, showing the history of external debt since the 1980s in order to illustrate and explain the factors exacerbating the crisis in developing countries.

Chapter Two: Origins of the Debt Crisis

2.1 Introduction

In order to illustrate the historical development of external debt since the 1980s in particular, this review focuses on less developed countries. This focus is taken as these countries are the most relevant when building up an explanation of the factors associated with the accumulation of external debt and economic growth (Kwack & Leipziger, 1988). The review therefore begins by considering the different factors that have contributed to the aggravation of the foreign debt problem.

At present, in developing countries, foreign debt size and the liabilities incurred are increased to very high levels, threatening the economies of many indebted countries, which suffer from deterioration in their political and social stability, and indeed security, simply because of the aggravation of their indebtedness (Benedict et al., 2003). The problem of foreign debt in developing countries came to prominence during the early 1980s, specifically in August 1982, when the Mexican Finance Minister announced that the country was unable to repay its obligations related to its foreign debts (Husain & Diwan, 1989). However, the responsibility for the problem of indebtedness cannot be limited to Mexico, or indeed other indebted countries, as there are many causes of the debt crisis experienced by such developing countries. For instance, some are the result of economic policies pursued by those countries themselves, but others are due to a variety of external factors (Elbadawi, Ndulu & Ndung'u, 1996).

Accordingly, this part of the review focuses upon the external and internal factors that can be identified as exacerbating such crises in developing countries since the explosion of the problem in the 1980s.

2.2 External Factors and Creditors' Responsibility

Creditor responsibility is associated with a number of external factors that are seen to have contributed to the crisis (Husain & Diwan, 1989). The most important direct external factors that caused the worsening and final breakdown of the financial system include: rising real interest rates, fluctuating oil prices, deteriorating conditions of commercial exchange for less developed countries, the effects of the economic recession on the developed countries during the seventies, and increasing customs protective measures against the exports of developing

countries (Wijnbergen, 1989). In addition, the Gulf crisis of 1990-1991, was also partly caused by external borrowing (Were, 2001). Increasingly protectionist policies by advanced countries have also had a tendency to discriminate against developing exports, thus lowering their earnings (Were, 2001). These factors are now discussed in more detail.

2.2.1 Rising Real Interest Rate

Real interest is the difference between the inflation rate prevalent in the United States of America and the nominal interest rate (Tease, Dean, Elmeskov & Hoeller, 1991). Loan repayment made in dollars meant that developing countries had to endure high rates of interest and exchange owing to the strength of the dollar at that time. The very high rates of real interest with which the indebted countries received the loans played a critical role in exacerbating the debt problem (Nunnenkamp, 1986). According to a study by the World Bank covering the period from 1965-1983 (Global Bank, Annual Report, Washington, 1987:59, 1989:37), the average real interest rate was about 1.4 (which is the nominal interest rate with which London banks deal in relation to deposits [labour] and from which the whole price rise is subtracted in the United States of America). This was a period during which the nominal interest rate of dollar loans for six months among London banks was 9.3%. This period witnessed wild acceleration in developing countries' growth (Global Bank, Annual Report, Washington, 1987:59, 1989:37).

However, with the beginning of the eighties, the nominal interest rate on such loans began to rise substantially, and the labour price, between 1981-1986, reached 11.1% on average, while the real interest rate, in the same period, was 6%. The labour price witnessed its highest level in 1982; i.e., the year of the foreign debt crisis among developing countries, when it became 13.5% in consideration of 7.1% for the real interest rate (Global Bank, Annual Report, Washington, 1987).

Information within the International Debt Tables issued by the World Bank, 1993-1994, indicates that the average real interest rate of the total debts of the developing countries during 1987-1992 were within the limits of 6.5%. Therefore, one of the main elements contributing to the extreme recession of 1981-1983 was the increase in the interest rates.

In turn, the recession had a devastating effect on developing countries as it dramatically reduced their export volumes and the price of their exports, thereby leading to a substantial fall in export earnings. Moreover, the recession induced the developed countries to adopt a more protectionist stance vis-à-vis imported goods, which further squeezed export earning (Leta, 2002).

2.2.2 Changes in the Price of Oil

The most important result of the oil crisis of October 1973 was a rise in oil prices, noticeably during the period 1974-1979. Many economists observe that rising oil prices caused sudden capital mobility to oil exporting countries (see for example: Kruger, 1987; Leta, 2002). This created a wave of deflation followed by inflation, in oil importing economies, which caused them to follow restrictive cash and monetary changing policies. In that regard, some economists consider that oil prices in the second half of the 1980s had a negative effect upon some developing indebted countries. For example, Rasche and Tatom (1977, 1981), Darby (1982), Hamilton (1983), Burbidge and Harrison (1984), and Gisser and Goodwin (1986) all pointed out the negative correlation between oil prices and real output. However, Berument and Ceylan (2005), studied the impact of oil prices on economic growth in the Middle East and North Africa, and found no negative and statistically significant effect of oil price shocks on the output growth for any of the countries in their sample.

That said, it can be readily agreed that the two effects together with their repercussions had a negative effect on the foreign indebtedness of developing countries (Kamp, 1986).

First - The Effect of Rising Oil Prices in the Seventies:

Rising oil prices began in 1973 greatly contributed to the growth of oil proceeds (Labys, 2006), showing an increase from 4.5 dollars per barrel in October 1973 to 11.6 dollars per barrel in December 1973. It subsequently rose again, to reach 33 dollars per barrel in the second quarter of 1979 (El Shar, 1992). Therefore, oil proceeds were raised from 8.5 milliard dollars in 1975 to 211.8 milliard dollars in 1980 (Zaki, 1987). This rise in of oil prices was, of course, reflected in the inflation of prices of manufactured goods exported by industrial countries. This inflation in turn, impacted negatively upon the economic conditions in non-oil producing developing countries that had to bear the liability of the double negative effect of a rise in both the price of oil and industrial goods at the same time (UNCTAD, 2004).

The share of oil imports as a proportion of total imports increased from 5.9% in 1973 to 20% in 1982 (Zaki, 1995) this caused large deficits in the commercial balances of these countries. These deficits forced the countries concerned to obtain more foreign loans to meet the obligations for expensive oil imports (Stambuli, 1998; Labys, 2006). Indeed, as noted by Kruger (1987), after the oil price was increased the oil importing less developed countries faced huge budget deficits. On the other hand, oil exporting countries found themselves with large surpluses that were lent to commercial banks, and then consequently used to finance the deficits of the oil importing countries. In other words, the oil importing countries spent the surplus that was achieved by the oil exporting countries (Stambuli, 1998).

Second - The Effect of Falling Oil Prices in the Eighties:

The fall in oil prices began at the beginning of the second half of the 1980s witnessed a great turn in the global oil market (Winckler, 2005). In fact, the oil crisis after 1983-1985, created the spot market, in which the oil market came under the control of the industrial countries and the buyers, instead of being controlled by the oil producing countries, as the case was in the 1970s (Allen, 2005). In March 1986, the oil market was exposed to a strong and sudden shock as a result of this control, as the barrel price collapsed from more than 25 dollars per barrel in January of 1986, to less than 9 dollars per barrel in July 1986 (Shojai and Katz, 1992; Arab Monetary Fund, 1987). Undoubtedly, this sharp drop in oil prices had a very negative effect upon the economies of countries producing and exporting oil. It resulted in a noticeable drop in their oil surplus, causing shrinking to their purchase capacity that was reflected in the size of their trade exchanges, especially with developed countries (Shojai and Katz, 1992). Subsequently, the global economy entered a shrinking circle.

For the indebted oil producing countries, an oil price drop weakens their ability to repay foreign debt liabilities, since oil is their main source of foreign cash, as for instance in the case of Nigeria and Mexico (World Development Report, 1987). For the non-oil producing indebted countries, an oil price drop is reflected in two opposite directions that are:

I. Its effect is positive since it supports the capacity of these countries to repay their foreign debt liabilities, because of the surplus made in oil and derivatives import costs, especially when those imports form an important percentage of the total imports of these countries (United Nations, 2004).

II. It impacts negatively upon these indebted countries, as seen by a decrease in the size of aid, subsidies and subsidized loans from OPEC countries in surplus. In addition, many of these countries export workers to Arab oil countries, and consequently rely upon the financial transfers of the workers abroad. Thus, an oil price drop reflects negatively upon those workers because many of them return to their countries as a result of a decrease in the general investment expenditure of the oil countries (Arab Monetary Fund Report, 1987). In this respect, some Arab countries suffered from the decline of demand for Arab labour in the Arab oil countries during the second half of the 1980s and particularly following the end of the Iraq-Iran war, which led to the return of hundreds of thousands of workers (Winckler, 2005). Furthermore, there was a decline in the workers' remittances from more than $1 billion in the early 1980s to $623 million in 1989. This decline was mainly due to a reduction in the salaries of the foreign workers who continued to work abroad (Winckler, 2005).

2.2.3 The Deterioration of International Commercial Exchange Conditions:

The deterioration of the commercial exchange conditions between industrial countries and developing countries is the most prominent feature in the nature of commercial relations as they had existed since World War II (Jones & Ocampo, 2009). This deterioration was caused by the international demands made upon developing countries, specifically the enforced specialization in producing raw materials at low price and the need to import the required machinery, equipment and technology from the developed industrial countries at high prices imposed by the exporters, because of the nature of these goods and the flexibility of their supply (Medani, 2008). Of course, the extent of the deterioration in commercial exchange conditions of the developing countries becomes clear by measuring the rate of the fall in prices of goods exported by developing countries in relation to the rate of prices of imported goods (Medani, 2008). This set of circumstances inevitably resulted in an increase in the deficit of balance of payments.

2.2.4 The Effects of Economic Recession on the industrial Countries during the Seventies

The subordination of developing countries to developed industrial countries causes the former to be affected by the latter in respect of economic movement and development (Amri, 1995). From the beginning of the 1980s, developed economies suffered an economic recession, which increased unemployment rates and decreased growth rates (Scott, 1981). This recession was accompanied by a major depression in international trade, which in turn resulted in a decrease in the international demand on the exports of developing countries to the developed countries by 20% between 1981 and 1985 (United Nations Conference on Trade and Development, 1989). The economic recession, which dominated the economies of the industrial countries during the first half of the eighties, also greatly influenced the economies of the developing countries.

This was a result of the deterioration in the volume and value of the exports of developing countries to developed countries in exchange for the industrial commodities exported by the industrial countries (Parfitt, Riley & Aynes, 1989). The latter raised the prices of their exports to developing countries, especially the prices of food products and intermediate goods, in order to cover their losses, which resulted from the international rising of oil prices (Parfitt et al., 1989). Furthermore, the economic recession negatively affected the size of loans and the subsidized aid provided to developing countries, which in turn decreased the flow of subsidized foreign capital and at the same time increased the payments for debt service and increased the difficulties entailed in foreign borrowing, particularly after the onset of the global debt crisis in 1982 (Ajaya & Khan, 2000).

2.2.5 Increasing Customs Protective Measures against the Exports of Developing Countries

An increase in protectionist policies occurred despite the capitalist countries' claim to advocate the principle of free-trade and free competition, and the fact that all such countries signed the GATT agreement, which aims at developing and freeing international trade between countries involved therein, through eliminating protective measures which some countries may apply (Ezeala-Harrison, 1999). This agreement laid down some basic principles that regulate international trade, the most important of which are (Ezeala-Harrison, 1999):

- Principle of non-discrimination in trade: This principle includes the clause of the most favoured nation. That is, any advantage exchanged between two GATT partners must be extended to all others (Ezeala-Harrison, 1999).
- Principle of protection, through only using customs tariff.
- Principle of special and differential treatment of developing countries.

This principle allows developing countries to impose quantitative restrictions or suspend customs privileges that were previously granted to some imports which come to threaten domestic producers, pursuant to Section 4 of the GATT in 1965. Article 36 thereof explicitly states that a developing country is not expected to offer tariff waivers which are advantageous to its development and its financial and commercial needs (Macrory et al., 2005).

2.3 Internal Factors and Debtors' Responsibility with Respect to the Aggravation of the Foreign Debt Crisis

External factors and the responsibility of the crediting countries greatly influenced the total economic conditions of developing countries, particularly their balance of payments, and further affected their ability to repay their foreign debts and increased their tendency to borrow from foreign countries (Elbadawi et al., 1996; Leta, 2002). However, it is worth mentioning that particular internal factors had worse negative effects. In fact, the indebted countries could be seen as largely responsible for the aggravation of the foreign debts problem. The following are the factors that indicate this responsibility.

2.3.1 Increasing Dependence on Foreign Funding:

It has been previously illustrated that foreign funding is subjectively justified due to the small amount of national savings of the developing countries. Accordingly, achieving high growth rates requires resorting to foreign funding. However, the grave mistake committed by most developing countries was to depend on foreign loans to finance their development programme (Hope, 1985). These countries considered foreign borrowing as a replacement for domestic saving, whereas the logical action would have been to encourage and mobilize domestic savings and increase the same, so that these countries could pay their annual foreign debt liabilities.

Subsidised foreign loans, which were relatively available during the seventies, and the then low interest rates, encouraged over-dependence on foreign borrowing, neglecting the mobilization of the available economic surplus and believing that continuing to obtain loans could be used to increase growth rates and promote levels of consumption. However, this opinion and the resulting over-borrowing from foreign countries could be argued to cause the difficulties with foreign loans that emerged during the eighties.

The deterioration of export prices for developing countries has previously been surveyed, (Yearbook of the United Nations, 1982), and has been observed as occurring at the beginning of the 1980s, along with the major deterioration of the foreign trade conditions due to the recession that dominated the economies of developed industrial countries, in addition to the decline in the savings rate of the indebted countries (Medani, 2008). These factors led to a widening of the gap in local resources as consumption rates exceeded production rates. This situation came about because of several reasons, as discussed in the sub-sections below.

I Decreasing Cash Incomes:

The gross domestic product (GDP) of the developing countries is negatively reflected in the income of individuals. In developing countries, the average GDP per capita in 1991 was 880 US dollars, and later decreased to 240 US dollars in the least developed countries in Sub-Saharan Africa (http://earthtrends.wri.org/text/economics-business-business/variable-638.html). In fact, there is a significant difference between the average per capita income in developed industrial countries and that of developing countries. In this respect, it is worth mentioning that the GDP income per capita in some low-income countries was less than 200

dollars (United Nations, Human Development Report, 1994). Of course, the declining average income per capita causes household savings to decrease and further causes governmental income to decrease, which in turn causes society's tax capacity to decline.

II General Overspending and the Prevalence of Irrational Consumption Types:

Most developing countries have high governmental expenses and high budget allocations to defence and security (Collier, 2006). Indeed, the defence expenses in some of these countries are triple the investments of the national economy (Collier, 2006). And despite the fact that the Arab countries enforce policies to rationalize general expenses, such rationalization is at the expense of the development expenditures (Arab Monetary Fund, 2005).

Furthermore, developing countries are characterized by disproportional distribution of income, which is greater than in the developed capitalist countries. Several economists confirm that the high-income classes and categories are mainly recognized as being capable of saving, whereas the poor classes are incapable of saving because their income hardly fulfills their basic living requirements (Deaton, 1989). Nevertheless, this statement does not apply to all those in developing countries. The estimates of the United Nations state that more than 60% of the income of high-income social classes is earmarked for personal consumption rather than being saved, and therefore helping to achieve a high saving rate or investment in productive investment projects (Mishra and Das 2010). People in these countries and classes also spend a huge portion of their income on luxuries that are incommensurate with the general consumption level prevalent in the country or the actual needs and capabilities of the national economy.

III Increasing Population

Overpopulation in developing countries is deemed to be a major obstacle hindering both economic and social development (United Nation, 2000). Considerations of population and economic growth are as old as the discipline of economics itself. The debate on the relationship between these two elements can be traced back to Thomas Malthus (1798) when he published his book "An Essay on the Principle of Population" (Savas, 2008). "Malthus asserted that there is a tendency for the population growth rate to surpass the production growth rate because population increases at a geometrical rate while production increases at an arithmetic rate. Thus, the unfettered population growth in a country could plunge it into acute

poverty" (Savas, 2008, p162). It has been suggested that these is a negative relationship between population and economic growth. The empirical works by Kormendi and Meguire (1985); Mankiw, Romer, and Weil (1992); Kelley and Schmidt (1995) and Bloom and Sachs (1998) record a negative and statistically significant effect of population growth on economic growth (Bloom and Sachs 1998; Kelley and Schmidt 1995; Kormendi and Meguire 1985; Mankiw, et. al. 1992). Such rates further the complication of economic and social conditions of poor developing countries because huge growth rates impose a troublesome burden on the national economy and expedite the consumption of the available economic resources.

On the one hand, overpopulation clearly affects society and the available abilities as overpopulation curbs economic activities and increases their burdens, including the different and increasing consumption needs (Erlandsen and Nymoen, 2008).

According to international statistics, the population of the world at the end of 2006 was estimated to be six billion (United Nation Report, 2006). Moreover, the situation is further worsened due to the fact that 85% of the overpopulation exists in the developing countries where more than 80% of the world population live and suffer the worst economic and social conditions (Khoury, 1995). Certainly, the high population growth rate and the doubling of the population during a short period of time in Arab countries, combined with the decreasing economic growth trend during the eighties, caused a real problem, which is evident through the fact that the production development levels in several Arab countries failed to fulfill the growing consumption needs of citizens or to provide the requirements of development (Turkistani, 2001). Overpopulation definitely contributed to decelerating economic growth during the eighties, which greatly affected the changes of consumption, saving and investment both in the public and private sector. It is calculated that in 1995, the Arab World population totaled around 348.2 million, but by 2005 it had increased to about 311 million (Arab Monetary Fund, Table 7/12, 2005), covered more than 18 million square kilometers in the African and Asian continents (ten countries located in the African continent and twelve in Asia, and reported a very high fertility rate when compared with that in industrial countries (Turkistani, 2001).

2.3.2 Deficiency or Lack of Proper Policies for Development

The development policies formulated and implemented by developing countries have generally perceived the target of the development as being to achieve the same standards enjoyed by the industrial capitalist population. Therefore, these countries have adopted a special approach to manufacturing, disregarding the economic, social or political conditions prevalent in such countries (Lin, 2004). Most development programmes focused on increasing investment rates without taking into proper consideration other economic, social, organizational and political aspects and this failure subsequently further deepened the duality of the economy between the modern and traditional sectors (International Monetary Fund, 1996). In this regard, most developing countries chose patterns of manufacturing which were not suitable for their particular circumstances and did not help these countries to achieve independent self-growth. This is reflected by the import contracts of turnkey projects, which promote the subordination of such countries to foreign countries in the financial, commercial and technological fields. This also contributed to the aggravation of pressure on the balance of payments. Another type of manufacturing also prevailed, that being 'import replacement' policy, which became dominant in several developing countries during the seventies. The industries which were established based on this pattern had several characteristics, which were closely related to the foreign debt problem of the developing countries due to the following reasons:

- These industries require huge capital for their establishment and operation. Furthermore, the operation of the production capacities in these industries depends on the continuing flow of intermediate goods, raw materials and spare parts, and also on recruiting foreign experts, which leads to intensifying the demand on foreign currencies available to these countries.
- These industries depend on the production of luxurious goods that are needed by high-income individuals, which leads to the prevalence of luxurious consumption patterns that exceed the national economic capacity
- These industries are not integrally related with other industries and the other branches of national economy. In addition, the development strategies in the developing countries did not consider developing the educational systems in accordance with the development requirements. These systems still encourage

academic education over technical and vocational education, which can on its own mobilize the local abilities to acquire developed technological skills, which could enable the country to dispense with imported experts and ready services. They also impose huge pressure on the balance of payments and largely contribute to the deficiency of the current balances.

These countries did not have a clear vision, neither were they far-sighted with respect to the future structure of the production body of the national economy, which is required for continuing growth. Furthermore, the development strategies chosen led to a neglect of the agricultural sector, which in turn resulted in the deterioration of agricultural production, decreased agricultural exports, an insufficiency of raw materials necessary for local industries, and aggravation of the food problem. Moreover, the situation is far worse in the Arab countries than in the developing countries generally given general levels of agricultural technological backwardness in the Arab World which has played a main role in the decline of the production rates (Unified Arab Economic Report, 2004).

2.3.3 Mismanagement

Mismanagement in developing countries has become a major problem, as can be seen by the aggravation of foreign debts (Afxentiou, 1993). A significant portion of such debts, which were obtained during the seventies and at the beginning of the eighties, were wasted one way or another on several unproductive purposes such as bribes, smuggling or otherwise. Leta (2002), asserst that this factor has been postulated to add to the debt crisis as it surrounds the uses of the funds borrowed by developing countries, and he stressed that the loans were used for consumption purposes and were not invested properly. It is argued that the borrowed loan was not put to good use and has been wasted on unproductive purposes. Presumably, if the funds had been invested wisely, the countries could have been able to repay them (Leta, 2002).

In fact, the spread of mismanagement in the developing countries, including the Arab ones, is a possible indicator of backwardness in these countries. Mismanagement results from several factors, including the huge disproportional distribution of incomes, retardation of social structures, spread of unemployment, and low education level.

2.3.4 Capital Flight from the Developing Countries

Capital flight is capital sheltered abroad, and essentially implies lost resources that could have been used to generate employment and produce goods and services (Kar, Cartwright-Smith, 2006). As a result, capital flight represents lost potential government revenue that could have underpinned social services that support economic growth (Epstein, 2005). The movement of capital abroad became widespread in most developing countries during the seventies and the beginning of the eighties, corresponding to the growth in the demand for the foreign debts of these countries. It is interesting to note that developing countries that experience capital flight are often countries that are highly indebted (Epstein, 2005). Naturally, this phenomenon negatively affected the economic conditions of the developing countries (Rojas-Suarez, 1990).

In addition, as noted by Pastor (1990), and Ajayi (1997, as citied by Almounsor, 2006), less developed countries suffered adverse consequences as a result of capital flight. "Firstly, the loss of capital through capital flight erodes the domestic tax base and, therefore, affects income redistribution. Secondly, it reduces a bank's ability to create money for investment projects. Most importantly, capital flight also contributes to the distribution of income from the poor to the rich" (Almounsor, 2006. p.2). The prevalent phenomenon of capital flight from developing countries to developed ones resulted from different factors, the most important being: administrative corruption, bribery, lack of control, political and economic instability, all of which provide encouragements for privileged and empowered individuals to transfer funds abroad to ensure their future in case of revolutions or change of government system (Liliana and Donald, 1990). Such people were assisted in achieving their goal by the pressure imposed by the different State bodies and institutions and the utilization of their power and authority to achieve their goals. Unfortunately, the economies of the countries from which these funds were transferred, are not only deprived of their returns, but also a huge portion of such capital flight that was deposited in foreign banks abroad, was recycled and granted as loans to the countries from where they were transferred (Almounsor, 2006).

2.3.5 Domestic Inflation and Deterioration of Exchange Rates:

There is a close relationship between domestic inflation and the increasing foreign debts of developing countries. Indeed, inflation negatively affects the balance of payments because it

results in increasing the prices of imports, corresponding with the decline of domestic exports abroad, which is permanently reflected in commercial balances.

Furthermore, domestic inflation causes the local currency exchange rates to decline (Ayre, 1977), resulting in transferring capital abroad, and hinders the flow of the special foreign investments (Stambuli, 1998). All these results lead to negative effects on the balance of payments and compel the country to borrow from foreign countries in order to finance the increasing deficiency of the current account. Consequently, inflation results in increasing foreign debts in order to fulfill the expanding needs in the developing countries. Meanwhile, the increasing foreign debts in turn result in inflation in such countries. In fact, there is a relationship between indebtedness and its liabilities on the one hand, and inflation and its aggravation on the other. This relation manifests itself as follows:

1- Increase of indebtedness and the aggravation of the liabilities of its services result in increasing the foreign cash share allotted to the payment of the liabilities of such debts, which undermines the debited country's ability to import and thereby causes the quantity of imports to decrease and their prices will rise due to inflation.

2- Increasing debt liabilities correspond to rising costs of projects that are financed by the foreign loans. This results in inflation pressures, which result in increasing the prices of the manufactured goods; i.e., cost inflation.

3- The aggravation of the debt liabilities imposes pressures and devalues the local currency exchange rates, and also results in increasing the prices of imports, including goods and services. Subsequently, production costs increase, which causes inflation pressures that are reflected in the rising prices of imported and manufactured goods. Hence, inflation is a serious phenomenon threatening the stability and entity of the economies of developing countries. In fact, it undermines the exportation competitive capability of the country, and further results in the deterioration of exchange rates, which is negatively reflected in the balance of payments because inflation will promote the deficiency of the commercial balance and result in the transfer of capital abroad, which causes a deficiency in the capital movement and results in increasing the need to continue borrowing from the foreign countries.

2.4 Summary

This chapter investigated the external factors that caused the worsening of the financial system, which are: rising real interest rates, fluctuating oil prices, deteriorating conditions of commercial exchange for the developing countries, the effects of the economic recession in the industrial countries and increasing customs protection measures and trade barriers faced by exports from developing countries. Whereas, internal factors are: increasing dependence on foreign funding, deficiency or lack of proper policies for development mismanagement, capital flight from the developing countries and domestic inflation and deterioration of exchange rates. The growth of external debt in the 1970s and 1980s can be traced back to a combination of external and internal factors as follows:

1- The 1980s was characterized by higher real interest rates.
2- The decade witnessed the adoption of anti-inflationary policies in advanced countries which led to a rapid rise in the nominal interest rates which then created substantial debt-servicing obligations to the less developed countries. The high nominal interest rates were caused by the fear that inflation would return.
3- Falling exports earnings for less developed countries were caused by the lower price of exports due to bad terms of trade and declining demand for imports in developed countries. The lower export price and higher interest rate led to mounting real cost of old and new debts.
4- The period after 1982 witnessed a rapid fall in savings surpluses of oil-rich countries and in surpluses of commercial banks and monetary institutions, coupled with a rapid deterioration of the USA saving-investment balance.
5- The world economy in the 1980s witnessed a sharp recession, high rates of interest, and declining commodity prices.
6- Most indebted countries in the Third World have been affected adversely by the sharp rise in the real interest rates and the decline in commercial bank lending, which brought formidable challenges in financing their investment to generate growth.

Thus, the debt crisis of less developed countries became a growth crisis from 1980. Many severely indebted countries in Africa experienced a sharp decline in savings and investment, resulting in slower growth rates in the face of growing population pressures. A sharp increase in the price of energy, capital goods and other imports have increased the imports bill and led to a deficit in the balance of trade and a deficit in the balance of payment. The following

chapter reviews the literature relating to the variables of economic growth and external debt of developing countries, in order to achieve the objectives of the study growth models are be discussed. In particular, the traditional growth theories such as the Harrod-Domar, neoclassical and endogenous growth model are presented.

Chapter Three: Economic Growth and External Debt: a Review of Literature

3.1 Introduction

The aim of most developing countries is economic development, which, as defined by Kondonassis (1991), is concerned with improving the standard of living for populations of specific locations through the efficient and sustainable allocation of scarce resources. However, economic development is dependent upon economic growth, and such growth must usually be underpinned by some amount of structural change. In its focus on the transformation of economic structures and institutions, research into economic growth favours the use of mathematical models to explain the quantitative relationships between economic variables. One such variable that emerged after the debt crisis experienced by many developing countries in the early 1980s is external debt. This chapter therefore explores the literature relating to the variables of economic growth and external indebtedness of developing nations.

3.2 Economic Growth

The phenomenon of economic growth is not new, and can be traced back several centuries to the ideas of "classical economists such as Adam Smith (1776), Thomas Malthus (1798) and David Ricardo (1817) as citied by Nahuis, (2003) and countless researchers since the 1950s, who identified the fundamental requirements for the growth of economies, without formulating specific models in this respect. However, in more recent times, neoclassical economists, for example, Allyn Young (1928), Frank Ramsey (1928), Joseph Schumpeter (1934), Ray Harrod (1939), Frank Knight (1944), and Evsey Domar (1946), have favoured the use of rigorous models to analyse economic growth, and several theories have emerged from these 'pioneers' in economic modelling.

Ramsey (1928), Solow (1956), and Swan (1956) are considered to be the main contributors to neoclassical growth models, while later scholars (Romer, 1986; Lucas, 1988) formulated endogenous growth theories. These aimed to explain the rate at which a country's economy grows over time, economic growth is generally measured as the annual percentage rate of growth of the country's major national income accounting aggregates, such as the Gross National Product (GNP) or the Gross Domestic Product (GDP), with appropriate statistical adjustments to discount the potentially misleading effects of price inflation (Johnson, 2000).

All economies demonstrate quite frequent movement (from quarter to quarter, and year to year) in their growth rates, but the attention of economists is usually focused on fluctuations in the long term, or the average rate of economic growth over ten years, and often longer, periods. Consequently in Business cycle theory are often left with the explanations of the short-term fluctuations around the longer term trend because investigation has revealed that the predominant influence on short-term growth rates seem to differ in important ways from the determinant of an economy's long-term average growth performance (Zhang, 2005).

3.2.1 The Harrod-Domar Growth Model

Using mathematical modeling, the Harrod-Domar growth model demonstrates a direct relationship between savings and economic growth, and an indirect relationship between capital and economic growth. In attempting to integrate a Keynesian interpretation with aspects of economic growth, the model assumes economic growth to be a direct result of capital accumulation in the form of savings. Economists have used this model in efforts to estimate the finance gap of a developing economy, claiming, and as noted by Effendi (2001), that in a situation where an abundant stock of labour exists, the only constraint to production is lack of capital. According to the Harrod-Domar model, growth is proportional to the rate of investment, being equal to investment divided by the Incremental Capital Output Ratio. The investment required to meet any target growth rate can be estimated by multiplying the target by the Incremental Capital Output Ratio. Hence, the financing gap represents the difference between available and required investment, and theoretically, when such a gap is plugged by the presence of foreign capital, the target growth rate should be achieved (Tiruneh, 2004).

In other words, the need for foreign borrowing finds its objective reason in closing the gap existing among the targeted investment needs and the available national savings; i.e. between the investment rate needed to be achieved to reach the targeted growth rate and the domestic saving rate achieved in the light of certain social, economic and political conditions (Rajan, 2009). It is usually called the "local resources gap" or "investment-saving gap". Nonetheless, this theory is not supported by empirical evidence since the tremendous external debt that has accumulated in developing countries since the 1960s has not been accompanied by a per capita income increase.

To illustrate the Harrod-Domar growth model, let savings (S) be some proportions, of national income (Y) such that S = sY. Investment (I) is defined as the change in capital stock, K, and can be represented by DK such that I =DK. Total capital stock, K, is directly related to national income, Y, as represented by the capital-output ratio, k, such that K/Y = k. This capital-output ratio can also be written in its marginal value as DK / DY = k, which is popularly known as the incremental capital-output ratio. Since the equilibrium saving, S, must equal total investment, I, it follows that sY = kDY or in a more familiar expression, DY /Y = s/k. This equation tells that the rate of growth of output is determined jointly by the national savings ratio, s, and the national capital output ratio, k. It also says that the growth rate of national income will be directly related to the saving ratio and inversely related to capital-output ratio.

Theoretically, the Harrod-Domar growth model is limited in that it requires the equalization of warranted and natural growth rates, and uses production functions that do not have much suitability between the inputs, thereby rendering it unstable. The production function within the model is of the Leontif type, with a fixed proportion of inputs. Consequently, being aware of these shortcomings, economists tend to favour less rigid growth models that have greater applicability in empirical efforts (Salvadori, 2003).

3.2.2 The Neoclassical Growth Model

The weaknesses of the Harrod-Domar growth model were addressed by the Solow (1956) and Swan (1956), who both independently produced a response referred to as the neoclassical growth model. These researchers used production functions exhibiting constant returns to scale, diminishing returns to each input, and positive substitutability to inputs. In this model, the production function is assumed to be a function of capital, labour and technology, and it is assumed that through a constant rate of saving, growth in the long term is a function only of technical progress (not of saving or investment). It is acknowledged that saving influences income levels, but not growth rate. Consequently, per capital growth will cease in an economy where there is no continuous improvement in technology.

Expressed in formal terms, the standard production function in the neoclassical growth model is $Y = Ae^{\mu}K^{\alpha}L^{1-\alpha}$,where Y is the gross domestic product, K is the stock of human and physical capital, L is unskilled labour, A is a constant reflecting the base level of technology,

and e^{μ} represents the constant exogenous rate at which technology grows. In this formula α represents the elasticity of output with respect to capital, this is the percentage increase in gross domestic product from a one percent increase in capital.

Empirically, α is measured as the share of capital in a country's national income accounts. This formulation of the neoclassical growth model yields diminishing returns to capital and labour since α is assumed to be less than one and private capital is assumed to be paid its marginal product. The Leontif production function with two inputs is stated in a general form as Y= min (α K, β L) where Y is national output, K is capital input; L is labour input, and α, β are constants.

The Solow-Swan neoclassical model shows that an increase in saving, subsequently reflected in investment, generates additional temporal growth. However, as the ratio of capital to labour increases, the marginal product of capital will decline and the economy will move back to a steady state in which output, capital, and labour all grow simultaneously. Growth in per capita income will continue and will equal μ, which is the annual rate of productivity improvement. The constant, μ can be interpreted variously as the improvement of organizational knowledge, re-arrangement of the flow of materials in a factory, or better management of inventory. However, there is a central concern with this model, that being that the determinants of the size of μ, the rate of growth of per capita income are left unexplained, thereby introducing an implicit shortfall in its predictive ability (Salvadori, 2003).

It is suggested in neoclassical growth theory that countries possessing the same technology will experience the same steady per capita income growth, thereby implying that a country with a low capital-labour ratio will have a higher per capita growth rate than one with a high capital-labour ratio, resulting in what is referred to as absolute convergence. In contrast, conditional convergence arises where a country experiences a growth rate despite having a lower starting level of real per capita income relative to the steady state position or long-run (Xiujuan, 1976). There has been much exploitation of the conditional convergence prediction emanating from the neoclassical model, and the results are mixed. Barro and Sala-I-Martin (1992), for example, were able to report convergence among the 50 states of the US in respect of per capital income and per capital gross state product income rates. Romer (1986) and

Lucas (1988) on the other hand, reported an absence of convergence of the growth rates of different countries. Barro and Sala-I-Martin (1992), however, argue for the likelihood of greater conditional convergence in homogeneous environments.

Adding to the neoclassical growth model provided by Swan and Solow, is that offered by Ramsey, which was in fact developed much earlier (in 1928), but which has undergone various refinements over the years. One of the key features in Ramsey's framework is the assumption that households optimize their utility over time, and this fundamental premise allows the model to operate dynamically. However, within it, the saving rate is exogenous, and continues to be so in the Solow-Swan model, whereas Cass (1965) and Koopmans (1965) in re-visiting the Ramsey theory amended this to become endogenous. That said the dependence of the long-term growth rate on exogenous technological progress is not eliminated in this later refinement, which, in effect, finalizes the efforts from the neoclassical growth school.

3.2.3 Endogenous Growth Models

Since then, renewed attention has been directed to growth theory, through the emergence of research that uses endogenous variables to explain growth rates. Romer (1986) and Lucas (1988) marked the onset of such investigations; carrying forward the arguments by Cass (1965) and Koopmans (1965) that long-term economic growth rate is determined by an exogenous technological progress.

Essentially, endogenous growth models share similarities with neoclassical frameworks but their underlying assumptions and suggested conclusions vary substantially, and three main deviations are clear, these being: firstly, the models reject the neoclassical assumption of diminishing marginal returns to capital; secondly, increasing returns to scale in aggregate production are envisaged; and thirdly, they appreciate the role of externalities in determining the rate of return on capital.

Endogenous growth theory can be expressed in a simple equation $Y = AK$, where
A represents any factor that influences technology, and K represents both human and physical capital. There are no diminishing returns to capital, a feature that can be achieved by invoking some externality that offsets any propensity to diminishing returns. Investment of any kind (physical or human capital), leads to an increase in productivity that exceeds the private gain.

This model embodies the potential for an increase in the investment rate (physical or human capital), to precipitate sustained growth if strong external economies are generated by the investment itself so that α in the neoclassical model becomes unity (Todaro & Smith, 2009).

In this case, the growth equation $Y = Ae^{\mu}K^{\alpha}L^{1-\alpha}$ reduces to the endogenous equation $Y = Ae^{\mu}K$. Sustained long-term growth resulting from increasing returns to scale is the net result. As is clear, there is no consideration of diminishing returns or of any sustained impact on growth, characteristic of the basic neoclassical growth model. Another way of obtaining an equation like $Y = AK$ is to posit that increased quality and/or variety of machinery or intermediate inputs offsets the predisposition to diminishing returns. Basically then, diminishing returns are not present in endogenous growth models, since any such appearance is counteracted by other forces. Hence, this type of growth theory is valuable in explaining anomalous international flows of capital that exacerbate wealth disparities between developed and developing countries (Salvadori, 2003).

Potentially, developing countries have a high rate of return on investment due to the law of diminishing returns. This is, however, evaporated by lower levels of complementary investment in human capital, infrastructure, or research and development, with the consequence that these economies do not benefit as much as advanced economies, from the broader social gains associated with each of these alternative forms of capital expenditure. Endogenous growth models also imply a proactive role for public policy in the promotion of economic development through direct and indirect investment in human capital formation and foreign private investment (Todaro &Smith, 2009).

It is assumed in such models that productive services that bring increases in the marginal product of private capital, and consequently impact upon economic growth are supplied by government. In this respect, if government investment is endogenous, and the production function is simultaneously homogenously linear in public and private capital, this approach yields an endogenous rate of growth. The first researchers to introduce productive public capital in growth models were Arrow and Kurz (1970), but they still used endogenous factors as determinants of growth. Later, their approach was adapted by Barro (1990) who presented a model with both endogenously determined growth rates, and a balanced budget. He, moreover,

assumed that government spending enters the macroeconomic production function as a flow variable, whilst Arrow and Kurz (1970) presumed the stock of public capital to show productive effects.

Another endogenous growth model, formulated by Futagami et al (1993) assumes the stock of public capital to have positive effects on the marginal product of private capital, thereby precipitating endogenous growth. Working at the same time, Ewijk and Klundert (1993) investigated the influence of different budgetary regimes for the dynamics of public debt and growth in a conventional growth model. They found that where the government keeps the budget deficit constant is less favourable with regards to productivity growth as compared to a regime where the government varies the budget deficit (Greiner, Semmler, 2000).

Despite their attraction, endogenous growth models have two important limitations, these being that they do not predict convergence either in absolute or conditional terms, and empirical evidence in support of their claims is minimal.

3.3 External Debt

In an effort to accelerate their economic development, developing countries often rely on external resources of capital to supplement the lack of domestic capital (Panizza, 2008). According to the World Bank (1996), foreign capital transfer can take various forms such as investment flows into equity markets either as collectives or holdings, direct investment by foreign organizations, loans of an official nature whether from individual countries or groupings, private debt such as by way of bonds, commercial banks or other interested parties, or official grants (aid) or official loans external debts, official loans and private debts are part of foreign capital transfer.

The issue of external debt has been at the centre of the economic development policy debate for many years. External debt research proliferated in the mainstream of economic literature when the debt crisis hit developing countries in the early 1980s. Since then the discussions on external debt and foreign aid have become an increasingly important subject for development economists.

3.3.1 The Early Stages

Developing countries have been influenced by the idea of a "financing gap." Essentially this is simply the difference between the funds that are available from purely domestic sources and the total investment required. One way to close the gap is by borrowing from abroad (Easterly, 1999). And as asserted by Easterly (1999), the idea itself originated in April 1946 when Evsey Domar published an article on economic growth called "Capital Expansion, Rate of Growth, and Employment". Domar's approach to growth became popular for developing countries to adopt. This model postulated that there would be a proportionate relationship between investment spending and the total growth of GDP. Thus it would be possible for development economists to calculate the required rate of investment against the targeted growth rate. It has been previously explained how the Incremental Capital Output Ratio (ICOR) would be used in this regard. Even though Domar has gone on record as acknowledging that in fact his model failed to make complete sense as far as growth is concerned, nevertheless this has proved to be the most widely used growth model in economic history (Effendi, 2001).

The idea of financing gap reappeared in the work of Rostow (1960) when he published "The Stages of Economic Growth" In it, Rostow suggests for any country to move from being a less developed to a developed economy it needs to pass through a sequence of events, or stages. The five stages he mentions in his article are the pre-existing society, the right conditions conducive to take-off to a growth cycle that can be self-sustained; the actual take-off itself, the urge to reach maturation and the era of intensive mass consumption. In order to reach the stage of take-off there needs to be utilization of all available internal and external savings so as to be able to generate sufficient investment so as to accelerate to the targeted growth. As discussed earlier, there is a proportionate relationship between such investment and economic growth. As Rostow indicates the necessary condition for a take off is that investment increases from 5 to 10 percent of income. If a developing country does not have enough domestic resources it must fill the gap with foreign aid or external debt. These mechanisms are in line with the idea of a financing gap (Rostow, 1960).

Cheney and Strout (1966) augment the Harrod-Domar Financing Gap model with an understanding of the need to have savings funded internally. National saving, in the event of an existing temporary shortfall between investment ability and saving ability can be

supplemented by foreign aid. Using the Incremental Capital Output Ratio (ICOR) formulation, investment will induce growth. Self refinancing occurs if a particular country has a high enough marginal saving rate. Only then will a country be able to finance its investment out of its own saving (Nushiwat, 2007).

3.3.2 The Debt Crisis

Early warnings about the danger of excessive indebtedness have been mentioned by Bhagwati (1966). He noted that Turkey was experiencing problems servicing its accumulated debt. Further indebtedness would exacerbate the situation. Bauer (1972), one of the early opponents of foreign aid, somewhat ironically noted that additional external debt is often called for as less developed economies were struggling to meet their pre-existing loans (even where these were subsidized) under earlier foreign aid agreements.

The debt crisis that hit many debtor countries in the early 1980s resulted in a rapid expansion in external debt study. Topics such as debt solvency, debt forgiveness and the identification of the causes of the crisis have been surveyed intensively. Later, however, research interest has shifted to the interplay between external debt and investment, external debt and growth, foreign aid and growth, aid and its relation to poverty.

Articles by Cline (1984) and McFadden et al. (1985) are two of the earliest studies that try to identify the underlying factors in the debt crisis. They attempted to explain the debt crisis by examining a series of financial variables across a range of different economies. This would include factors such as the ratio of external debt servicing to exports, the relationship between imports and foreign exchange reserves and so forth. Berg and Sachs (1988) argue that those studies suffer from endogeneity problems because rather than these being supposed causal variables (such as low foreign reserve holdings) they are not in fact the fundamental cause but rather are simply the symptoms of the crisis. They instead noted the foreign trade system in the analyzed countries in order to evaluate which economies became embroiled in the debt crisis and those which did not succumb to this difficulty. Using a probability model they discovered where there is a higher income inequality measuring a cross section of middle income countries this would significantly indicate a greater likelihood of the need for debt to be re-scheduled. Additionally, where there is an export driven regime this would significantly reduce the likelihood of the need for any debt re-scheduling (Kohlscheen, 2004).

The debt crisis is argued to cause the investment decline and growth collapse in the 1980s, particularly in heavily indebted developing countries. Kaminsky and Pereire (1996) calculated the drop in growth rate for Latin American countries to be more than 4 percent (from around 6 percent in the 1970s to 1.8 percent in the 1980s). In their studies using simulation and econometric method, they find that once government policies have been taken into account in relation to social inequality and consumption, it becomes apparent that the ability of the economy to continue servicing its existing debt is a key factor in understanding how and why there proved to be a collapse in both investment and output growth in Latin America in this period. However, subsequent to the 1982 debt crisis and the resultant diminishing of capital inflow they note that this affected investment but not internal consumption. As a consequence there was a sharp decrease in output growth.

3.3.3 Debt Overhang

As asserted by Kaminsky and Pereira (1996), Sachs (1989) was the first to attempt to really explain through the debt overhang hypothesis the debt crisis riddle. Debt overhang can be defined as a situation where the actual value of the foreign debt is less than the repayments that fall due. The "debt overhang hypothesis states that the external debt burden provides a disincentive to domestic investment in developing and [thus slows] economic growth since any additional foreign-exchange earnings would have to be turned over to foreign creditors" (Effendi, 2001, p.18)

Krugman (1988) provides a straightforward definition of the problem of debt overhang: this is simply when the anticipated present value of any future potential resource transfers is less than its debt. In the paper, Krugman shows that the choice between additional financing and debt cancellation to be somewhat of a dichotomy. Financing could create for any creditors an option value: that is to say that in the event of the country having exceeded expectations the creditors would not have had to write down unnecessarily any claims. On the other hand from the perspective of the country there could be an incentive distortion as creditors are more likely to be rewarded than the country itself (Krugman, 1988).

Borenzstein (1990) outlines two different routes by which investment can be affected by foreign debt. These can be described as credit rationing and debt overhang. Using a simulation method, he found that, for heavily indebted poor countries, these two non-mutually exclusive

effects are significant in explaining the significant decrease in investment in the 1980s. However, he also finds that credit rationing is a more important disincentive to investment than the debt overhang (Borenzstein, 1990).

Warner (1992), using a forecasting method, concludes that debt overhang may not be an important factor in explaining investment decline. Rather, shocks caused by high world interest rates and falling export prices in the early 1980s have been a direct cause in the rate of investment decline. One important result from his study is that a debt crisis dummy added to panel regressions that pool the data on all of the heavily indebted countries in the sample not only fails to have a negative coefficient as the debt theories predict, but actually is positive and significant (Warner, 1992).

3.3.4 Highly Indebted Countries

The International Monetary Fund (IMF) and the World Bank were behind the proposed Highly Indebted Poor Countries (HIPC) debt initiative. This was agreed by governments around the world in the autumn of 1996. The initiative was the first comprehensive approach to reduce the external debt of the world poorest and most heavily indebted countries by providing debt relief. For the first time in relation to debt relief efforts, poor countries meeting certain criteria were be provided debt write downs of World Bank and International Monetary Fund claims in current value terms. In the end of 1999, there were 40 countries classified as HIPCs. Among those, 32 are in Africa, 4 are in Latin America, 3 are in Asia, and 1 is in the Middle East. Table (1) provides a complete list of countries that are under the HIPC programme in 1999.

Table 1: the Heavily Indebted Poor Countries (As of October 1999)

Africa		Latin America	Asia	Middle East
Angola	Malawi	Bolivia	Lao, Peoples	Yemen Rep
Benin	Mali	Guyana	Dem. Rep	
Burkina Faso	Mauritania	Honduras	Myanmar	
Burundi	Mozambique	Nicaragua	Vietnam	
Cameroon	Niger			
Cntrl. African Rep	Rwanda			
Chad	Sierra Leone			
Congo	Sao Tome and Principe			
Congo, Dem. Rep	Senegal			
Cote d'Ivoire	Somalia			
Ethiopia	Sudan			
Ghana	Tanzania			
Guinea	Togo			
Guinea-Bissau	Uganda			
Kenya	Zambia			
Liberia	Madagascar			

Source: The World Bank

While debt overhang theory provides some explanations of the debt problem that HIPCs face, there are other factors as well. Easterly (1999) tries to find why the HIPCs became highly indebted. The sample period covered in his study is 1979-1997, a period that includes the first wave of debt crisis (early 1980s) and the second wave (early 1990s). The study casts doubts on the effectiveness of the programme. A set of theoretical models used in the study predict that countries with consistent on-going savings preferences will react to any debt relief with a mix of additional new borrowing or de-cumulation of assets. When developing countries are compared to highly indebted countries the study concludes that there is both direct and indirect evidence of new borrowing and asset de-cumulation in the event of debt relief. Despite the debt relief efforts, the study showed that there was a significant deterioration in the value of exports when compared to the net present value of debt in the period covering 1979-1999. Another significant finding is that there has been an important change over a period of time whereby there has been greater financing by way of IDA and multilateral financing of a concessionary nature than by way of bi-lateral and private non-concessional sources. However, this inherent debt relief has had a negative impact on net present debt value.

Aid mismanagement by corrupt government may also be a significant contributor to high indebtedness of HIPCs. The study by Alesina and Weder (2002) shows that there where a government is less corrupt that they as a consequence receive greater levels of foreign aid. Surprisingly, according to some corruption measures, where a government is more corrupt they often receive higher levels of foreign aid. This therefore tends to increase the likelihood of a worsening debt problem. On the reverse causation, the study concludes that there is no evidence of a reduction in corruption where there is an increase in foreign aid.

3.4 Empirical studies related to external debt and economic growth

There is still argument in terms of the exact relationship between external debt and economic growth. Attention to this relationship appeared in the early 1980s in the debt crisis, and there seems to be two diametrically opposed notions with two distinctive groups in this relationship. There are few scholars (Krugman, 1988; Sachs, 1989) who have empirically studied the debt overhang and crowding out effects. The majority of the empirical studies have found that the relationship between a fairly standard set of domestic variables and growth or investment was significant and negative; this relationship is based on the focus of research.

It is suggested in the literature that a developing country engaging in 'reasonable' levels of borrowing, is likely to improve its economic growth (Wang, 2009). Such enhancement is believed to occur through capital accumulation and productivity growth (Abid Hameed, et al 2008). According to the traditional neo-classical model, debt increases transitional growth, since the model permits capital mobility, and the ability to involve foreign sources in both borrowing and lending. This provides capital-scarce countries with an incentive to borrow and invest, since the marginal productivity of capital is greater than the world interest rate (Pattillo et al., 2002).

There are similar implications apparent in some endogenous growth models, for example, Barro and Sala-I-Martin (1995), and Barro et al (1995) believe that models with perfect international capital mobility are founded on unrealistic assumptions and contain empirical implications that are counterfactual. These researchers assert that it is more realistic to assume that countries may be unable to borrow as they wish, because of moral hazard, or the risk of debt repudiation. Gertler and Rogoff (1990) argue that the borrowing country might be able to hide its actions from the lender, and may then decide to consume or reinvest some of the

borrowed funds abroad. Developing economies usually have only a small capital stock, and are likely to have investment opportunities with high rates of return above those in developed countries. Provided these countries direct their borrowed funds to productive investment and there is no macro-economic instability, policies that distort economic incentives, or large adverse shocks, they should experience growth that in turn should ensure their capability to make debt repayments on time.

A pertinent question to be asked in connection with the theory of debt-growth is whether large amounts of accumulated debt would necessarily lead to lower growth. In this respect, the (debt-overhang theory) provides a ready answer, demonstrating that if domestic and foreign investors perceive a country's developing debt to exceed its ability to repay, they will be discouraged from further investment (Krugman, 1988; Sachs, 1989). The theory suggests that in such a situation, the domestic economy is taxed, being required to service the external debt costs, and in consequence investors limit their involvement, thereby discouraging economic growth. The 'Debt Laffer Curve', which depicts the relationship between economic growth and debt accumulation, "posits that larger debt stocks tend to be associated with lower probabilities of debt repayment. On the curve's upward slope (or good section), increases in the face value of debt are associated with increases in expected debt repayment" (Pattillo, Poirson& Ricc, 2004, p.4). On the other hand, increases in debt reduce the expected debt repayment on the curve's downward slope (or bad section) (Dunne, 2003). Additionally, in anticipation that some element of the debt will have to be forgone, private foreign investors will refrain from providing new finance, thereby lowering a country's ability to accumulate capital (Elhanan & Krugman, 1989).

Debt-overhang theory revolves around the negative impacts of external debt on investment in physical capital, but in effect, this theory has much wider scope. Clements et al (2003) note that high levels of external debt can also discourage governments from implementing structural and fiscal reforms, since improvements in a country's fiscal standing could strengthen the pressure to repay foreign creditors.

It is also emphasized in a different stream of debt-overhang theory that large debt accumulations increase expectations that debt service tends to be underwritten by distortion measures, such as inflation tax or reductions in public investment (Agenor and Montiel, 1999). According to Agenor and Montiel (1999), uncertainty surrounding potential taxes for private

domestic agents may have adverse effects upon the domestic economy, as well as possible discouraging impacts upon policymakers. Whilst a shortfall in the budget exists, there is always the possibility of increased taxation, and until more concrete information is available, it is highly likely that private investment in irreversible activities (such as physical capital and the acquisition of claims on the domestic financial system) will be postponed. In such a situation, private investors may prefer to wait, to continue but with a reduced investment, re-direct their resources towards activities that will being rapid financial returns with high risk, or opt to transfer their money abroad (Agenor and Montiel, 1999 as citied by Habimana, 2005), Serven (1997) asserted that where uncertainty surrounds the business of investment, private investors generally wait for more favourable conditions.

According to debt-overhang theory, the effects of debt are not restricted to physical capital but also apply to any activity requiring the injection of initial finance in the interests of improved productivity in the future. Examples of such activities are commitment to the development of human capital (education and health), and to technology acquisition, both of which may turn out to have stronger influences on growth in the long term (Clements et al., 2003).

In general, the literature discussing the relationship between foreign indebtedness, investment and growth, has concentrated on the negative outcomes of 'debt-overhang'. It is argued (Krugman, 1988, 1989; Sachs, 1989) that where a country's debt levels are anticipated to exceed that country's ability to repay, the costs involved with the continual servicing of the debts will impact unfavourably upon the country's economic performance. There is some benefit to be derived by the creditor country since a portion of the debt is repaid from the returns from the investment in the domestic economy. Hence, from the debtor country perspective, the debt overhang represents a high marginal tax rate on the country, reducing the return on the investment by domestic and foreign investors. This in turn hampers the formation of domestic capital with the result that the long-term economic development of the debtor country is severely compromised (Corden, 1989).

Clearly, debt-overhang theory focuses on the negative impacts of external debt stock on capital formation, but even so, it has not identified the total effects on growth, and as argued by Corden (1989), there are other, wider consequences. For example, debt overhang can stand

as an obstacle to growth by virtue of the fact that it may discourage governments from undertaking structural reform, such as trade liberalization, and fiscal reform aimed at providing national benefits, since a large part of those benefits would be diverted to creditors through higher debt repayments. Hence, debt overhang can result in a poor macro-economic policy environment. Yet another unwelcome outcome of high debt stock is policy uncertainty, since governments might enact distortionary measures to finance their debts, and suspicions of this kind are detrimental within the investment market. As noted by Serven (1997), in these situations, investors re-direct their capital to projects that offer quick returns rather than becoming committed to long-term, high risk, and often, irreversible investment. Such behaviour naturally reduces the efficiency of overall capital accumulation. Consequently, if high indebtedness is genuinely an obstacle to growth, as the debt overhang theory and the literature suggest, a potential solution might be debt relief, since the removal of the debt will normalize incentives.

Debt overhang does not only occur when a country accumulates too much debt, and can also arise when a country's circumstances change, making it difficult for a stock of debt that it was initially able to manage, to be discharged. Such conditions may emerge because of adverse economic shocks or poor economic policies (Arslanalp and Henry, 2004), and in these unfavourable circumstances, creditors' loan portfolios will face enhanced risk. The outcome is panic among creditors who rush to cash their claims, and the withdrawal of interest from potential new creditors in underwriting new loans. As a consequence of these events, the net resource transfers (NRTs) become negative, the tax burden on private sector rises, and investment and growth fall, precipitating yet more claims from creditors. In this context, the only way to encourage adjustment, investment and growth, is to write off the debt (Deshpande, 1997).

There is an attraction to the debt-overhang theory as a plausible explanation for the combination of impeded investment and growth together with increased negative net resources transfers, but empirical studies in this field have produced mixed results. Using panel data for fifteen developing countries, Serven and Solimano (1993) explored the macro-economic determinants of investment performance, finding that a significantly adverse effect on private investment is caused by the foreign debt burden.

Additionally, foreign debt burdens (and adverse external factors) were found to be the largest contributor to the decline in the average private investment/GDP ratio after 1982. Deshpande (1997), Greene and Villanueva (1991), Elbadawi and Francis (1997), and Chaudhary and Anwar (2001), all report outcomes that support the debt overhang hypothesis.

In his comparison of highly indebted poor countries (HIPCs) with other moderately and severely-indebted countries, Chowdhury (2001) uses extreme bounds analysis, aiming to establish whether the countries eligible for HIPC debt relief should be extended to include others. His finding that debt stock and debt service negatively influence growth rates in both country groups suggests the presence of debt overhang, and the possibility that beneficial consequences could arise from debt relief for those countries not currently part of the HIPC initiative. On the same theme, Djikstra and Hermes (2001) explore whether uncertainty surrounding annual debt service payments has an adverse effect on the economic growth of HIPCs, finding support for this hypothesis. The non-linear influence of external debt on growth is assessed by Pattillo et al (2002) using panel data for 93 developing countries from 1969-98. With this data these researchers used several econometric tests, and found the average impact of external debt on per capita GDP growth to be negative for net present value of debt levels above 160-170% of exports and 35–40% of GDP. Their findings indicate that doubling debt levels slows down annual per capita growth by about half to a full percentage point, (International Monetary Fund, 2006). Subsequently, Pattillo et al (2004) investigated the ways in which growth is affected by debt, finding that high debt stocks impact negatively upon on growth as a result of earlier negative impacts on both total factor productivity growth and physical capital accumulation. This unfavourable impact is also reported by Clements et al (2003), who find a ‘crowding out’ effect of debt service on public investment, which in turn reduces a developing country’s overall growth rate. They argue that growth rates in some HIPCs would rise by 0.5% annually if resources liberated by debt service relief were directed towards public investment.

As indicated by Karagol (2004), there is much interest from developing countries in the relationship between foreign debt and economic growth, since debt overhang has an impact on investment, and consequently on economic growth. However, the cause and effect is not a simple matter to establish. Clearly, debt overhang has a substantial influence on the rate of

investment, prompting reductions the greater the overhang. Claessens et al (1996) discuss debt overhang theory, illustrating that anticipated debt service becomes an increasing aspect of a country's output, as debt itself increases. Indeed, the situation may arise where debt service is such that the country does not have the ability to pay. As debt service grows, foreign creditors effectively remove some of the returns from investing in the domestic economy, and accompanying this removal, is the discouragement of new foreign investment (Clements, Bhattacharya & Nguyen, 2005; IMF, 2006). At the same time, the need to service debts ties an indebted country to its creditors (Dijkstra and Hermes, 2001). In effect, debt servicing transfers wealth from the domestic economy to foreign economy, creating certain dramatic multiplier-accelerator effects, which reduce the ability of the domestic country to develop its economy, and simultaneously enhance its dependence on foreign debt (Metwally and Tamaschke, 1994).

In the very heavily indebted countries, the external debt overhang is a major factor in depressing economic growth (Sachs, 1989; Bulow-Rogoff, 1990). It slows down economic progress because these countries lose their attraction to private investors. Additionally, the servicing of the debts eats up so much of the indebted country's revenue that the potential to return to growth paths is diminished. As indicated by Levy-Livermore et al (1998), even if hard adjustment programmes are put into place by governments of indebted countries, adverse incentive effects are still experienced on economic progress.

The problems associated with debt overhang are not quite as simple and straightforward as so far indicated, however, because it is not only investment in physical capital which is depressed, but also any activity involving upfront costs, such as for example, investment in the acquisition of technology, and in developing human capital. In fact, the effects of these two variables on economic growth may be even stronger than the effects on physical capital over time. The way in which debt overhang deters investment from private sources is a function of two factors, these being the way government expects to increase the means to pay the external debt service, and if both private and public investment are complementary. If, as argued by Were (2001), inflation tax or capital levy are introduced by a government, then such measures are likely discourage private investors.

There are other ways in which the requirement to service a large external debt can negatively influence economic performance, and these include the crowding out effect, which occurs due to high real interest rates and in this situation the terms of trade of an overly-indebted country become worse and foreign credit markets are no longer available. Claessens et al (1996) identify the decline in investment as being the effect of a decrease in a country's available resources for financing investment, and macroeconomic conditions. Additionally, anticipated higher taxes and failing domestic policies will negatively affect real returns on investment, leading to decreasing growth rates. And furthermore, foreign borrowing has an impact upon future growth through its influence on obligations to pay interest, thereby resulting in more outstanding debt. This has the result of tightening foreign exchange, and hence, future debt service obligations increase (Kamin et al., 1989). A reduction in a country's ability to service its debts results from the crowding out effect, and consequently as it strives to meet some of its obligations, there is little money available for domestic investment and growth (Patenio and Agustina, 2007).

Having considered the arguments and theory above, it can be seen that in simple terms, external debt produces a negative effect on investment, and this is known as the debt overhang theory. In the case where external debt exists and must be serviced, the indebted country is unable to fully benefit from any increase in production, as part, if not all, of the profits realized from such increase, are channeled out of the country and to the creditor. Investment decisions are made in the full knowledge of a country's ability to repay (Hansen, 2004).

Several scholars have supported the theoretical case for debt overhang, such as Dooley (1986), Krugman (1988), Sachs (1989), Froot (1989) and Calvo (1989). Additionally, there have been a number of researchers who have tried to test the debt overhang hypothesis empirically, among these being: Sachs (1989), Claessens (1990), Borensztein (1990), Cohen (1990), Warner (1992), Cohen (1993), Elbadawi et al., (1997), Iyoha (1999), Pattillo et al (2002) , Clements et al. (2003), Chowdhury (2004), Fosu,(2007).

In an effort to test the debt overhang theory empirically on private investment in the Philippines, Borensztein (1990) regressed investment on the relative price of investment goods, an estimate of the marginal product of capital, an estimate of expected real interest rate,

and several alternative debt variables. Of the six debt coefficients, five were significant and all negative, indicating that in the Philippines the stock of external debt has created disincentives for private investment, and that debt reduction would have beneficial effects on investment and growth.

Cohen (1990), for example, used pool data from 81 developing countries, taking investment as a percentage of GDP as the dependent variable, and population growth, inflation, the ratio of export to GDP, income per capita, the share of population in primary school, time and regional dummies, and the debt to export ratio in 1982, as independent variables. Cohen's findings are skeptical about the idea that debt stock reduces investment. Similarly, Warner (1992) is not convinced of the accuracy of debt-related explanations for the 1980s investment slumps, believing these to be part of the "same world economic shocks that caused debt problems in the first place". Warner examined out-of-sample forecasts of investment over the debt crisis period (1982-1989) using equations that incorporated world variables such as declining export prices for the indebted country, high world interest rate, and sluggish growth in industrialized countries that did not incorporate debt crisis effects. His conclusion was that investment was not depressed by the debt crisis. More attempts to test the debt overhang theory were made by Savvides (1992), and Oks and Van Wijnbergen (1995), who used Mexico as a case study, and found no debt, overhang effects. Likewise, a decade later, Brid and Milne (2003) and Arslanalp and Henry (2004) questioned the presence of a debt overhang problem in HIPCs, asserting that as the evidence demonstrates that official resource transfers to HIPCs often exceed their debt services payments, incentives for investment might not be distorted.

Using the OLS method on a sub-sample of 81 developing countries, over three sub-periods: 1965-1973, 1974-1981, and 1982- 1987, Cohen (1993) estimated an investment equation, demonstrating that the downturn of investment in highly rescheduling developing countries is not explained by the level of debt. Cohen (1993) also found that for the rescheduling countries the relationship between debt and investment were the same in the 1980s. This study also considered the impact of foreign aid on domestic investment. Here it was found that this was low and that 3% of GDP transferred abroad reduces investment by 1% below the financial-autarky rate.

The relationship between debt servicing, capital inflows and growth for three Arab countries (Algeria, Egypt and Morocco) was investigated by Metwally and Tamaschke (1994). They considered the period 1975-1992, and used both two-stage least squares (2SLS) and ordinary least squares (OLS) models to estimate the equations. Their results indicated that foreign debt and economic growth interaction was not one-way. They decided that the complicated interaction between debt servicing, capital flow and economic growth, was best investigated through the use of a simultaneous model, and after conducting such an investigation, the following results emerged:

- The relationship between debt servicing and growth should be examined with a two-way relationship.
- Economic growth negatively is affected by the rise in debt servicing ratio.
- The economy's growth potential is reduced by debt servicing. Thus, the debt problem faced by heavily indebted countries may be worsened by debt servicing.
- It is also argued that direct private investment is vital to the relationship of debt growth due to the fact that direct private investment does not directly affect economic growth, but is however affected by it.
- Large inflows of equity capital and equity capital contribute toward accelerated growth, attracted by high growth rates. They do so not only through their direct effect on the productive capacity of the economy, but also by reducing the country's dependence on external debt and thus reliving the negative impact of debt-servicing on the economy.

From these it can be seen how a significant influence upon the growth-debt relationship is exerted by capital inflows, because FDI accelerates growth and hence removes the need for the same levels of foreign borrowing. It is also seen that equity capital flows do not come about because of economic growth, and instead affect that growth.

With their focus on Turkey, Olgun et al (1998) conducted research using time series data covering the period 1965-1997. Their interest was on the interaction between capital inflows, foreign debt stock, economic growth and investment, and they used the two-stage least squares (2SLS) and three-stage least squares (3SLS) methods with their equations.

Their model is similar to that of Metwally and Tamaschke (1994) in that it has five equations, which contain exogenous variables. From their application of the 2SLS and 3SLS, a statistically significant two way relationship appeared between the debt stock and debt service, with an increase in the growth rate of the former causing an increase in the latter. And likewise, an increase in the growth rate of debt servicing causes an increase in the growth rate of the debt stock. Importantly, it also emerged that the rate of economic growth is not affected by debt servicing.

The relationship between direct, indirect and full effects of external debt, and GNP was investigated by Levy and Chowdhury (1993), who used panel data for the period 1970-1988 in relation to 36 highly-indebted developing countries. These countries were clustered into three distinctive regions, these being: Latin America, Asia-Pacific, and Sub-Sahara. Levy and Chowdhury (1993) established the potential interactions between GNP, public and publicly-guaranteed external debt, capital stock accumulation, and private external debt accumulation by employing a set of simultaneous equations, and found that GNP had the potential to be affected by a country's level of indebtedness as follows: “the higher the level of indebtedness, the larger the country's leverage, the more limited the external sources of credit, and the greater the number of incidences of financial distress and liquidation adversely affecting the GNP directly and indirectly through discouraging GNP level directly and indirectly through discouraging domestic investment” (Karagol, 2002, p.5). Furthermore, the rise in the public and publicly guaranteed external debt may indirectly lower the level of GNP by encouraging capital flight and discouraging capital formation due to the expectations of tax to rise. In order to finance external debt obligations, governments increase taxes (Karagol, 2002).

Savvides (1992) states that the net return to investment in indebted countries is decreased by the debt induced taxation of capital. Thus, from the debtor country’s perspective, as a whole, the debt overhang acts like a high marginal tax rate on the country slowing down the return to investment and discovering domestic capital formation. Savvides (1992) also considered the assertion by Bullow-Rogoff (1990) to the effect that economic downturn in developing countries is not caused primarily by the need to service external debt. The results of his study supported this claim and it is also debated that there is no compelling need to create an international institution for organizing debt rescheduling negotiation and debt relief between

their private creditors and indebted developing countries. The direct effect of the public and publicly external debt on GNP is negative for Latin America. The influence of debt reduction within a macroeconomic framework was investigated by Morisset (1991 as citied by Dijkstra and Hermes, 2003), who tested a number of relationships, both indirect and direct, between investment, external debt and economic growth. Morisset (1991) focused on the case of Argentina during the period 1962-1986, and used the three-stage least squares method for his simulations, considering some direct and indirect channels as a means of explaining the dramatic decrease in private investment.

Most scholars hold the opinion that in the event of credit rationing by the private sector, product investment is negatively affected because the high level of foreign debit creates a disincentive to produce. In most debtor countries, where increasing debt-service payments are not discharged, there is an expectation by the private sector that taxation on actual and financial assets will increase, and that in the economic environment generally there will be instability. Private investment is hence deterred by the debt overhang effect, and with increasing attraction of foreign assets relative to domestic assets, a greater increase in domestic interest rates occurs, thereby causing an even greater reduction in private investment.

In a study of the effect of foreign debt on economic growth in Sub-Saharan Africa during the ten-year period from 1980-1990, Fosu (1999) used the augmented production function, finding a negative correlation between outstanding debts and economic growth.
Exploring the same relationship, Karagol (2002) took Turkey as his focus and used multivariate co-integration techniques and a standard production function model with time series data from 1956-1996. Looking particularly for the short and long-term relationships between the two variables, he also found a negative relationship between debt service and economic growth.

Also in (2002), Pattillo et al sought to establish a relationship between debt and per capita growth. Their method was to adopt multiple regression techniques, controlling for standard determinants of growth such as lagged income per capita, the investment rate, secondary schooling, population growth etc. Most regressions were estimated both with, and without time dummies, in order to ensure that their results were not driven by time-specific effects or

the presence of outliers. Moreover, they used both the sample and a reduced sample obtained after the elimination of outliers. Their findings confirmed an inverted-U-shape relationship between debt and growth. A debt overhang effect on economic growth was also confirmed by Elbadawi et al (1996) in their study of 99 developing countries covering Sub-Saharan Africa (SSA), Latin America, Asia and the Middle East. Cross-section regression was used. In SSA in particular, they identified three direct channels whereby debt overhang suppresses growth, these being: past debt accumulation (encapsulating debt overhang) debt service ratio and current debt inflows as a ratio of GDP (which should stimulate growth). The fourth indirect channel was seen to operate as a consequence of the effects of the other three on public sector expenditure. It was revealed that growth was deterred by the accumulation of debt accumulation, and motivated in the opposite scenario. Data for Cameroon, confirmed that indebtedness and crowding-effects were seen on private and public investment respectively (Were, 2001; Mbanga and Sikod, 2001).

Further evidence from Africa comes from Iyoha (1997) who considered the issue in SSA and found heavy indebtedness to function as a depressant on investment, again through the crowding-out effect. Studying the Nigerian economy in the following year, Iyoha (1997) confirmed the phenomenon, noting its deterrent in respect of investment in the economy. Furthermore, in yet similar research, Iyoha (1999) focused on SSA countries, adopting a simultaneous equation and simulation method. The results were the same. Excessive external debt was shown to discourage investment and hence depress economic growth. And continuing his study of SSA, Iyoha (2000) reported the ratio of foreign debt to GNP ratio to be highly significant with a negative sign. In contrast, debt service negatively affects growth by the crowding out effect of public investment and appears as statistically insignificant.

More recently, in an investigation of the relationship between debt and economic growth for the period 1982-1999 in low-income countries (LICs), Chowdhury (2004) revealed similar negative effects on per capita real GDP growth, both in the HIPC sub sample (35 eligible countries) and in 24 other non-HIPC countries. Clearly, these findings are consistent with the debt overhang and crowding-out effect theories. Chowdhury (2004) suggests the need for an extension of the research to all indebted countries, on the grounds that large foreign debt sustains poverty.

However, it must be noted that his analysis is reached by placing debt flow and stock indicators into the regression separately, and that he does not consider either the institutional aspect, or the investment model.

Previously, Chowdhury (1994) conducted other research with panel data from Bangladesh, Indonesia, Malaysia, Philippines, South Korea, Sri Lanka and Thailand, spanning 1970-1988. His intention was to explore the direct, indirect and full effects of indebtedness on GNP and vice versa, and given the complexity of the perceived relationships in this respect, he adopted a structural simultaneous equation model which took as its assumption the idea that the basis that both dependent and independent variables are actually determined by each other. Attempting to provide an answer to the cause and effect questions concerning external debt and economic slowdown, Chowdhury (1994) used the Granger causality tests and found a rejection of both the Bulow-Rogoff (1990) and Krugman propositions that the external debt of the developing countries is a symptom rather than a cause of economic slowdown. However, it also emerged that a feedback-type relationship was not rejected for two of the countries in the study. Because of these mixed findings, the inter-relationships between public and private debt accumulation, capital accumulation and production were estimated using a system of simultaneous equations, with results that indicated the overall effects of the public and private external debts on GNP to be small and of an opposite sign, whilst a rise in the level of GNP, brings an accompanying and substantial increase in public and private external debts.

Chowdhury (1994) believed that the favourable estimates of the indirect impacts of the public external debt on GNP obtained demonstrate that the capital flight caused by expectations of tax rise is lower than the contribution of public borrowing in financing investment in capital stock. Furthermore, the impact on GNP of the whole impacts of the public external debt is both positive and large.

Looking at the different types of effect, it emerged that the direct effect of the private external debt on GNP is positive, but the adverse indirect effects on the external debt on GNP through lowering private investment and the overall level of capital stock are large in absolute value and substantially exceed the direct effect. Consequently, the full impact on GNP of such debt is negative.

Also in Chowdhury's estimates, a positive direct effect was shown on the stock of capital, by GNP, and the reduction of this positive effect is enhanced indirectly by the positive effect of the public external debt on capital stock. Overall, the effect of GNP on capital accumulation is positive, as also is the marginal product of capital. Furthermore, there is diminishing marginal productivity of capital!

Therefore, from the previous mentioned studies it can be seen that Cohen, (1993); Elbadawi et al., (1997); Pattillo et al., (2002); Clements et al., (2003); Hansen (2004); Chowdhury (2004) and Fosu, (2007) find that both debt service obligations and debt burden pressurize investment and economic performance. Cohen (1993) instead, supports the crowding out effect and rejects the debt overhang hypothesis.

In this study, the researcher has decided to adapt Chowdhury's (1994) model. Instead of the four equations as used in his model, he studied the relationship between four dependent variables, public and private external debt, capital accumulation and production function, this study focuses on two dependent variables, real income and investment depending on data availability and absence of long time series data, this restricts the reliability of the findings although in the case of this study, the data available is sufficient for using two separate equation to analyze the impact of external debt on economic growth and debt service on investment in some Arab countries.

To pursue the analysis, adaption of the Chowdhury's model is undertaken to explore the direct, indirect and full effects of indebtedness on economic growth and investment in three Arab countries together. The ideas used are similar to those of the original model, which is constructed on the basis that the dependent variables are not only determined by the independent variables, but also that some of the independent variables are determined by the dependent variables. This means the independent variable (Y) is determined by the level of investment (I), which is also a dependent variable in the second equation.

3.5 Summary

This chapter reviewed some of the existing literature on the relationship between external debt and economic growth in developing countries. Growth models were also discussed. In particular, the traditional growth theories such as the Harrod-Domar, neoclassical and endogenous growth models were presented. Moreover, the growth convergence debate between developing and developed countries was highlighted.

The issue of economic growth is of great importance to any nation state because it is the country's total output that determines the general welfare (per capita income) of the citizens. Many economists have formulated economic models that explain growth and how it is influenced by exogenous and endogenous factors. Key among them is the Harrod-Domar Growth Model, which argues that growth is directly related to the savings ratio, but inversely related to the capital ratio. The model assumes that economic growth is a direct result of capital accumulation in the form of savings. The higher a country's savings ratios are the higher the growth rate and vise versa. However, the model's shortcoming is that the equilibrium is unstable since it requires the equalization of warranted and natural growth rates. Also, it uses production functions with little suitability among the inputs.

The Solow-Swan model (1956), also known as the neoclassical, resolved the flaws of the Harrod-Domar Model. It uses production function that exhibits constant returns to scale, diminishing returns to inputs, and positive substitutability to inputs. The production function is assumed to be a function of capital, labour, and technology. It predicts that growth in the long run is a function of only technological change and not of savings or investment. The model further suggest that two countries with the same technology will have the same steady state growth rate of per capita income, implying that a country with a lower capital-labuor ratio will have a higher per capita growth rate than a country with a higher capital-labour ratio.

Romer (1986) and Lucas (1988) developed models known as endogenous growth models. Unlike the Solow-Swan model in which the long-run growth rate is determined by an exogenous technological progress, Romer and Lucas suggested a model that endogenises the growth rate. The endogenous growth models are similar to Neo-lassical models, but differ in their underlying assumptions and their suggested conclusions. In the next chapter the discussion has been organized into sectors which provide several definitions of external debt

and introduce the types of external loans and their role in financing Arab economic development.

Since the explosion of the debt crisis in the 1980s, many scholars have written extensively on the link between external debt and growth in developing countries. Most find one or more debt variables to be negatively and significantly correlated with investment or growth (depending on the study's focus). Development economists acknowledge that poor countries at an early development stage have insufficient capital stocks and will probably encounter investment opportunities with higher rates of return. In traditional neoclassical models, which allow for capital mobility, and the possibility to borrow and lend from foreign sources, debt increases transitional growth. Since the marginal product of capital is higher than the world interest rate, there is an incentive for capital-scarce countries to borrow and invest (Pattillo et al., 2002). Therefore, these countries can borrow to augment their limited domestic capital and hence promote growth and development through productive investments. Once growth is achieved, the returns of the invested resources should be used to service the debt.

However, many recent empirical studies on developing countries show that external borrowing, instead of positively promoting economic growth and investment, retards growth and investment. This is because high external indebtedness discourages the inflow of foreign capital in the form of investment for fear of pour macroeconomic policies that distort the economy. Debt-service, which is the immediate impact of large external debt, drains the debtor countries of resources that could be invested to promote growth. Owners of domestic capital withhold investment plans in fear of nationalization, thus, affecting growth. From evidence of the reviewed literature, the conclusion is that large external debt negatively affects economic growth and investment.

Chapter Four: Types of External Debt and Their Role in Financing Arab Economic Development

4.1 Definitions of External Debt

This chapter started by introducing the definition of external debt, which is “money borrowed by a country from foreign lenders. Interest on this debt must be paid in the currency in which the loan was made” (Zaki, 1995, p.163). Therefore, the borrowing country may conceivably need to export its goods to the lender's country in order to earn that currency. This means that in general, the debt is acquired by a country from foreign countries or banks, or from international institutions, such as the International Monetary Fund, and the World Bank. There have been many individual attempts on the part of some economists to determine the content of these debts, as well as some attempts by some international organizations. The total external debt is the amount of current actual, not potential, debts based on the inhabitants in a certain economy, in any time for non-inhabitants, which requires returning the payments from the part of the debtor in order to pay the interest and the original amount at a certain point, or temporal point in the future (International Monetary Fund, 2003).

The difficulty is in finding a common and accurate definition of external debt that is agreed upon by all different concerned parties. There are four major international organizations concerned with this issue, and they are: the Bank for International Settlements, the International Monetary Fund, the International Bank for Reconstruction and Development, and the Organization for Co-operation and Economic Development. Together, these organizations have formed a working group which has published a common definition for external debt indicating that the net external debt equals the amount of current contractual duties (Were, 2001). This definition presents some implementation problems, such as the following:

- The difficulty in determining the identity of the creditor and the debtor and their residences.
- It excludes many sources, such as the special drawing rights in the International Monetary Fund; in principle it is included in the definition of the debtor. In addition, there are other difficulties when debts are rescheduled. The Organization of African Unity defines external debt in general as a set of due financial obligations in a certain period. This means the obligations were contracted by central government or public institution, with the guarantee of a central government, or contracted by the private sector (Al-Mahdi, 2005). This definition includes the debt and the overdue balance of loans and long-term, medium-term and short-term trade credits presented by bilateral or multilateral official sources, or by financial markets

sources. In order to overcome the aforementioned difficulties, researchers have adopted the definition of external debt that treats it as the amounts borrowed by the national economy, where the period of the loan exceeds one or more years, and the amounts become due to the creditor party via foreign currency payment, or exporting goods and services to the creditor party (Saleh, 1993).

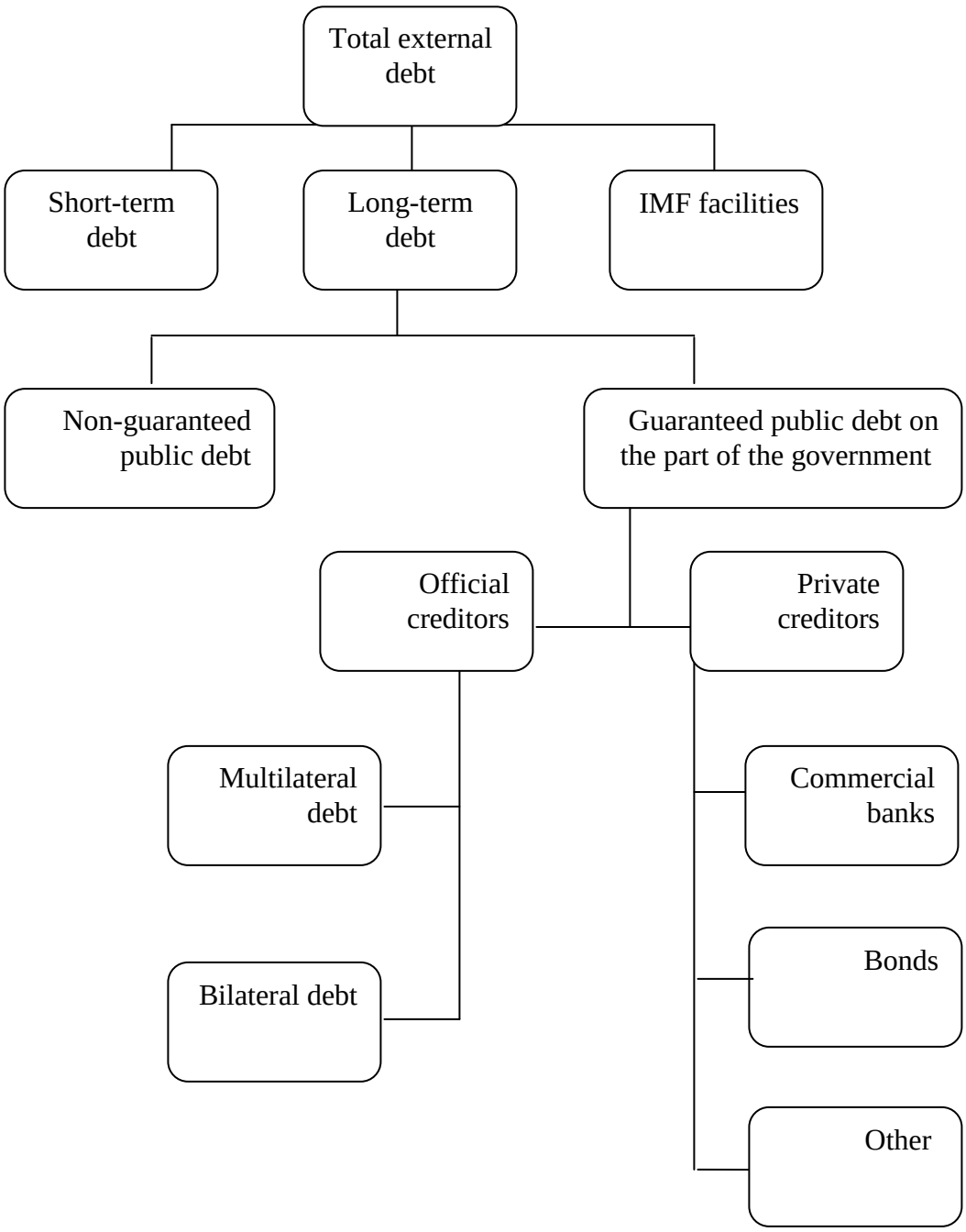
The World Bank (2009) describes total external debt as "debt owed to nonresidents repayable in foreign currency, goods, or services. It is the sum of public, publicly guaranteed, and private non-guaranteed long-term debt and includes all debt having an original maturity of one year or less and interest in arrears on long-term debt" .(World Development Report, 2009: p.366). This research adopts a definition of foreign debt as follows - money borrowed by a country from foreign lenders, including commercial banks, governments or international financial institutions. These loans, including interest, must usually be paid in the currency in which the loan was made (Zaki, 1995).

4.2 Types and Components of External Loans

External loans can be divided into different distributions in terms of the authority issuing the loan, the authority receiving the loan, the purpose of the loan, the provisions of the loan, or the period of the loan (Al-Mahdi, 2005; Shah, Ahmad & Zahid Shah., 2005).

The following figure (1) demonstrates the types of external loan:

Figure 1: Types of External Loan



Source: Global Development Finance: Harnessing cyclical gains for development, volume 1 (The World Bank, 2004: XIX).

4.2.1 Source of Loans

External loans are divided, according to the lending authority criterion, into official and trade debts. However, international financial institutions divide them into public and private debts. The crucial factor in the differentiation between trade debt and official debt is the type of creditor and not the debtor. If the creditor is a government, the debt is official, and if the creditor is a private company, whether a bank or a foreign private company, the debt is a trade debt even if the debtor is the government (International Monetary Fund, 2003).

First- External Loans Guaranteed by Government

These are the loans provided by governments and international financial institutions, such as the World Bank, the IMF, and different development funds, whether they are regional or international (World Development Indicators, 2008). These loans are characterized by being facilitated loans, in terms of the length of the loan period, the permission period, and the low interest rate which divided into:

Official bilateral loans:

External bilateral loans are loans contracted between the debtor country and the governments and their agencies (including central banks) of the creditor country (Global Development Finance, 2007). That means they are extended by governments or official agencies. There are two basic types of these loans (World Development Indicators, 2005). They go on to state that, the first type is commodity loans, especially food products loans, which represent a big percentage of the size of capital exported to developing countries. This type of loan satisfies the highest needs in these countries as developing countries suffer from extreme deficiency in their food resources. The United States of America plays a significant role in this type of loan (Maurer, 2003). This type of loan is settled with the local currency of the debtor country and because it is not paid for with foreign currency, the cost is extracted from the external public debt of the country. The second type is the loans contracted between the creditor and debtor countries based on certain conditions, and the settlement is in foreign currency. This type of loan is within the external debt of the country. It is worth mentioning that military aid falls into this category as it is given to developing countries in order to finance the building and enforcement of military bases on their territory (World Development Indicators, 2005).

According to the International Monetary Fund (2003), it is necessary to properly understand the word 'aid', and to differentiate between loans given as aid, but which should not be called aid. Governmental loans must include essential requirements, such as the period of the loan, the permission period, and the interest rate.

Official loans contracted with multilateral international organizations:

"...loans from multilateral organizations are loans and credits from the World Bank, Regional Development Bank, and the other multilateral and intergovernmental agencies. Excluded are loans from funds administrated by an international organization on behalf of a single donor government; these are classified as loans from government" (Global Development Finance, 2008, p.XV). The top multilateral organizations with which developing countries contract this type of loans are as follows:

The World Bank group, including:

1- International Bank for Reconstruction and Development (IBRD)

2- International Development Association

3- International Finance Corporation

The Regional Banks group, including:

1- African Development Bank

2- Asian Development Bank

3- Inter-American Development Bank

Multilateral European Organizations, including:

1- European Development Fund.

2- European Investment Bank.

The United Nations Agencies, including:

1- The United Nations Development Program (UNDP)

Other bodies (World Bank, 2005).

The previously-mentioned organizations are an essential part of the long-term loan market. There is a unity in the general principle that governs the loan processes of these multilateral bodies, despite the differences between them in terms of requirements imposed on the countries dealing with them.

It is worth noting that the majority of these bodies (specifically regional development banks, European organizations, and the Inter-American Development Bank) work according to the rules of trade that govern a private venture, and aim at augmenting the size of its profits (Global Development Finance, 2008). They consider a group of rules related to long-term capital markets; for instance they provide loans in conditions when payment is guaranteed. This depends upon the economic position of the country, its position with regard to past debts, and the future potentials. Thus, these organizations send delegations to the countries that will receive the loan and conduct necessary studies (Global Development Finance, 2008).

Second- External loans from private foreign creditors:

These are "neither governments nor public sector agencies. These are include private bondholders, private banks, other private financial institutions, and manufacturers, exporters, and other suppliers of goods that have a financial claim" (OECD, 2008: 422). This definition by the OECD means that these loans are provided by private investment institutions. Their flow within developing countries is subject to the decisions of shareholders or their operational representatives. They comprise export loans, facilities for suppliers, loans from trade banks (trade finance), private funds, in addition to offering bonds for lending in financial markets (Global Development Finance, 2004).

Loans from foreign banks and private funds:

These are bank facilities acquired by developing countries from trade banks, or private funds, in order to finance an increasing deficiency in the balance of payments (Zaki, 1987). The interest rate on this loan is determined in the light of the interest rates of common short-term loans in the country in which the bank is situated, and the interest rates of short-term loans on international markets. This type of loan is often used in financing the import of necessary and intermediary consumables in order to operate existing production capacities.

Loans bonds offered by the international markets:

These are bonds offered in trade capital markets in developed countries. A country offers bonds of a certain value with a certain interest rate, and they amortize after a certain period, during which individual investors in capitalist countries underwrite the bonds. In this case, external burdens arising from this type of foreign resources are represented in the interest

imposed on the bonds, as well as the obligation to pay the amount of these bonds when they are due. The principle in offering these bonds for underwriting is the trust enjoyed by the country owning the bonds in international trade capital markets. The import of foreign capital to developing countries takes two forms: the first is external loans from the previously-mentioned private bodies, and the second is direct private investments (Unified Arab Economic Report, 2004).

Although the data published by international organizations and authorities with regard to the external debt of developing countries does not include direct private foreign investments, it is best to discuss the subject of external debt and the capacity of the country to service its external debt, as well as considering the burdens that arise from hosting private foreign direct investment; the impact of these burdens on the balance of payments of the debtor country is equal in the final analysis to the burden of serving external debt. The obligations that arise from hosting these investments, which constitute a pressure on the balance of payments in developing countries, are represented in five major items: profits transferred abroad; the interest on invested capital; the expenses of retrieving invested capital; the transfer of some of the salaries of foreigners residing in the country who work on these projects to their foreign countries; and the expenses of technology transfer represented in fees, patents, trademarks, licenses, management costs, and other technical expertise.

4.2.2 Purpose of Loans

The loans according to the purpose divided as following:

First- Productive external loans

These are loans used in the purchase and building of means of production. The use of these loans results in an increase or expansion in the productive capacity of the national economy of the debtor country (Folornso et al., 2008). It supports the productivity of the national economy, as well as improving the balance of payments by creating new production capacities from foreign currencies in order to contribute to increasing exports or reducing imports. Moreover, productive loans create additional sources that serve the burdens of external debt. That means they are expected to yield a sufficient income to be able to meet the debt service and a certain rate of profit (Chand, 2000).

Second- Non-productive external loans

These are loans that do not contribute to the increase or the expansion of production capacities of the debtor country (Currie, 2005). They are used to purchase consumables, or to acquire military equipment and armament. This type of loan remains a burden to the balance of payments, being a dead weight on the resources of the country (Chand, 2000).

4.2.3 Provisions of Loans

Before demonstrating the types of external loans according to provisions, three major provisions for loans must be referred to. These provisions are the general essential elements on which any external loan is based.

- The loan period (the repayment period): extends from the commencement of the loan contract to the termination of the debt, with its installments and interest.
- The permission period: the number of years after the loan is contracted, before the debtor begins to pay the debt installments.
- The interest rate on the loan paid by the debtor country. For example, some governments get loans at low or zero interest rates, to encourage some action such as purchasing goods from the lender's country (Joisce, 2005).

Not all external loans are the same with regards to these provisions; they differ greatly in terms of the period of the loan, the interest rate, and the grace period. The difference in these provisions creates the possibility for categorizing debts into:

First- Concessional Loans

These are loans (soft loans) contracted for long periods with low interest rates, length of period for repayment, and grace period. They also contain a grant element; this element is considered as foreign aid (Shah et al., 2005).

Second- Non-concessional Loans

Hard loans are loans given in order to finance industrial imports and are contracted for short periods with a high interest rate, and a short grace period. Thus, they cannot be regarded as foreign aid (Shah et al., 2005).

4.2.4 Loans Period

There are short-term external loans that are paid within a period that does not exceed one year, such as bank facilities to finance current operations, and medium-term loans with a period that extend between one year to ten years, such as the loans by the World Bank to finance projects (Asadiq, 1998). Additionally, there are long-term loans with periods exceeding ten years, and periods of payment that reach fifty years, such as those of the international financing institutions (Global Development Finance, 2004).

4.3 The Role of Foreign Debt in Financing Arab Economic Development

In any consideration of the development of Arab countries, it can be seen that irrespective of the stage of that development, there is a need to accelerate their economic growth. However, research over the past few decades suggests that this objective is hindered by the issue of investment at both a national and international level. In this respect, Rostow (1985) and Degefe (1992) as noted by Were (2001), asserted that one of the obstacles impeding economic growth is the low level of local savings, which are insufficient to finance the development process (Adepoju, Adekunle & Abiodun, 2007) and (Folorunso et al., 2008). As a result, the majority of Arab countries resort to foreign finance to bridge the gap in their resources and to gain more access to the necessary foreign currencies to import commodities and services required for development (Ajisafe et al., 2006). It has been suggested that foreign finance is not an alternative to local savings, but is a compliment to them (Adepoju et al., 2007).

The achievement of economic growth is possible provided that external debt is geared to finance productive projects (Adnan, 2008). Investments it can be suggested to be used to increase exports and reduce imports, which may result in a surplus in the balance of payment. It is not invidious to ask for external investment, but it is important to channel this into productive and not consumptive purposes to reduce the balance payment deficit (Global Development Finance, 2006). In Arab countries, the role of external debt depends on the pattern of its use in financing development projects.

The research question in this respect is: to what extent does external debt contribute to the financing of development? This question refers to the methods of allocating external debt such

that it effectively underwrites development and places the indebted countries in a position where they can manage the repayment on their accumulated borrowings.

Conceptualization of Economic Development, its Finance and its Main Problems in Arab Countries

Identifying economic development in the context of Arab countries is of special interest to researchers of economic development. In order to accelerate economic growth, the majority of Arab countries, resort to financing their economic development and to increase the resources available for investment, by relying on external financial resources (Liburd, 2000). Some fundamental, but critical questions arise from this knowledge as follows: does this foreign finance help Arab countries in achieving their desired development? To what uses is foreign financial assistance put? How far are the countries capable of allocating their foreign debts and repaying them?

To answer these critical questions, it is important to offer a relevant context for understanding the concept of economic development, while trying to analyze its components with a particular emphasis on its complexities and pre-requisites. In addition, economic development needs to be measured using several parameters, with reference to the main challenges in Arab countries. This study seeks to examine the actual situation of the role of foreign finance in Arab economic development.

4.3.1 The Concept of Economic Development

According to the Economic Dictionary, economic development is the process of growth in the total and per capita real income of an economy accompanied by fundamental changes in the structure of economy. Schumpeter (1911, as cited by Jain et al., 2008), argued that economic development consists of changes that occur within cultural, social and political fields, and the concurrent changes in structures, that result in societal economic development. Other intellectuals define economic development as the micro level improvements in an individual's skills, productive competence, creative freedom, self-reliance and ability to assign responsibilities (Qannus & Drasah, 1990). And yet other scholars believe that it is "understood to be a process, which leads a country from a state of underdevelopment, characterized by low income and a poor quality of life, to one of higher living standards for a large majority of

people" (Siggel, 2005). Similarly, Adleman (1962) also refers to a transformation, stating that economic development is the process by which an economy is changed from one whose rate of growth of per capita income is insignificant or even negative to one in which important self-sustained rate of increase of per capita income become permanent and a long term characteristic (Jain et al., 2008).

This transfer in status of a country requires many radical changes in both economic structure and hierarchy. In addition, it is a breakthrough economic process in which the national economy takes off into a stage of self-growth and viability. However, a country in the early stage of development is likely to have relatively low capital absorptive capacity (Raymond, 2007). Generally speaking, economic development is the process through which an increase of per capita real income occurs. This can be done via structural changes in production structures, quality of produced commodities and services, and real changes in income distribution mechanisms for the benefit of the poor (Abdulaziz and Nasf, 2003).

In conceptualizing economic development, scholars draw a distinction between it and economic growth. According to Herrick and Kindleberger (1983), whilst economic growth means more output, economic development implies much more, requiring not only more productivity, but also different kinds of output than previously produced, as well as changes in the technical and institutional arrangement by which that output is produced and distributed. This position is confirmed by Jain et al. (2008), who assert that economic growth is indeed an essential condition to achieve economic progress, but is insufficient in itself to achieve comprehensive economic development. Economic progress represents the material or qualitative aspect of the development process, which must be accompanied by some social and political qualitative changes that are responsible for fostering the development path (Onyemelukwe, 2005).

Certainly, the basic foundation of economic development is the principle of self-reliance, and as noted by Onyemelukwe (2005), the desired development cannot be attained if the state depends totally on complete imported technology and means of production. In this respect, the state's ability to make and develop productive commodities is the main purpose towards real economic development.

Economic development is also defined as a group of trade-offs within the society that aspires to viable growth in a short time (Al-Haj, 1998). And Peter and Agenor, (1999) as asserted by Jain, et al., (2008, p5), argues that this concept is concerned with an increase in per capita income and the causes behind this increase. Hence, in order to calculate the economic development of a country, it is necessary not only to take into consideration the increase in its total production capacity and consumption, but also any increase in population, because if the rate of population growth is higher than the rise in income, per capita income may decrease instead of increase. Barro, (1997 as citied by Ferede, 2005), asserted that the population growth rate is relevant in explaining growth in developing countries. In countries where population growth is high, fertility is generally high and hence resources will be diverted away from productive purposes to raising children, since the population features in the equation. Jain et al. (2008) recognize this in their definition of the concept when they observe that economic development refers to the process by which per capita income and economic welfare of a country increase over time. Clearly, therefore, such development requires a package of measures intentionally adopted to increase the real national income within a specific period, with an increase rate higher than population growth. It is a multi-faceted process via economic, social, cultural and political dimensions.

Thus, in order to achieve economic development via the aforementioned dimensions, it is deemed necessary to be conscious of problems in term's of the community, policies, orientation, and what affects the economic development path of the whole society. So, the economic development concept differs according to the indicators or parameters that are used to measure its dimensions. As to the traditional indicators, using these, economic development can mean the ability of the national economy to achieve economic growth, i.e. ability to realize an increase of gross domestic production, whereas the other alternative is that of the ability of the national economy to make the per capita income rate exceed the rate of population growth giving an increase in real income or production (GDP or GNP) of an economy.

In order to result in an increase in living standards, economic growth has to occur in terms of per capita income. In other words, income has to grow faster than the population. When measuring per capita income and its growth, we must first remember the differences between national income and GDP, (although they do not matter for the present purpose). GDP is the

total value of all economic activities that take place within the geographical frontiers of country, whereas GNP is the value of production of all factors that are owed by the nation's citizens (Siggel, 2005).

Having explored the concept of economic development, it is easy to see why poor countries are keen to move towards this state, since this type of development can solve the problems of general poverty, unemployment, backwardness, and low standards of living. That said, economic development is equally significant to developed economies as it helps them to maintain their existing growth rate.

To sum up, economic development is a concept that aims at increasing productive energy in particular. It entails choosing a suitable strategy that helps to develop the national economy and to attain the desired objectives.

4.3.2 Impediments to Economic Development in Arab Countries

In Arab countries, economic development faces many problems as follows:

First- External Problems:

There are two main problems, these being firstly economic peripheral dependency, seen in the fact that Arab countries import machines and skills necessary for economic development projects from industrial countries (Al-Ali, 1991). Secondly, the returns of foreign investment in Arab countries accrue to the external lenders or investor meaning that some of the profits from investing in the domestic economy are effectively taxed away by foreign creditors (Clements, Bhattacharya and Nguyen, 2004), because the required debt service payment may create the crowding out effect on investment by transferring resources out of the country in the form of interest and principal repayment (Leta, 2002).

Second- Internal Problems:

These include insufficient capital, retarded means of production, and a vicious circle of poverty (Sayigh, 1977). The low level of public health leads to a low ability to work efficiently, which results in poor productivity (Boutayeb, 2006). Another related vicious circle concerns education in that a low level of education is conducive to low technical skills and low incomes and investment (Sala-I- Martin and Artadi, 2002). However, Musibau (2005)

studied the relationship between economic and education growth in Nigeria in the period 1970 to 2003, asserting that "a well educated labour force appears to significantly influence economic growth as a factor in the production function and through total factor productivity" (Dauda, 2010, p.163), meaning that the labour force has a positive effect on economic growth through factor accumulation, and on the evolution of total factor productivity. Three internal problems are summarized in this stage as follows:

Low Level of Accumulating Capital Investment and Savings

The accumulated increase of national income does not solve the problem of financing the necessary investment (Birdsall, Pinckney and Sabot, 1996). Consequently, the quantity of accumulation should be taken into consideration (Sala-I-Martin and Artadi, 2002). However, at the stage of updating the national economy and importing technology, the absolute size of accumulation is more important than the indicator of the percentage of accumulation increase (Bisat et al., 1997). As to foreign investment, this includes institutions and projects established via foreign finance in one country, whether this finance is via individuals or institutions (United Nations, 2008). Investment always means any capital added to the society's assets, such as new building construction, new factories, machines, any addition to new material, stock, and completed or semi-manufactured commodities (Murad, 1962). Development needs a growing accumulation of capital, whether individual or community, through the creation of sufficient investment opportunities. Some kinds of difficulties do not apply to oil-producing Arab countries, but to other Arab countries, and the intensity of the problem differs from one country to another. This is mainly due to the persistent poverty that dominates the majority of Arab countries to the extent that no chance is left for thinking about savings, which is the base of economic development (Arab Human Development Report, 2009).

In any society, the starting point of the development path is the formation of proper infra-structure that can facilitate the productivity of other sectors of the economy of the borrowing country so that external debt servicing does not constrain the debtor's economic performance (Leta, 2002). Additionally, from the beginning modern productive units must be established to ensure the availability of necessary goods and services for the community. So, a portion of the local accumulation of investment capital should be allocated to update and develop the material means of production, which contribute to producing goods and services to fulfill the

basic needs of society. Low accumulation and investment do not sustain the ability of the public or private sector to implement new developmental projects (Sala-I-Martin and Artadi, 2002).

Population Growth in Arab Countries

A constant theme in economic literature has been the increasing complexity of demographic growth since if the rate of annual production is equal to, or less than, population growth, poor countries become poorer (Kelley, 1988; Dasgupta, 2002). This places a burden on the national economy as resources become rapidly exhausted, "Neoclassical (Malthus) asserted rapid population growth leads to increasing scarcity of productive capital per worker and thereby to declining worker productivity" (Kelley, 1988). Moreover, as the population increases, part of an economy's investment is used to supply capital for the growing labour, and the capital-labour ratio will fall (Ferede, 2005). Some Arab countries have managed to curtail their demographic growth, whereas others have started to achieve the same objective. But some have not succeeded at all in reducing the population growth rate, and this has partially impeded their path to socio-economic development (Nabli 2004; Arab Monetary Fund, 2004). One salient character of Arab countries is the low percentage of the population who participate in economic activity (Nabli 2004). In 2003, the Arab population amounted to 300 million and its productive manpower amounted to 110 million, that is, the participation ratio was 36% (Arab Monetary Fund, 2004), due to the following reasons: "the sex-age composition, the low participation of women in the workforce, the increasing ratio of handicapped children less than 20 years old, and the increasing unemployment of different types" (Behrendt et al., 2009). Several factors may be pointed out as responsible for the salience of developing human energies in Arab countries. Contrary to the common belief that the Arab region is rich, the fact is that in the long run it is rich only in people (Behrendt et al., 2009). So, if this human element is developed properly, there will be real active participation in the prospective development project. There are clear solutions to problem. It is necessary to confront the course of current education, look to indigenous knowledge and skills, promote human development by launching campaigns against illiteracy, and enhance the intellectual talents of criticism, expression, and creativity (Al Abdullah, 2009). It is also important to raise health levels, improve nutrition, and establish good disease protection methods, that is, guarantee the dignified fulfillment of basic needs.

The discrepancy of economic evolution naturally affects the annual rate of population growth, but it is also affected by this rate. This leads to a real difference in the quotient of per capita GDP. Overall, the difference in the stage of evolution and population number plays an important role in impeding co-ordination, integration, and co-operation among Arab countries. In addition, as mentioned, in countries with high population growth resources will be diverted from productive purposes to provide supporting mechanism for the growing population. Moreover, as the population increases part of an economy's investment is used to supply capital for the growing labour force.

Discrepancies in the Stages of Development among Arab Countries

The Arab world includes several countries that vary in their political, social and economic circumstances (different political systems applied in Arab countries as republican, monarchist, and from the economic side some of them rich and some poor and some producing oil and some non oil producing depend on a small number of primary product exports to earn foreign exchange, (Al-Moneef, 2006). They differ also in their natural and demographic indicators (Almounsor, 2006). Yet, they have common factors such as language, history, Islamic Arab culture, and common economic interests. More importantly, they have a common challenge, that being, the task of comprehensive development and accelerating economic growth (Turkistani, 2001). In terms of the development scale, there are several levels of discrimination apparent, the first being that among Arab countries, which is severe and apparent from the population and resources. Secondly, there is discrimination between Arab countries and other developing countries, and thirdly, there is a gap between Arab countries and the developed countries (United Nations, 2005). This discrimination is based on demographic indicators, viz. annual population growth rate - birth rate - mortality rate, economic indicators, viz. growth rates, particularly GDP during a specific period.

The discrepancy and inequality of income weakens the Arab unified front against the consequences of globalization. Clearly, from the foregoing discussion, it is obvious that the some Arab countries face substantial barriers to economic development. For this cause some of them borrow to enable growth and close the gap between domestic resources and desired investment.

4.4 The Status of Foreign Finance of Economic Development in Arab Countries

One salient problem that impedes the economic development process in Arab countries is these countries' lack of the necessary financial resources for capital formation, as a result of which these countries resort to foreign finance, which assumes several forms (Eid and Paue, 2002). These forms are: financial flow and remittances from international institutions and organizations, donations and aid from foreign countries, direct and indirect foreign investment offered by international organizations.

Suppose that (S) stands for Savings, and (I) for Investment, the economy of any country has one of these three states: S > I means that the economic ability to finance exceeds investment, S = I means that the economy enjoys both a state of balance of capital scale and scarce financial competence to finance the investment, and S < I means that there is a financial deficit and the country has need of net foreign capital (Hameed, et al., 2008). This last case has been the dominant situation in Arab countries during the last decades when they were seriously thinking about implementing their ambitious development programmes. They resorted to foreign finance is due to two reasons: firstly, the occurrence of an unexpected shock; and secondly, the desire of these countries to realize quick development.

4.4.1 Coercive (compulsory) External Borrowing

When a country faces an unexpected external and internal shock, for example a multi-dimensional shock such as a sudden decrease in its exports, returns, and a sudden increase in its imports for one reason or another, external borrowing is attractive as it provides the funds needed for economic growth without the need for excessive increase in taxes or decrease in consumption (Ferede, 2005). In this case it may be that, external foreign debt is the only outlet to mitigate the severity of the shock.

4.4.2 Optional External Borrowing

When local resources are insufficient, it is optional for ambitious countries aspiring to change their stagnant status quo to draw on foreign investment in the hope that its human and natural resources will positively and quickly respond to such aspirations. Actually, resorting to foreign investment resources increases investment energies, but dependence on foreign investment should be viewed with caution. One consideration is the ability of the indebted country to refund the interest on its debt, i.e. the payment of the loan installments. The ability of the

indebted country to meet its repayment commitment depends on its ability to reach and maintain a surplus in its commercial balance, and on how it allocates such foreign financial resources. This is a main consideration in respect of foreign borrowing to underwrite economic development, since it is imperative to identify the effectiveness of utilizing such loans in financing the development process, as well as the ability of the country to service its external loans.

4.5 The Role of Foreign Debt in Financing Economic Development in Arab Countries

The role of foreign debt in financing development projects depends on the pattern and effectiveness of the economic development process and the ability of the indebted Arab countries to repay the installments of the original debt and its interest, according to the agreement reached between the two parties. In other words, if the external resources are effectively utilized to sustain output expansion, the resulting increases in income and profit would inevitably provide the financial resources needed for repayment of the principal and interest (Mbroh, 2003).

It was indicated how the developing countries resort to foreign financial resources to cover the deficit in their internal resources, in order to finance the investment necessary to attain the targeted rate of growth. The ability of an indebted country to make the periodical payments that service external debt influences the way that foreign financial resources are used, as well as the policy that a country adopts when gearing the external finance to generate additional viable resources to serve the burdens of debts. In other words, as asserted by (Ferede, 2005), the theoretical foundation for the role of external finance in helping economic growth is based on the Harrod-Domar growth model. According to the model in which the economic growth rate depends on investment, the key to enhanced economic growth is to invest more.

Countries that invest a substantial part of their GDP are countries which grow quickly, and countries that fail to invest are countries that fail to grow. The importance attached to investment by this theory has led to a number of empirical researchers examining the relationship between investment and economic growth, such as Barro 1991; Levine and Renelt 1992; Mankiw, 1992; Sala-I-Martin, 1997; Easterly, 1999; Xavier Sala-I-Martin and Artadi, 2002).

Developing countries may not be able to save enough to finance the desired level of investment (Rostow, 1960; Hunt, 2007). It is important to distinguish between the ability of the state economy to pay back external debts in both the short and long run, since this differs according to the time scale (Folorunso and Felix, 2008). The state capacity to service debts and commitments in the short run is related to loan liquidity, international liquidity and other factors affecting liquidity (Currie, 2005). The factors which are important in this respect relate to whether a country has the proper means of repayment, and whether international precautions have been taken to ensure external debts are serviced in the short term, meaning a period of no more than one year.

4.6 The Effective UtiliZation of Foreign Loans

In order to perceive the effectiveness of foreign debt usage, it is necessary to distinguish between productive and non-productive loans.

First- Non-productive External Loans

These loans do not contribute towards expanding the productive energies of the indebted country. They are used mainly for financing the importation of consumer goods and services, or applied to production of non revenue generating social services like roads and bridges (Akanle, 1991), products that the country can dispense with without any effect on the viability of the national economy. In general, a portion of the country budget of foreign currencies is devoted to importing goods and services. So, if decrease the size of imports, particularly luxury and semi-luxury goods, the ability of the national economy to fulfill its commitments to external repayments in the short run will increase.

The major problem for countries in the early stage of economic development is that borrowing is not productively employed which leads to the accumulation of debt service (Currie, 2005). These debates which are in vogue, are useful when deciding on reducing imports of some goods to empower the country to make surpluses at the expense of non-productive external debts. Consequently, the country will increase its potential resources of hard currencies to service its external debt commitment in the short run. This type of debt represents a burden on both the country's commercial balance and payment balance as a whole. So the economic logic

does not justify the idea of external loans but it does suggest the use of such foreign loans with caution, and in case of emergency.

Second- Productive External Loans

The major objective of these loans is to finance productive investments and projects which add more productive energies to the national economy of the indebted country. These types of debt surprisingly contribute to create a surplus in the commercial balance through increasing exports and reducing imports, which mean the external loans do not automatically convert into debt burden since when the loans are used in an optimal condition, the marginal return on investment is more than the interest of borrowing (Folornso et al., 2008). Consequently, the return yields an accumulation of hard currencies necessary for national economic development and for servicing the burdens of external debts. On the other hand, external loans should be geared towards various development aspects. This requires establishing a relationship between the new loans in one respect, and both investment and exports on the other (Martirena, 1987). However, the external loans from donor to recipient countries are commonly rationalized in terms of their being beneficial to a recipient if the loans help to improve the productive capacity. This in turn means that the economy of the borrowing country becomes self-sustaining, rendering further borrowing unnecessary (Krumma, 1985). An exercise to map items financed by productive loans ought to distinguish between various types of investment financed by external debts according to its contribution to increasing the commercial balance, and according to the national strategy for allocating foreign financial resources, as follows:

1. Debt allocated to finance investment in infra-structure projects: these projects contribute indirectly to creating a surplus in the commercial balance (Eurodad, 2001).
2. Debt geared towards investment to create productive energies that yield goods and services for export. This is done without resort to any imported production requisites and it results in increasing the national export of goods and services (Adnan, 2008).
3. Debt geared towards manufacturing specific imported materials necessary, creating more productive energies to increase the national potential for exporting. These materials do not concern the commodities locally produced and they result in a surplus in the national commercial balance when the national exports of these products exceeds the national imports of these requirements.

4. Debt used to create national productive energies that produce alternative articles to imported goods. These have positive effects on the national commercial balance (Leta, 2002).
5. The same as the previous debt, but it is necessary to import some production requisites from abroad. This type leads to a real surplus in the commercial balance.
6. Debt used for innovating new energies to produce goods and services not for exporting but necessary for local markets, without resorting to the imported production requisites. It does not affect the payment balance but it creates an increase in the total consumption of demand (Teofilo, 2005).
7. Similar to no. 6, but it requires some foreign production requisites. This type affects passively the commercial balance such that imports may exceed exports.

It is worth mentioning that even if the establishment of development projects does not require importing foreign machines and production requisites, it will passively affect the local resource gap. Partly, the production of new commodities and services for local consumption means that increasing local production consumption of such new material occurs at the expense of national saving, which passively affects the gap of local resources.

Although the national economy of any developing country needs all forms of the aforementioned investment, there is a discrepancy in the effectiveness of using such investment to affect the commercial balance of the country. The problem, then, is not to borrow foreign loans and pay back the burdens associated with them, but how to apply such foreign investment for the benefit of the indebted countries. This is true when the marginal productivity of investment is higher than, or equal to, the marginal costs of the principal and interest repayment (Cline, 1995).
Naturally, this is conducive to gearing external loans towards national exporting productive projects or projects that replace foreign imported goods by locally manufactured ones. As for Arab countries, there is a discrepancy in the effect of using foreign loans. In fact, the external debts of Arab countries witnessed a recession from 2000 to 2001 (Arab International Monetary Fund, 2005) but rose in 2002 with an increase of 7.9%. Despite the growing public debt since that time, the tempo of its growth receded to 6.9% in 2003, becoming 2.3% in 2004. This is due to efforts exerted by some countries to impose restrictions and limitations, an idea that had positive effects on the size of the general external debts. In 2004, nine Arab countries

witnessed an increase in their external debts, whereas the percentage recession in such foreign debts became 11.8% in Algeria, 2.6% in Morocco, and .8% in Jordan. This percentage exceeds 10% in both Lebanon (18.1%), and Tunisia (13.6%). Other countries whose percentage of external debts ranges from 5% to 10% are Djibouti 8.9%, Oman 7.4%, Mauritania 5.3%, Sudan 2.2%, Egypt 1.8% and Yemen 0.1%; to streamline the path of these mistakes when dealing with foreign debts, the following should be considered:

- Avoiding excessive resort to foreign indebtedness.
- Promoting the exportation of not raw materials, but the manufactured ones.
- Rationalizing the use and allocation of foreign financial resources.
- Ensuring that the marginal ratio of investment returns exceed the marginal ratio of debts used to finance investments (Amin and Audu, 2006).

In addition, investment should be channeled to sectors that contribute highly to economic growth in order to increase the future local savings in a manner that could serve the external debt when the borrowed money is expended on increasing the exports of the country; in this situation it is easy to pay back debts (Folorunso and Felix, 2008). So, the future vision of external indebtedness concerns itself with the size of debts, the sum of its service in relation to the increase in output and GDP, and exports.

If within a specific period, for example, the debt size is compared with the GDP, and the percentage debt service compared with exports diminishes, the national financial policy has been successful, utilizing loans objectively in national socio-economic development. Not surprisingly, there is a variation between Arab countries as to the outcome of the effective use. This stems naturally from the way these countries use foreign loans in financing national development projects, and the extent to which the investment is more successful in one sector than another in accelerating economic growth.

4.7 Summary

This chapter started by providing definitions of external debt, which is taken to refer to monies borrowed from foreign countries and international institutions for particular purposes. It is a debt that has to be repaid according to the conditions enshrined in the loan contract. The chapter then introduced the types of external loans, and the various components of each, providing a diagrammatic representation in Figure 1. The source of loans has been discussed and it was highlighted that according to the type of creditor, the loans received either fell into the category of 'trade debt' or 'official debt'. Continuing with this overall issue, a more detailed discussion of the types of loans and their sources was presented. Thereafter, the chapter turned to the question of the purpose of loans. The distinction here was made between productive loans, and non-productive external loans. Having fully considered these categories, a discussion of the provisions contained within loans was provided, from which it was seen that concessional and non-concessional loans are treated differently. Issues relating to the loans period were then considered.

In addition, the role of external loans in financing development projects depends on the effectiveness of the economic development process, the productive and non productive external loans to perceive the effectiveness of external debt usage and the ability of the countries to repay the installments of the original loans and its interest, according to the agreement reached between the two parties. The purpose of the following chapter is to provide an overview of the extensive literature that has been developed about the relationship between external debt and economic growth and investment in particular exploring the empirical studies on developing countries.

Chapter Five: Characteristics of Arab Countries' Economies

5.1 Introduction

This chapter indicates and describes the fluctuation in the variables for the Arab countries and focuses on the three selected individually, which are Tunisia, Egypt and Morocco. The Arab World consists of twenty two countries, namely: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabic, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, West Bank and Gaza, and Yemen Republic. However, this classification of the Arab World is not used in any of the economic publications of the World Bank, the IMF or the OECD.

Arab countries are divided into two groups, for the purposes of these Bretton Woods organizations, namely the Middle East and North Africa, and Sub-Saharan Africa. The former comprises nineteen states, two (Iran and Israel) of which are not Arab countries, while the latter includes among its members four Arab countries only (Djibouti, Mauritania, Somalia and Sudan).

The Arab World population totaled around 310 million in 2005, and it covers an area (in the African and the Asian continents) of more than 18 million square kilometers (Compared to populations of 370 million in 3.2 million square kilometers in the European Union). Almost two thirds of the total area is located on the African continent, which contains ten Arab countries and accommodates more than 150 million people. The rest, twelve countries, are located on the Asian continent. The fertility rate in the Arab World is one of the highest in the world. It is about 2.2%, compared to less than 1% in the industrialized countries.

The Arab World has a very strong base for agricultural development. It covers a very large range of different climates, and it has the potential to grow a variety of agricultural products, such as wheat, malt, maze, olives, beans, cotton, fruit (pineapple, banana), tea, coffee etc. In addition, it is very rich in mineral resources, such as: iron ore, phosphate, magnesium, copper, coal, lead, gold, silver, uranium, zinc and above all oil and gas. In fact, the Arab countries have more than 50% of the world oil reserves, and about 17% of world reserve of gas. In addition, they produce about 28% of the world production of phosphate. Having these agricultural and mineral resources and a relatively very large market, with population of 310 million, the Arab World has the necessary potential to develop a very strong and large economy.

5.2 One world, different countries

The Arab World has enough potential (homogeneity in language, religion, and history and richness in natural resources) that could lead any economy to great economic success. However, many obstacles have been obstructing the way toward this success. This richness in natural resources is not under the control of one economic planner (one government for example), which is the result of the fact that the Arab World is not one political entity. These resources, moreover, are randomly and unevenly distributed among twenty-two entities.

What is more, the adaptation of different economic and political systems makes cooperation between these entities even more difficult. While six countries (Algeria, Iraq, Libya, Somalia, Syria and Tunisia) follow the socialist systems and have a centralized market economy, the other sixteen (Comoros, Bahrain, Djibouti, Egypt, Jordan, Kuwait, Lebanon, Mauritania, Morocco, Oman Qatar, Saudi A., Sudan, UAE, Yemen and West Bank and Gaza) countries follow different political system and use different degrees of free market economy. In addition, each country has a different starting point in its economic progress towards development. Morocco was the first country, in the last century; to set up an economic development plan, in 1956, where as the state of Bahrain started its first four years development plan in 1982. So, not only has each country started its development plans at different dates but also within a framework of different political and economic ideologies, and with different reserves of natural resources. As a result, the Arab World has had 22 different experiences of political and economic development. To show the huge differences in the economic potential and achievements of the Arab countries, one can shed some light on facts such as per capita income, size, and illiteracy rate.

Table 2: Average per capita GDP at current prices in $ US during the period 1995-2005

Year / Countries	1995	2000	2001	2002	2003	2004	2005
Qatar	16,642.0	28,784.0	27,023.0	28,393.0	32,777.0	41,976.0	53,345.0
Kuwait	17,755.0	21,719.0	19,939.0	19,968.0	21,937.0	24,342.0	32,541.0
United Arab Emirates	14,453.0	16,927.0	15,562.0	16,128.0	19,250.0	22,409.0	28,177.0
Bahrain	9,965.0	12,493.0	12,105.0	12,571.0	14,057.0	15,794.0	18,413.0
Saudi Arabia	7,855.0	9,247.0	8,754.0	8,794.0	9,761.0	11,112.0	13,412.0
Oman	6,477.0	8,269.0	8,048.0	8,008.0	9,305.0	10,256.0	12,249.0
Libya	6,340.0	6,130.0	5,141.0	3,389.0	3,945.0	4,982.0	6,280.0
Lebanon	3,178.0	4,430.0	4,493.0	4,837.0	5,176.0	5,629.0	5,665.0
Algeria	1,445.0	1,799.0	1,786.0	1,819.0	2,135.0	2,626.0	3,125.0
Tunisia	2,015.0	2,032.0	2,073.0	2,366.0	2,734.0	2,945.0	2,873.0
Jordon	1,560.0	1,736.0	1,803.0	1,880.0	1,950.0	2,130.0	2,322.0
Morocco	1,258.0	1,159.0	1,136.0	1,223.0	1,455.0	1,636.0	1,674.0
Syria	1,171.0	1,159.0	1,210.0	1,207.0	1,236.0	1,376.0	1,542.0
Egypt	1,054.0	1,543.0	1,396.0	1,299.0	1,211.0	1,144.0	1,274.0
Iraq	,365.0	,871.0	,713.0	,682.0	,403.0	,910.0	1,134.0
Djibouti	,858.0	,813.0	,818.0	,820.0	,839.0	,863.0	,893.0
Sudan	,179.0	,421.0	,462.0	,510.0	,581.0	,655.0	,831.0
Yemen	,334.0	,529.0	,462.0	,510.0	,581.0	,655.0	,757.0
Mauritania	,463.0	,355.0	,405.0	,402.0	,472.0	,521.0	,650.0
Average	1,991.0	2,497	2,371.0	2,374.0	2,598.0	2,992.0	3,558.0

Source: Arab Economic Report (2005).

As mentioned in chapter two decreasing cash incomes and as can be seen from Table (2), per capita GDP varied widely between the Arab countries during the period 1995 - 2005, the Arab World includes among its members Mauritania, which had as low as $650, per capita income in 2005. However, it also includes Kuwait, which enjoyed per capita income of $ 32,541 in the same year. Whereas, according to the table above the per capita GDP in the selected countries increased from 2,015 to 2,873 during the period 1995-2005 in Tunisia, from 1,258 to 1,674 in Morocco in the same period and from 1,054 to 1,274 in Egypt. The rate increased in these three countries as a result of GDP growth in these countries being higher than the rate of population growth, whereas in Egypt the per capita GDP decreased in 2004 compared to 2000, as a result of the devaluation of the Egyptian currency against the dollar.

With regard to size, the Arab countries are substantially different in their sizes. Djibouti, Qatar, Tunisia and Syria are countries with a total area of less than 200 thousand square

kilometers, While Mauritania, Sudan, Saudi Arabia and Algeria are large countries, each with a total area exceeding 2 million square kilometers.

However, as a basic measure of human development, the illiteracy rate (percentage of population aged over 15 year) in 2005 is as impressive as 7.4% in Lebanon and about 14% in Jordan and Bahrain. However, in Morocco, Sudan and Djibouti it is very high, more than 50% of the total population of fifteen years old and above (Joint Arab Economic Report, 2005).

Several ambitious efforts have been attempted to strengthen the weak political and economic ties among Arab countries, in order to narrow the gap between their different standards of living. As a result, regional and sub-regional Arab organizations have been established to serve the ultimate goal of a united Arab World. The latest is the Great Free Trade Zone, which was established by the Economic and Social Council of the Arab League, in February 1997, and to be completely applied in ten years, commencing in 2008.

5.3 Economic features of the Arab World

The need to have a general overall view of the Arab economies places some demand on the researcher to sort these twenty-two economies with respect to some economic characteristics, and then to classify them into a small number of groups.

In fact, the Arab Countries League has divided them in four groups. The first two groups are oil-exporting countries: one contains highly populated countries, such as Algeria and Iraq, while the other is the low population group, which comprises five countries namely, Kuwait, Libya, Qatar, Saudi Arabia, and United Arab Emirates. On the other hand, the second two groups are non-oil exporting countries, the middle income and the lower income groups. The middle-income group comprises Bahrain, Egypt, Jordan, Lebanon, Morocco, Oman, Syria and Tunisia, while the low-income group consists of seven countries, namely Comoros, Djibouti, Mauritania, Somalia, Sudan, West Bank and Gaza and Yemen. According to the Arab Countries League grouping, this study focuses on three Arab countries from the middle income group according to availability of data. Data for some countries is available in some sources where other Arab countries data is not available.

5.4 Domestic savings and investment in the selected counties

Gross domestic savings are defined in the national income accounting context as net of gross national disposable income after accounting for consumption (Shiimi & Kadhikwa, 1999). Economic literature suggests that saving is the difference between income and current consumption. Any part of income that is not consumption is saved and therefore invested to boost the investments and to increase growth. In this context, the key to enhancing economic growth is to invest more.

"High savings and investment rates are important in view of their strong and positive association with the growth rate, as suggested by endogenous growth theory (Romer 1986; Lucas, 1988)" (Agrawal.2000. p.2). As mentioned in chapter two, the origin of external debt can be traced to the willingness of the debtor country to borrow and the lenders to lend. Many developing countries, including the selected Arab ones, are developing a strategy to attract foreign capital by means of loans and other ways to promote investment. The inflows of these resources are seen as an addition to investment that boosts economic growth (Chaudhary and Anwar 2000). In addition, increases in savings and investment in a country lead to economic growth (Hunt, 2007). The achievement of high rates of economic growth is one of the main objectives that the selected countries are trying to reach, because growth rates increase is the only way for these countries to achieve social and economic development. The major determinant of economic growth in any economy is investment, which is determined by accumulated capital realized from savings. These are usually lacking in less developed countries, thereby impeding the growth of their economy.

The need for foreign borrowing finds its objective reason in closing the gap existing among the targeted investment needs and the available national savings; i.e. between the investment rate necessary to achieve the targeted growth rate and the domestic saving rate achieved in the light of certain social, economic and political conditions (Rajan, 2009). It is usually called the "local resources gap" or "investment-saving gap".

A local resources gap exists if domestic saving alone is insufficient to finance the investment required to attain a target rate of growth. As noted from table (3), the volume of savings in selected countries was too low due to low per capita income in these countries as shown in

table (2), in other words, because of their low initial income they save less than they invest, therefore, domestic saving must be supplemented by foreign resources to boost investment and increase the rate of economic growth.

In selected Arab countries, the levels of domestic savings have not been sufficient to meet with the required level of investment needed to achieve the desired rate of economic growth. This has created a saving and investment gap. If the country's local resources are not sufficient to finance the required investment, the country turns to foreign financing sources (external loans, foreign investment, aid) which are supposed to play a great and important role in narrowing the resource gap and ensuring accelerated economic growth in the recipient economy (Kiiza, 2007). Increases in savings and investment in an economy lead to economic growth. Dual gap theory postulates that investment is a function of savings as mentioned in the Harrod-Domar growth model in chapter three, and that in developing countries including the selected countries, the level of domestic savings is not sufficient to fund the investment necessary to ensure economic growth (Adegbite et al., 2008). The following numerical example for the three countries explains the above mentioned issues:

Table 3: investment and savings in the three Arab countries during the period 1982 -2005, Figures in Millions of US Dollars

Country	Tunisia			Egypt			Morocco		
Year	Total Investment (IY)	Saving (S)	(Saving) - (Investment) (S- IY) Local resource gaps = IY –S	Total Investment (IY)	Saving (S)	(Saving) - (Investment) (S- IY) Local resources gap = IY –S	Total Investment (IY)	Saving (S)	(Saving) - (Investment) (S- IY) Local resources gap = IY –S
1982	2,572.0	1,715.6	-,856.4	8,072.9	4,352.8	-3,720.1	4,352.6	2,392.4	-1,960.2
1983	2,371.8	1,674.1	-,697.7	7,934.4	5,257.9	-2,676.5	3,344.8	2,245.3	-1,099.5
1984	2,568.2	1,629.8	-,938.4	8,308.3	4,268.4	-4,039.9	3,224.1	1,980.5	-1,243.6
1985	2,198.9	1,692.0	-,506.9	5,743.3	3,125.3	-2,618.0	3,490.5	2,436.3	-1,054.2
1986	2,076.6	1,434.5	-,642.1	6,029.8	3,585.2	-2,444.6	3,863.4	2,883.2	-9,80.2
1987	1,987.5	1,891.7	-,095.8	8,881.6	5,456.8	-3,424.8	3,952.9	3,227.6	-,725.3
1988	1,963.5	2,000.4	,036.9	9,211.5	4,264	-4,947.5	4,661.0	4,654.1	,-6.009.0
1989	2,298.1	1,897.2	-,400.9	9,522.9	5,152.8	-4,370.1	5,411.8	4,279.4	-1,132.4
1990	3,333.0	2,465.0	-,868.0	10,443.0	6,010.0	-4,433.0	6,519.0	5,150.0	-1,369.0
1991	3,382.0	2,738.0	-,644.0	8,212.0	5,505.0	-2,707.0	6,297.0	4,936.0	-1,361.0
1992	4,525.0	3,450.0	-1,075.0	8,245.0	7,073.0	-1,172.0	6,603.0	4,886.0	-1,717.0
1993	4,272.2	3,173.0	-1,099.2	8,487.0	8,953.0	,466.0	6,019.0	4,629.0	-1,390.0
1994	3,852.0	3,393.0	-,459.0	10,502.0	7,814.0	-2,688.0	6,479.0	4,656.0	-1,823.0
1995	4,459.0	3,754.0	-,705.0	12,117.0	9,022.0	-3,095.0	6,879.0	3,653.0	-3,226.0
1996	4,904.0	4,600.0	-,304.0	11,235.0	7,254.0	-3,981.0	7,175.0	5,755.0	-1,420.0
1997	5,005.0	4,541.0	-,464.0	13,760.0	9,016.0	-4,744.0	6,917.0	5,658.0	-1,259.0
1998	5,398.0	4,724.0	-,674.0	18,241.0	10,183.0	-8,058.0	7,936.0	6,293.0	-1,643.0
1999	5,235.0	4,790.0	-,445.0	19,588.0	12,106.0	-7,482.0	8,152.0	5,137.0	-3,015.0
2000	5,302.0	4,616.0	-,686.0	19,094.0	12,634.0	-6,460.0	7,886.0	4,092.0	-3,794.0
2001	5,599.0	4,680.0	-,919.0	16,486.0	12,106.0	-4,380.0	7,588.0	4,272.0	-3,316.0
2002	5,949.0	4,959.0	-,990.0	15,654.0	11,921.0	-3,733.0	8,229.0	4,824.0	-3,405.0
2003	6,733.0	5,692.0	-1,041.0	13,488.0	11,711.0	-1,777.0	10,558.0	6,060.0	-4,498.0
2004	7,227.0	6,266.0	-,961.0	13,044.0	12,753.0	-,291.0	12,530.0	5,970.0	-6,560.0
2005	6,514.0	5,752.0	-,762.0	15,786.0	14,307.0	-1,479.0	13,005.0	4,649.0	-8,356.0

Sources: Arab Monetary Fund, National Accounts of Arab Countries, several reports.

Figure 2: Domestic Savings and Investment in Tunisia for 1982 to 2005

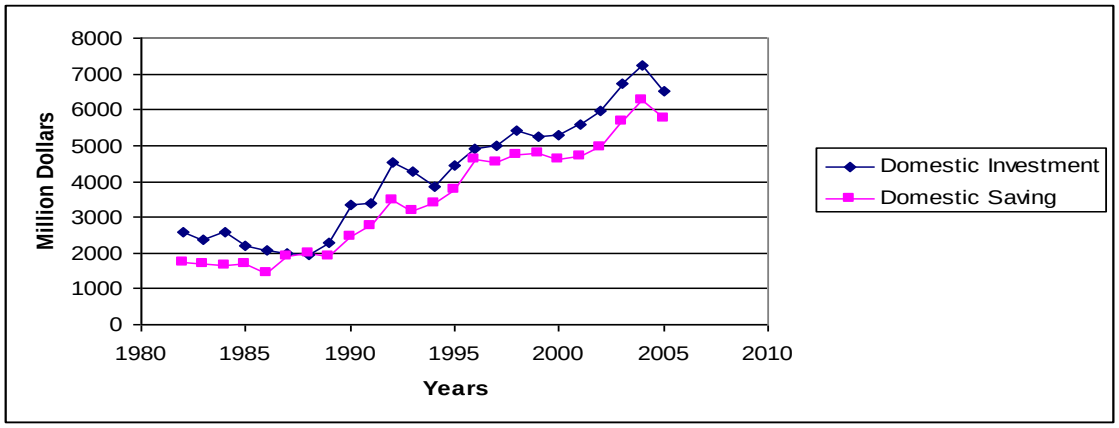


Figure 3: Domestic Savings and Investment in Egypt for 1982 to 2005

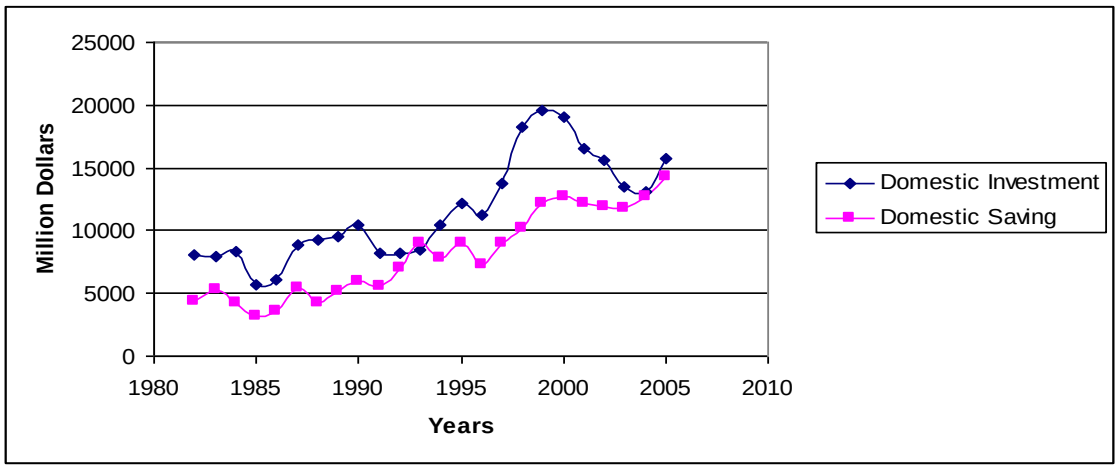
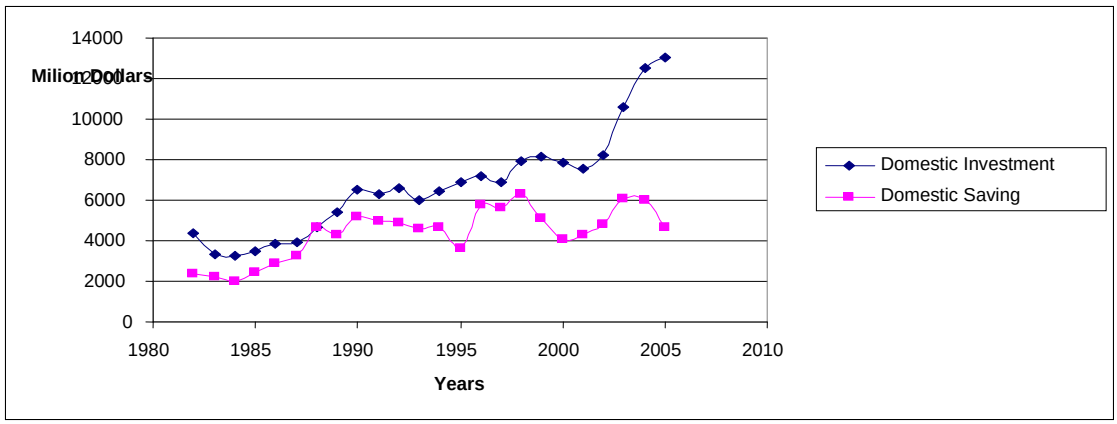


Figure 4: Domestic Savings and Investment in Morocco for 1982 to 2005



The gap between investment and savings for the three countries observed in table (3) and Figures (2, 3, 4) respectively, underlines the role of external resources. During the entire period 1982–2005, the investment rate was higher than the savings rate, at times very markedly. As can be seen, investment in Tunisia increased in 2005 by about three times that of 1982, from 2,572 million to 6,514 million dollars, whereas, the savings also increased from 1,715.6 to 5,752 million dollars in the same period, and the big resource gap between the investment and domestic saving in Tunisia was between 36.9 in 1988 and 1,099.2 millions in 1993. On the other hand, investment in Egypt increased in 2005 by nearly two times, from 8,072.9 million in 1982, to 15,786 million dollar in 2005, whereas, the savings also increased from 4,352.8 to 14,307 million in the same period, and the gap was narrowed in 2004 to just 291 million. In addition, in the first half of the 1990s, Egypt attained a balance between savings and investment.

However, as can be seen from Figure (3), this equilibrium was brought about by raising savings. In Morocco, on the other hand, investment increased from 4,352.6 million dollars in 1982 to 13,005 million, and domestic saving also increased by nearly two times, from 2,392.4 million to 4,649 million dollars in the same period, and the largest gap was 8,356 million in 2005. It is clear that the investment rate in the countries under study over the period 1982–2005 fluctuated considerably. The main reason behind these variations was the availability of domestic savings. Savings and investments obviously play a main role in the development process and economic growth. Savings determine a country's “capacity to invest and thus to produce, which in turn affects its economic growth potential. Low saving rates have been cited as one of the most serious constraints to sustainable economic growth” (Independent Review of Bangladesh’s Development, 2005, p.7). Indeed, as asserted by Ozturk and Okyay, (2011) various studies have recorded a close relationship between low domestic saving in developing economies and low investment rates (Bayoumi, 1990; Dooley, Frankel & Mathieson, 1987; Feldstein & Horioka, 1980). These researchers have found that countries with low saving rates also have low investment rates Ndikumana, 2000).

5.5 The exports, imports and gap resources for selected Arab countries

The export and import of goods and services represent the value of all goods and services provided to or received from other countries. Exports and imports together play an integral role in determining the trade balance of a country (Mukhtar& Rasheed, 2010). Not only should savings exceed investments, but exports must be more than imports as well. The trade gap means the difference between exports and imports of goods and services that occurs when the value of imports is increased more than the increase in exports of goods and services within a certain period for any country. The increase in the imports of goods and service of the three countries is due to the reliance of each country on imports to meet investment, intermediate and consumer needs.

The value of foreign trade resulting from an increase in imports is more than the value of exports within a certain period. This can be done through the usage of foreign exchange reserves or through external financing (foreign aid, gross-border sovereign lending by commercial banks, foreign direct investment and portfolio investment – loans from the World Bank).

Table 4: Exports and imports in the three Arab countries during the period 1982-2005, Figure in Millions of US Dollars

	Tunisia			Egypt			Morocco		
Year	Exports (X)	Imports (M)	Trade Gap (X-M)	Exports (X)	Imports (M)	Trade Gap (X-M)	Exports (X)	Imports (M)	Trade Gap (X-M)
1982	3,002.0	3,858.5	-,856.5	7,730.0	11,450.0	-3,720.0	3,011.3	4,971.6	-1,960.3
1983	2,869.5	3,567.2	-,697.7	7,405.3	10,081.8	-2,676.5	2,967.1	4,066.6	-1,099.5
1984	2,721.4	3,659.9	-,938.5	7,660.2	11,700.1	-4,039.9	3,059.0	4,302.6	-1,243.6
1985	2,699.8	3,206.7	-,506.9	5,071.5	7,689.5	-2,618.0	3,199.8	4,254.0	-1,054.2
1986	2,721.9	3,364.0	-,642.1	4,468.6	6,913.3	-2,444.7	3,626.6	4,606.8	-,980.2
1987	3,377.0	3,472.8	-,095.8	4,281.1	7,706.0	-3,424.9	4,249.1	4,974.4	-,725.3
1988	4,242.9	4,206.0	,036.9	4,812.7	9,760.3	-4,947.6	5,466.5	5,473.5	-,007.0
1989	4,480.9	4,881.8	-,400.9	5,482.5	9,852.6	-4,370.1	5,036.5	6,168.9	-11,32.4
1990	5,364.0	6,232.0	-,868.0	7,166.0	11,599.0	-4,433.0	6,341.0	7,710.0	-1,369.0
1991	5,251.0	5,896.0	-,645.0	9,538.0	12,246.0	-2,708.0	6,156.0	7,517.0	-1,361.0
1992	6,127.0	7,201.0	-1,074.0	12,131.0	13,302.0	-1,171.0	6,399.0	8,116.0	-1,717.0
1993	5,909.0	7,007.0	-1,098.0	15,535.0	15,069.0	,466.0	6,104.0	7,494.0	-1,390.0
1994	7,025.0	7,483.0	-,458.0	11,840.0	14,527.0	-2,687.0	7,555.0	9,377.0	-1,822.0
1995	8,105.0	8,810.0	-,705.0	13,561.0	16,657.0	-3,096.0	6,294.0	9,519.0	-3,225.0
1996	8,239.0	8,543.0	-,304.0	14,036.0	18,017.0	-3,981.0	7,991.0	9,410.0	-1,419.0
1997	8,287.0	8,752.0	-,465.0	14,761.0	19,505.0	-4,744.0	7,721.0	8,980.0	-1,259.0
1998	8,633.0	9,307.0	-,674.0	13,754.0	21,812.0	-8,058.0	8,092.0	9,735.0	-1,643.0
1999	8,474.0	8,919.0	-,445.0	13,638.0	21,119.0	-7,481.0	6,687.0	9,702.0	-3,015.0
2000	8,582.0	9,267.0	-,685.0	15,821.0	22,282.0	-6,461.0	6,698.0	10,492.0	-3,794.0
2001	9,562.0	10,481.0	-,919.0	15,782.0	20,161.0	-4,379.0	6,726.0	10,042.0	-3,316.0
2002	10,470.0	11,460.0	-,990.0	15,699.0	19,431.0	-3,732.0	7,834.0	11,239.0	-3,405.0
2003	11,771.0	12,812.0	-1,041.0	17,763.0	19,539.0	-1,776.0	8,997.0	13,495.0	-4,498.0
2004	13,049.0	14,010.0	-,961.0	22,431.0	22,722.0	-,291.0	10,438.0	16,997.0	-6,559.0
2005	13,830.0	14,592.0	-,762.0	27,617.0	29,096.0	-1,479.0	10,613.0	18,968.0	-8,355.0

Sources: Arab Monetary Fund, National Accounts of Arab Countries, several reports.

Figure 5: Exports and imports in Tunisia during the period 1982 -2005 Million of US Dollars

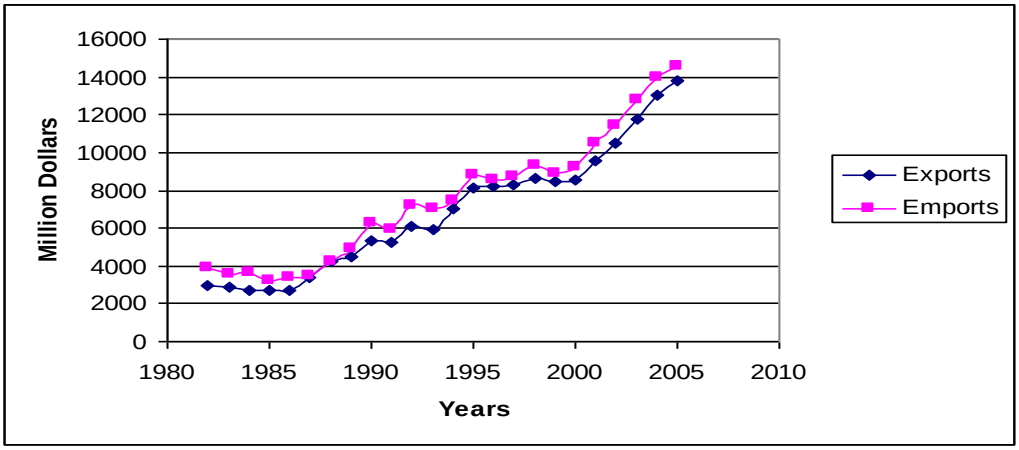


Figure 6: Exports and imports in Egypt during the period 1982 -2005 Million of US Dollars

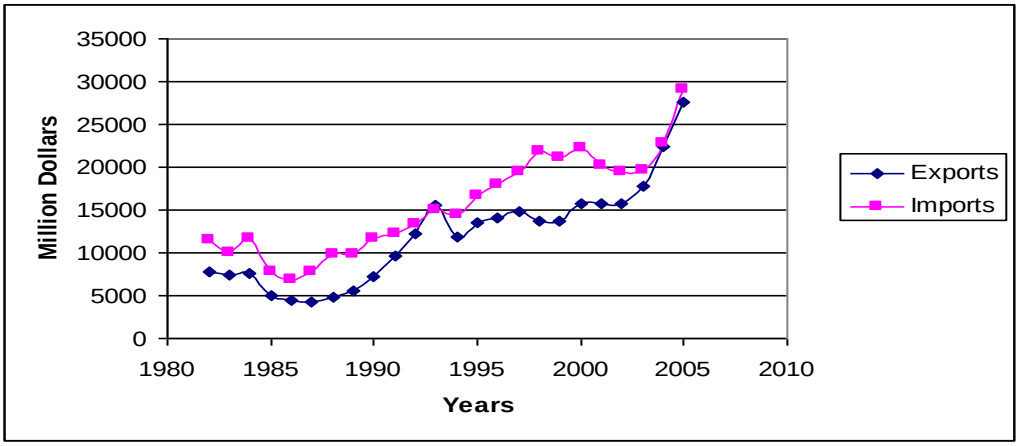
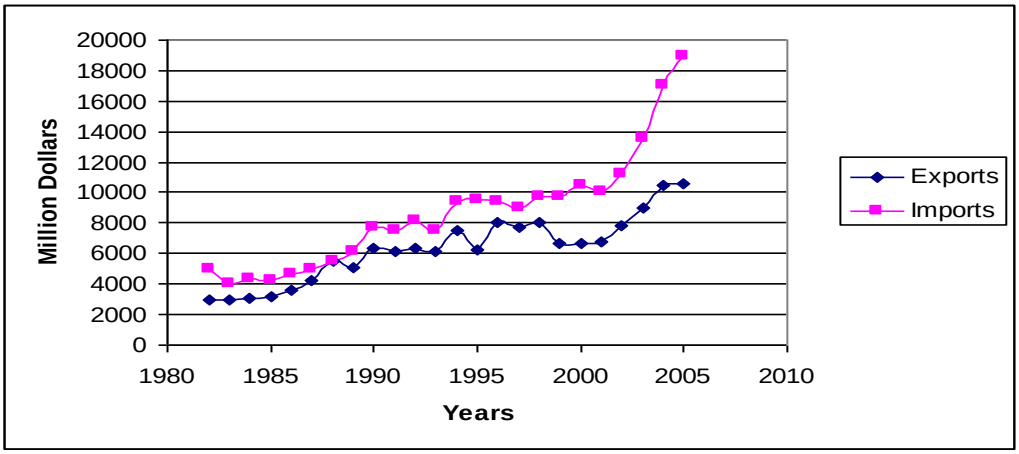


Figure 7: Exports and imports in Morocco during the period 1982 -2005 Million of US Dollars



From the above Table (4) as can be seen, the value of exports of goods and services for Tunisia increased from around 3,002 to 13,830 million dollars for the period between 1982-2005. This was due to promoting and diversifying non-oil exports and enhancing the role of the production projects oriented to exports, and the imports also increased in the same period from the 3,858.5 to 29,096 million dollars and the highest gap was 1,098 dollars in 1993. Whereas in Egypt the value of exports increased from 7,730 to 27,617 million dollars in the same period where the imports also increased from 11,450 to 29,096 million dollars and the biggest gap was 8,058 million dollars in 1998, and the increase in exports more than the imports was assumed to be sufficient to generate a trade surplus by 1993 in Egypt. In addition, the exports from 1982 to 1990 decreased because it relied disproportionately on a single commodity, namely, cotton; towards the end of the twentieth century it remained vulnerable. Whereas, in Morocco the exports increased from 3,011.3 to 10,613 million dollars and the imports also increased from 4,971.6 to 18,968 million dollars and the biggest gap between exports and imports was 8,355 million dollars in 2005.

The value of exports is less than the value of imports, as shown by the figure (5, 6, 7) because these Arab countries were mainly exporting primary commodities such as raw materials and agricultural and fishery products with low prices. Furthermore, these countries' export products are not complements but rather substitutes and the majority of imports are capital goods and final consumption goods as food and many manufacturing products (Tukistani. 2001). And as mentioned before, the increase in the imports of goods and service of the three countries is due to the reliance of each country on imports to meet investment, intermediate and consumer needs.

The lack of exports in selected countries may be caused by a failure to provide loans to export-oriented investment projects. These loans are used to increase the domestic consumption of local produced goods, which means that the loans have negative effects on exports in selected countries. To increase exports it is necessary to improve the investment that generates and increases the imports of technology. This requires money which is not available to the selected countries. They are therefore unable to purchase the equipment needed to boost exports. In addition to this kind of investment, expenditure on the foreign goods is also needed, and any countries are seeking to achieve high gross domestic product by increasing exports.

Foreign financing is also needed because of the insufficient available external resources obtained by the country as a result of their trade balances. When a value of the imports of a country within a defined period exceeds the achieved foreign exchange proceeds resulted from its exports during this period, this difference, that represents the deficit in the achieved trade balance during this period, should be financed through additional foreign financing.

Both gaps can prove that there is a match between the local resources gap and the foreign trade gap. In addition, both gaps should be equal during any previous period (Forgha, 2009).

5.6 The external debt and debt service in three Arab countries during the period 1982 to 2005

A cursory look at external debt profile and some debt indicators of selected Arab countries reveals the inherent serious nature of a debt burden (Table 5).

Table 5: Total External Debt and Debt Service for Selected Arab Countries for 1982- 2005 (in Millions of Dollars)

Country	Tunisia		Egypt		Morocco	
Year	Total External debt (**TED**)	Debt Services (**DS**)	Total External debt (**TED**)	Debt Services (**DS**)	Total External debt (**TED**)	Debt Services (**DS**)
1982	2,275.0	,495.0	19,733.0	1,252.0	6,118.0	1,365.0
1983	2,394.0	,575.0	21,855.0	1,562.0	7,112.0	1,215.0
1984	2,495.0	,650.0	24,113.0	1,790.0	7,927.0	,732.0
1985	3,031.0	,672.0	28,513.0	2,393.0	9,769.0	,996.0
1986	3,620.0	,792.0	30,495.0	2,394.0	11,605.0	1,236.0
1987	4,329.0	,988.0	37,129.0	1,007.0	14,054.0	1,218.0
1988	4,269.0	,967.0	37,563.0	1,840.0	14,615.0	1,382.0
1989	4,556.0	1,000.0	35,516.0	2,271.0	15,496.0	1,721.0
1990	5,233.0	1,220.0	26,584.0	2,489.0	17,305.0	1,499.0
1991	5,836.0	1,131.0	24,470.0	2,047.0	14,982.0	2,107.0
1992	5,898.0	1,215.0	24,676.0	2,182.0	15,588.0	3,652.0
1993	6,248.0	1,219.0	25,445.0	1,862.0	15,487.0	3,056.0
1994	6,886.0	1,346.0	27,734.0	1,856.0	16,127.0	3,154.0
1995	7,400.0	1,409.0	28,795.0	2,146.0	16,515.0	3,628.0
1996	7,480.0	1,368.0	27,518.0	2,098.0	15,964.0	3,294.0
1997	6,987.0	1,304.0	25,729.0	1,707.0	14,220.0	3,036.0
1998	7,059.0	1,314.0	26,749.0	1,671.0	14,255.0	2,789.0
1999	6,414.0	1,404.0	25,469.0	1,890.0	13,157.0	3,053.0
2000	6,030.0	1,785.0	23,741.0	1,719.0	12,031.0	2,576.0
2001	6,159.0	1,294.0	23,355.0	1,799.0	11,756.0	2,585.0
2002	7,218.0	1,442.0	24,658.0	1,976.0	11,722.0	3,665.0
2003	8,541.0	1,581.0	26,372.0	2,618.0	11,688.0	4,263.0
2004	9,365.0	1,968.0	26,367.0	2,182.0	11,802.0	2,971.0
2005	8,362.0	1,722.0	23,226.0	1,936.0	10,117.0	2,725.0

Sources: Arab Monetary Fund, Arab Countries Economic Indicators, several reports.

Figure 8: External Debt and Debt Service in Tunisia between 1982- 2005

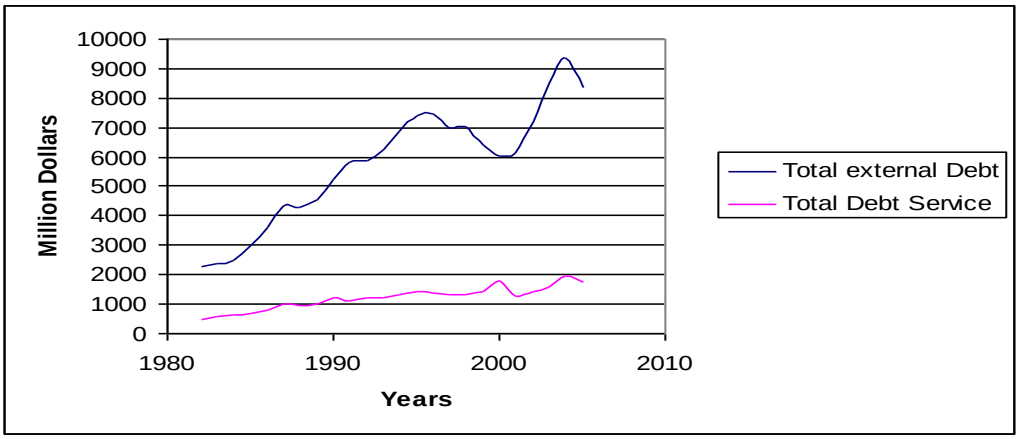


Figure 9: External Debt and Debt Service in Egypt between 1982- 2005

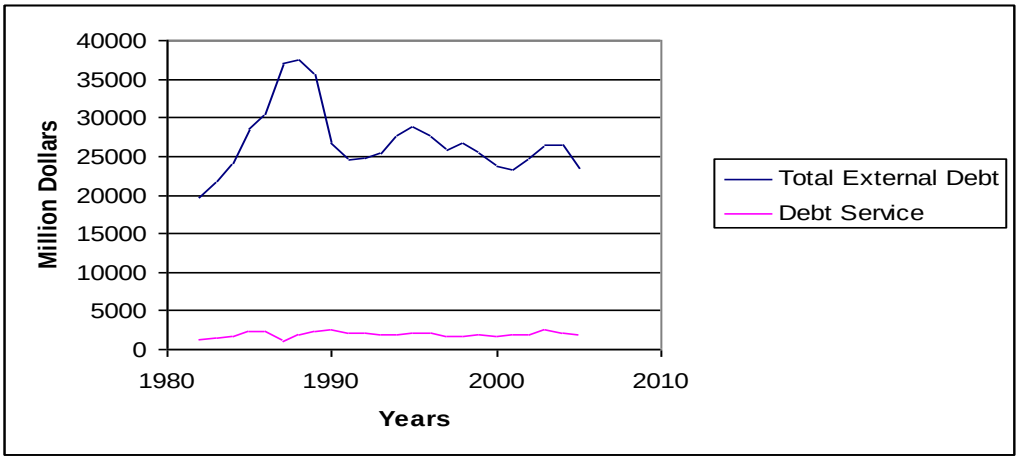
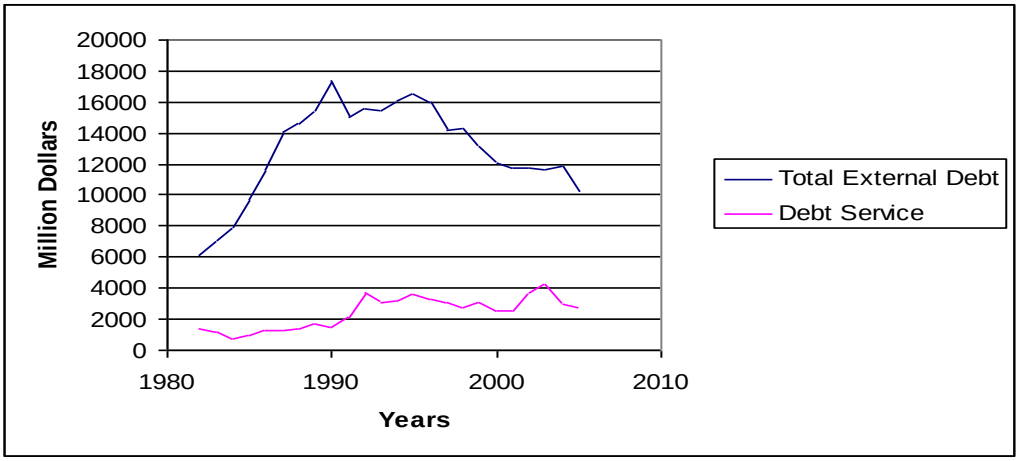


Figure 10: External Debt and Debt Service in Morocco between 1982- 2005



From the above Table (5) as can be seen the stock of external debt in Tunisia has been increasing at a sustained high rate, from 2,275 million US dollars to 5,898 million US dollars in 1992 (62% increase); from 5,898 million to 7,218 million in 2002 (19% increase); and from 7,218 million to 8,362 million US dollars in 2005 (14% increase). The total external debt increased due to the increase in imports without forcing down consumption or increase in taxes and rise in population, and the value of external debt decreased in 2005 due to the lenders conditions, as mentioned in chapter four, while the external debt service increased nearly four times in the same period from 495.0million to 1,968 million dollars, due to excessive foreign borrowing and its improper use generating severe debt service obligations, because there is a positive relationship between external debt and debt services. This contributed to worsening the external account imbalances and to further contracting new loans.

Whereas, the external debt in Egypt increased from 19,733 million US dollars to 24,676 million US dollars in 1992 (20% increase); from 24,676 million to 24,658 million in 2002, slightly decrease less than 1%; and from 24,658 million to 23,226 million US dollars in 2005 (2% decrease), which was less than 1988 due to Egypt reducing the value of imports compared to the value of exports, that means, Egyptian imports increased nearly two times while the exports increased about six times in the same period, and narrowed the gap between them. Also, the debt service payment had risen from 1,252 in 1982 to 1,936 in 2005, the slight rise in the debt service ratio in 2005 was because there were no accumulated arrears in Egypt and (due largely to rescheduling and some amount of debt forgiveness) as an example from the Paris Club because Egypt reached agreements with the Paris Club in the first months of 1990 (Kuhn & Guzman, 1990).

Whereas, the external debt in Morocco increased from 6,118 million US dollars to 15,588 million US dollars in 1992 (61% increase); from 15,588 million to 11,722 million in 2002 (32% decrease); and from 11,722 million to 10,117 million US dollars in 2005 (16% decrease), whereas, the debt service increased from 3,665 million dollars to 4,263, the rise in the debt service ratio in 2003 was due largely to repayments of accumulated arrears in Morocco.

A comparative view of the external debt stock of selected countries can be seen from table (5). In 1982 the total external debt in Morocco was nearly three times higher than in Tunisia, but in Egypt it was more than nine times that. Whereas, in 2005 the figures in Tunisia and Morocco where very similar, but in Egypt the level was significantly higher – reaching more than them two times that of the other two countries. In addition, figures (8, 9, 10), indicate that the debt volume for Egypt is significantly higher than that of Morocco and Tunisia. The debt stock followed an upward trend in Egypt until 1995. The debt stock volume for Tunisia has been stabilised over the period, until 2004 when debt stock started to record an upward pattern. Whereas, in Morocco debt increased until it reached its peak in 1990, after that it declined until 2005 when it became 10,117 million dollars.

The decrease in debt service in the period under study is a clear indication for an improvement in the economic situation of the Arab countries or may benefit from policies set by the International Monetary Fund, such as the rescheduling of debt, low interest rate policy and the policy of debt relief to some Arab countries like Egypt.

However, in these countries when the debt service ratios reached high levels in any year, it became clear that, debt repayment would not only just constrain economic performance in their countries, more importantly, it would be virtually impossible to repay these loans and leave a favorable balance to support their domestic economy. Due to the increase in the debt service several problems may arise as the countries need to increase the taxes in order to raise the resources to service the debt, and to transform the domestic resources to foreign exchange in which debt service must be paid.

Debt service then becomes the main reason for new borrowing and this sustains real interest rates at high levels. As the stock of debt grows at a compound rate, debt service eventually exceeds new borrowing, so that there is a net reduction in resource availability to borrowers. However new borrowing exceeds the amortization component of debt service so that the stock of debt continues to grow.

5.7 Gross domestic product, consumption and savings in three Arab countries

Since domestic product generates an equal income that is used for financing the current consumption and forming the savings (S), the following shall be realized as (Y = C + S).

Gross Domestic Product: is a measure of an economy's "total production of final goods and services for domestic consumption and investment, and for export. The value of intermediate (non-final) goods and services is not included as that would represent double-counting. Alternatively, GDP can be thought of as the sum of value added in production at each successive stage of the production-marketing chain. GDP can be used to reflect the state of production, and hence development, in a country" (Colin and Rudasill-Allen, 2005, p82).

Zupi (2002) asserted that, economic literature suggests that saving is the difference between income and current consumption. Any part of income that is not consumption is saved and therefore the rate of change in gross domestic savings is influenced by the marginal propensity to save, S, and the marginal propensity to consume, C. These two variables are inversely related. The raise the level of gross domestic savings, S, the marginal propensity to save S, and the level of gross domestic output, Y, must rise together. Besides, it is important to restrain the rate of growth of aggregate consumption such that S could rise following an expansion in Y.

Table 6: Gross domestic product, consumption and domestic saving in the Tunisia, Egypt and Morocco during the period 1982-2005, figures in Million $US

Country	Tunisia			Egypt			Morocco		
Year	Cross domestic product (**RY**)	Total consumption (**C**)	Saving (**S**)	Cross domestic product (**RY**)	Total consumption (**C**)	Saving (S)	Cross domestic product (**RY**)	Total consumption (**C**)	Saving (**S**)
1982	8,133.4	6,417.8	1,715.6	30,325.7	25,972.9	4,352.8	15,423.9	13,031.5	2,392.4
1983	8,098.7	6,424.6	1,674.1	29,859.3	24,601.4	5,257.9	13,941.6	11,696.3	2,245.3
1984	8,033.0	6,403.2	1,629.8	34,387.4	30,119.0	4,268.4	12,751.3	10,770.8	1,980.5
1985	8,280.4	6,588.4	1,692.0	26,295.9	23,170.6	3,125.3	12,870.3	10,434.0	2,436.3
1986	8,842.6	7,408.1	1,434.5	28,305.6	24,720.4	3,585.2	16,994.5	14,111.3	2,883.2
1987	9,650.1	7,758.4	1,891.7	33,942.6	28,485.8	5,456.8	18,746.1	15,518.5	3,227.6
1988	10,124.7	8,124.3	2,000.4	27,720.1	23,456.1	4,264.0	22,198.3	17,544.2	4,654.1
1989	10,177.0	8,279.8	1,897.2	30,499.4	25,346.6	5,152.8	22,847.7	18,568.3	4,279.4
1990	12,314.0	9,849.0	2,465.0	35,489.0	29,479.0	6,010.0	25,826.0	20,676.0	5,150.0
1991	13,010.0	10,272.0	2,738.0	34,228.0	28,723.0	5,505.0	27,835.0	22,899.0	4,936.0
1992	15,497.0	12,047.0	3,450.0	41,755.0	34,682.0	7,073.0	28,451.0	23,565.0	4,886.0
1993	14,609.0	11,436.0	3,173.0	46,896.0	37,943.0	8,953.0	26,801.0	22,172.0	4,629.0
1994	15,633.0	12,240.0	3,393.0	51,661.0	43,847.0	7,814.0	30,351.0	25,695.0	4,656.0
1995	18,050.0	14,296.0	3,754.0	60,142.0	51,120.0	9,022.0	33,184.0	29,531.0	3,653.0
1996	19,563.0	14,963.0	4,600.0	67,646.0	60,392.0	7,254.0	36,639.0	30,884.0	5,755.0
1997	18,934.0	14,393.0	4,541.0	75,781.0	66,765.0	9,016.0	33,415.0	27,757.0	5,658.0
1998	20,054.0	15,330.0	4,724.0	84,829.0	74,646.0	10,183.0	35,818.0	29,525.0	6,293.0
1999	19,911.0	15,121.0	4,790.0	90,604.0	78,498.0	12,106.0	35,254.0	30,117.0	5,137.0
2000	19,434.0	14,818.0	4,616.0	97,654.0	85,020.0	12,634.0	33,278.0	29,186.0	4,092.0
2001	20,055.0	15,375.0	4,680.0	90,284.0	78,178.0	12,106.0	33,147.0	28,875.0	4,272.0
2002	23,143.0	18,184.0	4,959.0	85,725.0	73,804.0	11,921.0	36,241.0	31,417.0	4,824.0
2003	26,903.0	21,211.0	5,692.0	81,499.0	69,788.0	11,711.0	43,815.0	37,755.0	6,060.0
2004	29,253.0	22,987.0	6,266.0	78,505.0	65,752.0	12,753.0	50,031.0	44,061.0	5,970.0
2005	28,816.0	23,064.0	5,752.0	89,171.0	74,864.0	14,307.0	52,023.0	47,374.0	4,649.0

Sources: Arab Monetary Fund, National Accounts of Arab Countries, several reports.

Figure 11: Gross domestic product, consumption and savings in Tunisia

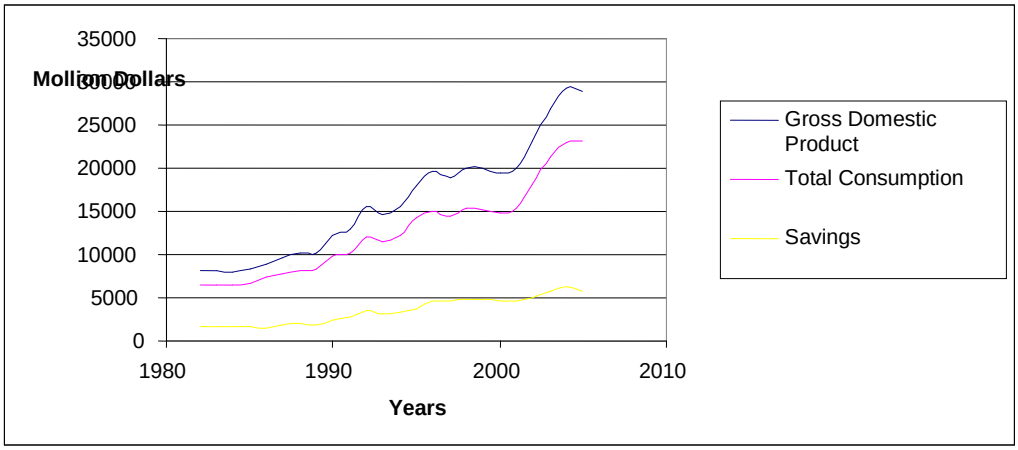


Figure 12: Gross domestic product, consumption and savings in Egypt

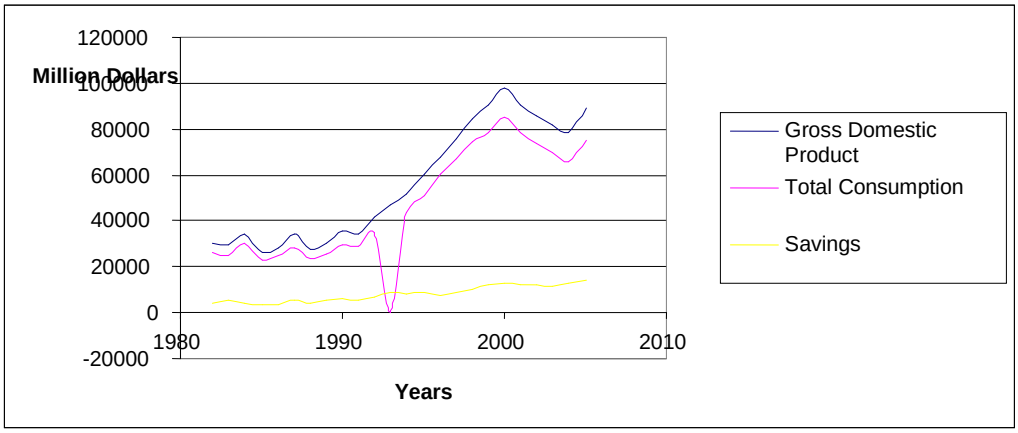


Figure 13: Gross domestic product, consumption and savings in Morocco

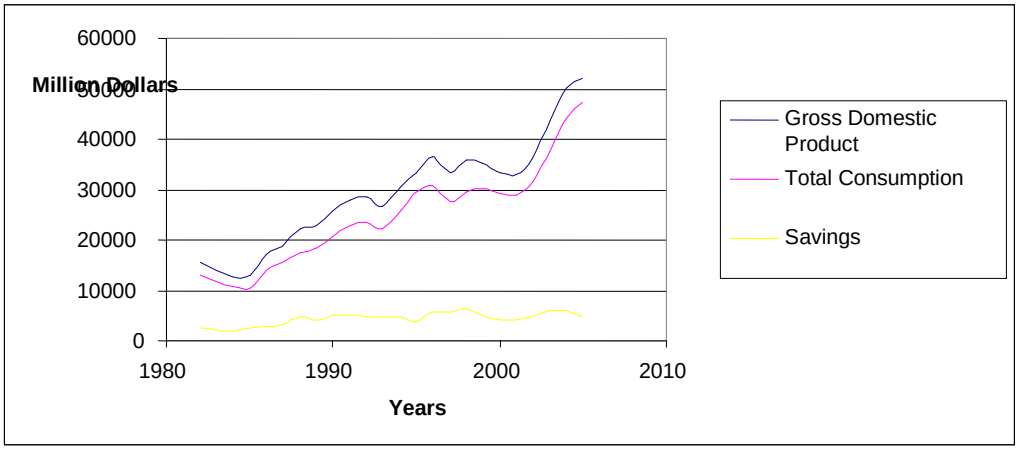


Figure 14 : Gross domestic product (GDP) in three Arab countries

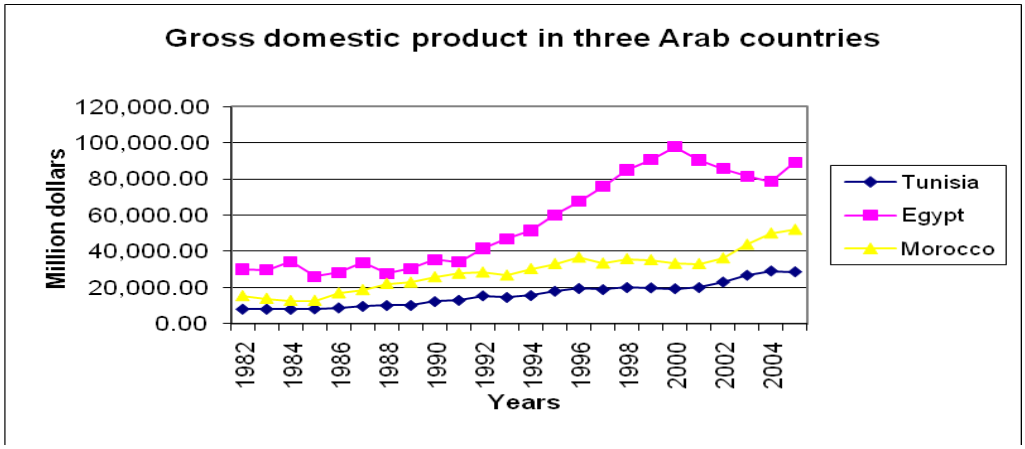
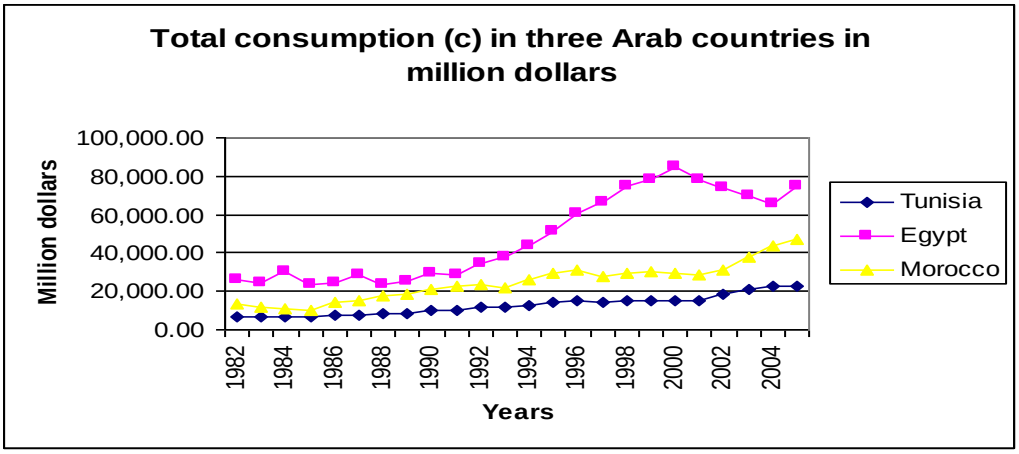
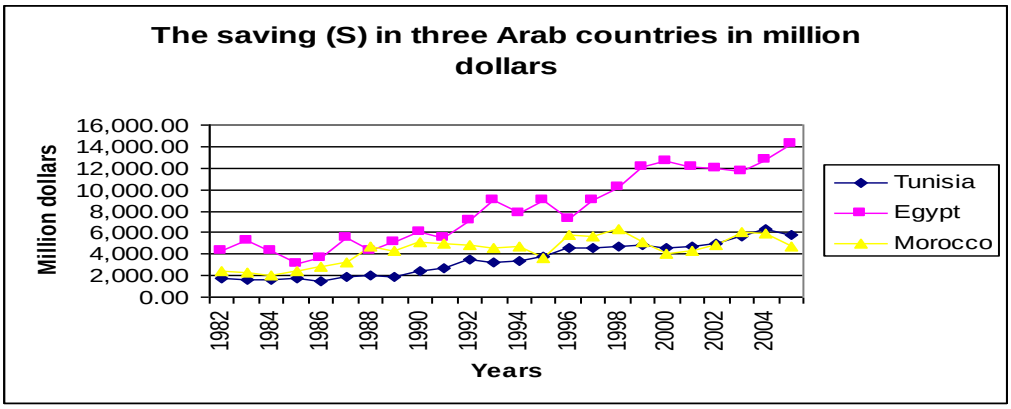


Figure 15 : Total consumption (C) in three Arab countries



: Total savings (S) in three Arab countries16 Figure



From the above table (6) and the figures (11, 12, 13), as can be seen the gross domestic product in Tunisia has been increasing at a sustained high rate, from 8,133.4 million US dollars to 15,497 million US dollars in 1992 nearly double about (48% increase); from 15,497 million to 23,143 million in 2002 (33% increase); and from 23,143 million to 28,816 million US dollars in 2005 (20% increase), due to the increased exports of goods and services for Tunisia from around 3,002 to 13,830 million dollars in the period under study and may be due to the increase of the return of investments, while the consumption increased also nearly two times in 1992 from 6,417.8 million to 12,047 million dollars; from 12,047 million to 18,184 million in 2002 (34% increase); and from 18,184 million to 23,064 million US dollars in 2005 (21% increase). Due to the rise in population from 6.700 million in 1982 to 10.003 million in 2005, and the borrowed fund from abroad increasing from 2,275 million US dollars to 8,362 million US dollars in 2005, and because the main imports to Tunisia were consumption goods, for that reason the imports increased from 3,858.5 million $US in 1982 to 4,592 million $US in 2005, and there is a positive relationship between consumption and gross domestic product. Whereas, the gross domestic product in Egypt increased from 30,325.7 million US dollars to 34682 million US dollars in 1992 (13% increase); from 34,682 million to 73,804 million in 2002 (53% increase); and from 73,804 million to 89,171 million US dollars in 2005 (17% increase), this was due to the increase in exports in Egypt and the decrease in the repayment to the lenders as a debt services.

Also, in Morocco the gross domestic product had risen from 15,423.9 in 1982 to 28,451 million dollars in 1992; from 28,451 million dollars to 36,241 million dollars in 2002; from 36,241 million dollars in 2002 to 52,023 million dollars in 2005. The exports in Morocco also increased in the period from 3,011.3 million dollars in 1982, to 10,613 million dollars in 2005. On the other hand, consumption increased from 13,031.5 million dollars in 1982 to 23,565 million $ US in 1992; from 23,565 million dollars to 31,417 million dollars in 2002; from 31,417 to 47,374 million dollars in 2005, this means that there was an increase in 2005 of more than three times compared to 1982. In the same period the imports also increased from more than 4,000 million dollars in first 1980s to 18,968 million dollars in 2005.

A comparative view of the gross domestic product of selected countries can be seen from figure (14). In total the period gross domestic product in Egypt has been higher than in Tunisia and Morocco. In addition, from figure (15) it can be seen that the total consumption in Egypt is also higher than in the other two countries. And from figure (16), it is clear that in general saving in Egypt were higher than in Morocco or Tunisia. In 1982 the savings level in both Morocco and Tunisia were very similar.

5.8 Summary

This chapter showed the different fluctuation in the data of variables used in the three selected countries to see the difference among them individually before combining the data for the selected countries. In order to answer the main research question and to find the relation between growth and investment on one hand and external debt and debt service on the other, the following chapter presents the research methodology, method, data collection and statistical tools related to this study.

Chapter Six: Methodology, Method, Data Sources and Econometrical Tools of the Study

6.1 Introduction

This chapter discusses the methodology applied in order to capture the impact of external debt on economic growth and debt service to investment in three Arab countries, namely Tunisia, Egypt and Morocco, within the period from 1982 to 2005, which is to cover the time during and after the debt crisis faced by developing countries in one side and stop in 2005 depending on data availability in the other side, using developed Chowdhury (1994) model. A quantitative research method is required as the research topic involves the relationship between quantifiable variables. In addition, secondary data will be used which is quantitative in nature. As Saunders, Thornhill & Lewis. (2007) show, secondary data come from various sources such as the government, institutions reports. There are advantages in using secondary data, mainly the saving of time and the reduction of research costs (Ghauri & Gornhaug, 2005), together with the reduced likelihood of bias.

Research on external debt and its impacts on growth have only exploded after the debt crisis that hit many developing countries in the early 1980s (Suma, 2007). The debt crisis experienced by African countries (in Sub-Saharan Africa during 1980s) is used as a benchmark for studying the impact of external debt on economic growth in selected Arab countries (Ikejiaku, 2008). However, it is not necessarily the case that countries need to be in a debt crisis as in Sub-Saharan Africa to investigate the impact of external debt on economic growth. Increasing the burden of external debt service in selected Arab countries is one of the factors that spur attempts to ascertain the link between external debt and economic growth.

The study focuses on three Arab countries for the following reasons. Although there are many studies that examine the impact of external debt on growth for some countries separately included with other African countries (eg as a comparative study of Nigeria and Morocco by Edo, 2002), to knowledge, there is a lack of studies on these countries together from North Africa exclusively. While previous studies generally used total debt in the analysis, this study focuses on external public debt that has significant effect on domestic fiscal policy, due to the unavailability of the required data for private debt and long period of private investment.

In the literature, there are many studies that examine the impact of external debt on economic growth empirically. As mentioned in chapter three empirical studies have centred on middle-income countries, particularly those in Latin America and little attention has been paid to

African countries (Green, 1989; Schclarek & Balleste, 2005). The focus of this study is on these Arab countries, because the economic and political conditions of these countries are different, Tunisia follows the socialist systems whereas, Morocco and Egypt follow different political systems and use different degrees of free market economy and the three selected countries are from the middle-income group as divided by the Arab countries league as mentioned in chapter five. One notable characteristic of these countries is that governments are the main borrowing agents and the lion's share of these countries' external debt is either public or publicly guaranteed.

The accumulation of external debt in these countries is viewed as the main source of their economic slowdown (Sachs, 1998). Generally, these countries have slow economic growth, low saving rates, small tax bases, and little inflow of foreign direct investment (Martin, 2003). Moreover, these countries depend on a small number of primary product exports to earn foreign exchange. The deterioration in terms of trade of these primary products has weakened their foreign exchange earnings and their import capacity (United Nations, 2005).

Some Arab countries are suffering low saving and investment rates as mentioned in chapter five. This is mainly due to scarcity of domestic resources (United Nations, 2005). In such economies, foreign inflow of resources, as asserted by Abdul Waheed (2004), like foreign direct investment and foreign borrowing can help economic growth of developing countries based on the Harrod-Domar growth model. According to this model, in which the economic growth rate depends solely on investment, the key to enhanced economic growth is to invest more (Siddiqui, 2007). Developing countries, however, may not be able to save enough to finance the desired level of investment. Essentially, there will be a gap between domestic saving and the desired level of investment (Rajan, 2009) as showed in chapter five. The increase in investment financed by external resources can boost economic growth in the recipient economy (Siddiqui, 2007). In such circumstances foreign borrowing is attractive as it provides the funds needed for economic growth without the need for an increase in taxes or a reduction in consumption.

6.2 Model specification

General Chowdhury Structural Model

Chowdhury (1994) used a structure of simultaneous equation model built to capture the interrelationship between public and private external debt, capital accumulation and production function. This simultaneous equation is constructed on the basis that the dependent variables are not only determined by independent variables but some of the independent variables are determined by the dependent variables.

The structure of the Chowdhury Model is as follows:

1 -Aggregate production function:

$$Y_{it} = \delta_0 + \delta_1 D_{it} + \delta_2 Dp_{it} + \delta_3 K_{it} + \delta_4 K_{it2} + \delta_5 L_{it} + \delta_6 L_{it2} + \delta_7 AG_{it} + E1_{it}$$

2 -Capital accumulation equation:

$$K_{it} = \alpha_0 + \alpha_1 Y_{it} + \alpha_2 D_{it} + \alpha_3 Dp_{it} + \alpha_4 K_{it-1} + \alpha_5 G_{it} + \alpha_6 P_{it} + \alpha_7 IN_{it} + E2_{it}$$

3 -Public and publicly guaranteed external debt accumulation equation:

$$D_{it} = \beta_0 + \beta_1 Y_{it} + \beta_2 D_{it-1} + \beta_3 AG_{it} + \beta_4 TT_{it} + \beta_5 IN_{it} + E3_{it}$$

4 -Private external debt accumulation equation:

$$Dp_{it} = \gamma_0 + \gamma_1 Y_{it} + \gamma_2 P_{it-1} + \gamma_3 AG_{it} + \gamma_4 TT_{it} + E4_{it}$$

Where Y = GNP

K = Capital stock

D = Public and publicly guaranteed external debt

DP = Private external debt

L = Labour force

AG = Percentage of labour force in agriculture.

P = Population

IN = Income share accruing to the bottom 40 per cent of households, Proxy variable for income inequality.

Chowdhury used the three-stage least squares (3SLS) to achieve consistent and efficient estimators on pooled annual observations for the period 1970-1988 in ten countries in Asia

and the Pacific. The literature review gave an explanation of Chowdhury's findings as mentioned in chapter three he adopted a structural simultaneous equation model to explore the direct, indirect and full effects of indebtedness on GNP and vice versa and because he studied the relationship between four dependent variables, public and private external debt, capital accumulation and production function, whereas, this study focus on two dependent variables, real income and investment depending on data availability which is appropriate to use the two equation separately.

Structural model

This study uses a model of foreign debt accumulation specified using two equations: gross domestic product equation, and investment equation. The model aims at examining empirically the interaction between these two equations, using models of foreign debt and economic growth adapted from developed Chowdhury model (1994), estimated by ordinary least squares (OLS) or two stage least squares (2SLS) which appropriate in the analysis depending on the result as be seen in next chapter. The model will be applied to three Arab countries which are Tunisia, Egypt and Morocco, with panel data examined together for the period 1982-2005 to find if there a significant debt overhangs effect and crowding out effect. This means whether the stock of external debt and debt service payments have a depressing influence on investment in the countries understudy.

The relationship between debt and growth is not a simple one, and many variables that are used for estimation may be endogenous, and the impact of this relationship may also have direct and indirect effects. Moreover, "due to the circular relationship among external loans, economic growth, debt servicing and investment, a single equation model cannot analyze appropriately" (Karagol, 2002, p9) and fully the interactions between these and other macroeconomic variables (Leta, 2002).

Thus, the two structure equations are as follows:-

Aggregate output equation: ..... equation (1)

$$RY_{it} = \alpha_0 + \alpha_1 IY_{it} + \alpha_2 TED_{it} + \alpha_3 L_{it} + \alpha_4 XM_{it}.$$

Investment equation: ..... equation (2)

$$IY_{it} = \beta_0 + \beta_1 RY_{it} + \beta_2 MPK_{it} + \beta_3 EDY_{it} + \beta_4 TDS_{it} + \beta_5 POP_{it}.$$

Where:

RY = Real income.

IY = Investment.

TED = Total external debt.

L = Labour force.

XM= the ratio of exports to imports (Terms of trade capture external shocks).

MPK = Marginal of capital stock.

EDY = Ratio of total external debt to income (to capture the debt overhang).

TDS = Total debt service to exports of goods and service ratio (reflect the crowding out effect).

POP = Population.

The existing literature on growth theory related to the topic is high accumulated debt levels to negative impact on growth. The first can be represented both by early post-Keynesian models and by neoclassical models as indicated in chapter three. The early post-Keynesian models of growth, such as the Harrod-Domar model (1939, 1946) and neoclassical growth models, such as the Solow-Swan model (1956), have stressed the importance of investment and savings in furthering growth as mentioned in chapter three. In traditional neoclassical growth models postulations about capital mobility or ability of a country to borrow or lend raises transitional growth. This can be explained because the marginal productivity of capital surpasses the world interest rate on capital in developing countries. Theories of the second group can be portrayed by the well-known debt overhang theories. According to Claessens et al (1996), the debt overhang theory is based on the premise that if debt exceeds the country's repayment ability with some probability in the future, expected debt service is likely to be an increasing function of the country's output level. Thus, "some of the returns from investing in the domestic economy are effectively taxed away by existing foreign creditors and investment by domestic and new foreign investors are discouraged" (Clements, 2003, p.4).

The aggregate production function uses the neoclassical model following Solow (1956) and Swan (1956), who argued that real output depended on capital input (K), labour force input (L) and disembodied technology change. It also employs the modification introduced by Chenery and Strout (1966), which confirmed the role of investment and investment-income

ratio, and the temporary gap between investment ability and saving ability, which is filled by external loans and aid. In this study, therefore, the aggregate output depends on four variables which are levels of investment, external debt, labour force, and terms of exports to imports.

The aggregate output equation has real income (gross domestic product) as the dependent variable, and the right hand side includes, control variables, gross domestic investment, external public debt, labour force, and terms of exports to imports. Similarly, the investment equation has public investment rate as the dependent variable, and explanatory or control variables include real income (gross domestic product), marginal product of capital, population and two debt variables (external public debt to GDP and external debt service to exports of goods and services) to capture the debt overhang and crowded out investment respectively.

Gross domestic production is incorporated in the second equation, which is the investment equation, because it is expected to capture the investment accelerator effect, which in turn leads to higher saving as a result of higher investment. The debt overhang problem shows how, in these indebted countries, an accumulation of foreign debt may reduce investment, and, hence, economic growth. In order to test the idea that debt service payments have a crowding out effect on investment, the investment equation includes the external debt service to export ratio as an explanatory variable. The crowding-out hypothesis predicts that external debt service payments adversely affect investment and the growth rate of a country, due to the fact that external debt service payments reduce investment. In other words, the required debt service payment may create a crowding out effect on investment by transferring resources out of the country in the form of interest and principal repayment. On the other hand, the reduction in debt service payments, in turn makes additional resources available for investment (Haraldsottir, 2006).

6.3 Data description

The analysis in this study uses two equations for three Arab countries and relies on secondary data for the period 1982 to 2005. Secondary data comes from various sources such as the government, institutions reports and is transferred to real figures by dividing by the customer price index. The purpose is, as mentioned, to cover the time during and after the debt crisis but is dependent on data availability.

The data was collected from different publications and institutions depending on availability. The external public debt to GDP is from two reports, Arab Countries Economic Indicators published by the Arab Monetary Fund, and Global Development Finance, which includes the World Bank authorities review of developing countries and the data are compiled from the statistics provided by countries who are members of the World Bank debtor reporting system. The latter report was renamed as Global Development Finance to reflect the significant change in global capital flows (World Bank, 1997). Terms of trade and total investment are from national accounts of Arab countries published by the Arab Monetary Fund. The value of debt service to exports of goods and services, external debt and external debt to gross domestic product are from Arab Countries Economic Indicators published by the Arab Monetary Fund and Global Development Finance by the World Bank. Population data is from Arab countries economic indicators published by Arab Monetary Fund. Capital account is from balance of payments and external public debt of Arab countries published by the Arab monetary fund. The Labour Force data are from United Nation development programmes, and Arab statistics by World Bank.

According to the CD (2010) and the publications from the International Monetary Fund, which show that the year 2005 was stable in terms of inflation and other economic indicators because no economic problems occurred. Hence this year is taken as base to calculate the customer price index for the three countries to convert all data into real figures for the variables used. All variables are measured in US dollar at constant prices (1995) for econometric estimation, and all series are transformed into natural logarithm form.

A limitation arises from the problem of the diversity of data reported by different organizations. The same organization sometimes shows several figures for the same year. As a result, sources are used jointly and all figures converted into real terms according on customer

price index. Moreover, the lack of long term data available may limit the findings because long term data indicates more information which makes the findings more reliable. To pursue the analysis, adaption of the Chowdhury (1994) model is needed, as will be indicated in the model specification section.

6.4 variables

***Investment (I)*:-**

The saving rate is exogenous and equal to the ratio of investment to output in the neoclassical growth model for a closed economy. A higher saving rate increases the steady state level of output per effective worker and in this way increases the growth rate. The growth rate of investment in any country is considered to have a favourable impact on the growth of output, since the investment rate is the key determinant of economic growth as identified by neoclassical growth theory model (Petrakos, Arvanitidis & Pavleas, 2007). Countries that fail to grow are countries that fail to invest, and countries that grow quickly are countries that invest a substantial fraction of their GDP (Martin et al 2002). "This explanation is partly based on economic theory. After all, the basic neoclassical growth model of Solow (1956) and Swan (1956) predicts that one of the key determinants of growth is the investment rate" (Martin et al 2002, p.8). In this study investment is expected to have a positive effect on growth in the aggregate output equation, and in the second equation is determined by independent variables as shown in the second equation.

Total external public debt (TED):-

The debt stock presents the total debt accumulated by the borrower countries. It shows information on the magnitude of future debt service burden on the economy of the borrower. The effect of total external debt on GDP depends on the level of indebtedness which might affect the output in two ways:

- First, the higher level of indebtedness, ceteris paribus, the greater the country's leverage, the more limited the external sources of credit and the larger the amount of financial stress and liquidation that negatively affect the level of GNP through preventing domestic investment.

- Second, the rise in public external debt might discourage GNP level indirectly by encouraging capital flight due to the expectations of tax to rise. Nonetheless, a positive correlation between the countries' GNP level and its external debt can be expected, if a significant portion of external borrowing is directed toward financing efficient investment in productive capital. Therefore, the effect of external debt on income cannot be anticipated a priori.

  It is shown in various theoretical models (neoclassical theory) that reasonable levels of current debt inflows are anticipated to have a favourable impact on growth. In traditional neoclassical models, which allows for capital mobility, and the possibility to lend and borrow from overseas sources, debt encourages transitional growth. Since the marginal product of capital is higher than the world interest rate there is an incentive for capital-scarce countries to borrow and invest (Pattillo et al., 2002).

Labour force (L):-

The labour force variable appears in the output equation, labour force is considered to have a positive effect on growth as a production input. An increase in the aggregate output of less developed countries relies most heavily on an employed labour force. The labour force is proxied by the ‘employed labour force’. Although selected countries have high population growth rate, it used labour force as a proxy in aggregate output equation instead of population. In spite of the high rate of population growth in the selected countries, a high labour force employment rate, especially that of skilled labour, is assumed to give an impetus to growth in the selected Arab countries’ economies. Thus, labour force is assumed to encourage the economic growth.

There is also some argument that the contribution of the labour force can be negative for developing countries in that an additional unskilled and inefficient labour force decreases output rather than increasing it (Feder, 1983; Todaro, 1994). This can be true in developing countries in general, where most of the labour force is unskilled and the possibility of making it more productive is limited. Therefore, the expected effect cannot be predetermined.

Terms of trade (XM):-

The output equation also incorporates the effects of changes in the country's terms of trade (exports to imports, XM). On the one hand, it is expected that an increase in XM increases the level of income due to improved balance of payments. On the other hand, XM is expected to have a negative effect on income through the price effect. This means, when the prices of imports increase relative to exports through the price effect, the demand for imports will fall. This affects the level of output negatively, especially when the country depends extensively on imported input in the production process. Therefore, depending on the magnitude of the income and price effects, the impact of XM on income can be either positive or negative.

In addition, terms of trade movement can affect a country's macroeconomic performance through two possible channels. Firstly, a decline in terms of trade reduces foreign exchange earnings and the profitability of the export sector, thus diminishing export growth. The recurrent terms of trade shocks in many developing countries in the past decades has led to increased foreign borrowing to finance imports. Secondly, a decline in the terms of trade may affect growth indirectly by worsening the current account balance. Many countries respond to a deficit current account by several means, such as increasing controls on imports, and the devaluation of exchange rates. In addition, an increase in the world interest rate is also found to contribute to negative economic growth in developing countries.

On the other side, this variable is presented as the percentage change in terms of trade. The effect of this variable on the stock of the government foreign debt might come through its effect on economic growth. In fact, an increase in the terms of trade improves the country's competitiveness in international markets, which implies an increase in the export revenue and in the country's reserve of foreign exchange. Therefore, an improvement in the terms of trade is expected to improve the country's ability to service its foreign debt and may eventually reduce its need for foreign borrowing and its stock of foreign debt.

Also, the variable reflects the growth in the country's export sector. A higher export growth means an increase in the country's export earnings of foreign exchange, which improves its ability to service its foreign debt. The increase in the country's earnings of foreign exchange may reduce its need for foreign borrowing and eventually its stock of debt.

This means the improvement in the terms of trade, which implies an increase in export earnings, could reduce the stock of debt for two reasons: one is related to improvements in debt service ability and the other is related to a reduction in the country's need for new foreign debt.

The macroeconomic policy variables are captured by inflation and by real exchange rate. These variables illustrate the extent of vulnerability of the economy to external factors and as a result the dependence on financing foreign resources.

The aggregate output equation and investment equation are constructed on the basis that the dependent variables are not only determined by independent variables. This means the independent variable (Y) is determined by the level of investment (I), which is also a dependent variable in the second equation. Due to this, income is also included in the investment equation since it is expected to capture the investment accelerator effect (Iyoha, 2000); this is because higher income means higher saving which leads to higher investment. As a result, higher income is expected to accelerate investment levels. Thus, growth rate in income is expected to affect investment positively.

***Marginal production of capital (MPK)*:-**

Marginal productivity of capital is computed by dividing change in capital formation to change in output as proxy variables. It measures by how much income is increased via per unit increase in capital, higher marginal productivity of capital is anticipated to boost investment. Thus, marginal productivity of capital is envisaged to affect positively investment levels. Marginal productivity of capital is assumed to have a favourable effect on investment (Iyoha, 2000). Since it measures by how much the income is increase per unit increased in capital, higher marginal productivity of capital is expected to affect the level of investment positively.

Total external debt to income (EDY):-

The ratio of external debt stock to GDP is the usual measure of debt overhang, which is defined as the ratio of the total debt outstanding to GDP, external debt at the end of the year to annual GDP. By using GDP as denominator "the ratio may provide some indication of potential to service external debt by switching resources from the production of domestic goods to the production of exports" (International Monetary Fund, 2000b, p.175). Indeed, if

exports comprise a very small part of GDP a country might have a large debt to export ratio but a low debt to GDP ratio.

Debt service:-

Debt service crowds out alternative uses of resources by debtor countries and is, thus, considered as the obvious indicator that immediately reveals the burden that debt imposes on a country's economy. The ratio of debt service indicates how much the debtor country is losing in debt service (Sachs, 1989). The higher this ratio, the more the likelihood that debt could be unsustainable and vice versa, and higher debt service repayment implies fewer resources available for public investment.

The debt service to exports of goods and services (TDS):-

The ratio of total debt service payments to exports of goods and services, is expected to capture the crowding-out effect of external debt (Iyoha, 1999). The crowding out effect is particularly relevant for countries with limited capacity to raise revenues or obtain market financing (IMF, 2003, as cited by Habimana, 2005). This ratio is defined as "the ratio of external debt service payments of principal and interest on long-term and short term debt to export of goods and services for any one year" (International Monetary Fund, 2000b, p.174). The debt services to exports ratio is a possible indicator of debt sustainability since it shows how much of a country's export revenue will be occupied in servicing its debt and thus, also, how vulnerable the payment of debt service obligations is to unanticipated falls in exports proceeds. This ratio tends to draw attention to countries with major short-term external debt.

In addition, the debt to exports ratio scheduled debt service (interest and payments due on public and publicly guaranteed debt during a year) for the same data, expressed as a percentage of exports for that year. The increase in the debt servicing ratio affects economic growth indirectly by investment, whereas the decline in the rate of growth decreases the ability of an economy to service its debt.

Population (POP):-

The domestic level of savings is affected by the socioeconomic variable, population (POP) which is also included in the investment equation as indicators of income distribution. The growth rate of population decreases growth of investment through discouraging domestic saving.

The larger the population the smaller the share of income allocated to savings. The issue of population and economic growth is as established as economics as a subject. The argument about the link between population and economic growth can be traced back as far as Thomas Malthus (1798) when he published his book "An Essay on the Principle of Population" (Savas, 2008). "Malthus asserted that there is a tendency for the population growth rate to surpass the production growth rate because population increases at a geometrical rate while production increases at an arithmetic rate. Thus, the unfettered population growth in a country could plunge it into acute poverty" (Savas, 2008, p.162). However, for developed economies, this pessimist interpretation has proven unfounded, since many have achieved a high level of economic growth at the same time as an increase both population and the real gross domestic product (GDP) per capita. The negative and positively sides of population growth is ongoing debate (Savas, 2008).

This variable is taken into account in order to conform to neoclassical growth model. As asserted by Kelley, (1988) rapid population growth leads to increasing scarcity of productive capital per worker and thereby to declining worker productivity. (Coale and Hoover (1958), who considered the adverse impacts of population growth on savings and capital formation, contend that rapid population growth per se increases the amount of saving. Rapid population growth generates a strong demand for government expenditure in areas such as education and health, thereby diverting funds from relatively more productive, growth-oriented public and private investments. As a result, population is expected to have a negative impact on investment.

The usual view is that higher population growth lowers the growth rate of per capita GDP. This view is based on the notion that having and raising children is costly in terms of time. Further, more population could imply more demand for public service, which requires more

government expenditure. In that case, lower economic growth is expected to put extra pressure on the country's burden of foreign debt, and may eventually increase its stock of foreign debt. Therefore, a higher population will increase the government's stock of foreign debt. In addition, in countries where population growth is high, resources will be diverted from productive purposes to growth population (Barro, 1997). Moreover as the population increases, part of an economy's investment is used to supply capital for the growing labor, and the capital-labour ratio will fall.

6.5 Econometrical Tools

This part indicated that, the panel data model is used to find the relationship between external debt and economic growth. The study utilizes Stata version 10. The random effects, fixed effects both regression models are selected for the study, whether the relationship between external debt and growth is as mentioned in the previous chapter through the per capita income equation and investment equation. To select which model will be used, fixed or random, the Hausman test depending on p-value is used.

Regression analysis was first developed by Francis Galton in the latter part of the 18 century. The term regression persists to this day to describe statistical relationships between variables. Regression analysis is the statistical methodology for predicting the values of one or more variables from a collection of predictor (explanatory) variables (Julmanurl, 2000). In the social and behavioural sciences, the use of panel data analysis is a more and more accepted form of analysis of longitudinal data (Kennedy, Godoy and Leonard, 2009). The regression model is concerned with estimating and predicting the relationship among dependent variable and one or more independent as this study as mentioned in this chapter previously or explanatory variables. Based on this definition there are two types of regression models: simple regression model and multiple regression model.

6.5.1 Panel data analysis

There are many types of data available for empirical analysis: time series, cross section, and pooled data (Julmanuri, 2000). In order to overcome the problems of using a pooled sample, and due to the advantages of using panel analysis, the models that are employed in this study

are estimated using panel data analysis. Panel, or longitudinal or cross-sectional time-series, data were observed at multiple instances, for example people and countries at two time periods or more. Panel data have become available in less developed countries. In these countries, there may not be a long tradition of statistical collection (Hsiao, 2003).

Hsiao (1985, 2002) asserted that for economic panel data sets has several major advantages over traditional cross-section or time series data sets one of which is usually to give the research a large number of data points, which is very important when using annual data (Bhat and Jain, 2004). In addition, panel data allows for the constructing and testing of more complicated behavioural models, and enables better control of individual heterogeneity without running the risk of yielding biased results (Julmanuri, 2000). Another advantage is increasing the degrees of freedom and reducing the collinearity among explanatory variables, hence improving the efficiency of econometric estimates. More importantly, longitudinal data allow a researcher to analyze a number of important economic questions that can not be addressed using cross-sectional or time-series data sets (Hsiao, 2003). Lastly, is providing micro foundations for aggregate data analysis (Hsiao, 2003; Brooks, 2008).

For these reasons used real income as dependent variable in first equation and independent variable in investment equation and investment as dependent variable in the second equation (investment equation) and real income as independent variable. This study uses panel data to apply the fixed and random effect models using for three Arab countries.

Fixed Effects and Random Effects Models and Hausman Test

In this study the researcher focuses on two types of techniques used to analyze panel data: The fixed effects and random effects models, respectively. The fixed effects model encompasses the panel effect by permitting the intercept to vary across groups. However, the random effects model has a unique composite error (Kuo, Hu and Hsu, 2006). As illustrated following:

Fixed Effects Models

It is also called dummy variables model or error component model (Kezdi, 2003). Fixed-effects explore the relationship between predictor and outcome variables within an entity. However, each entity has its own individual characteristics that may or may not influence the

predictor variables. The fixed effect is the model to employ when the researcher wants to control for omitted variables that are constant over time but differ between cases (Paulo and Teresa, 2007). It uses the changes in the variables over time to estimate the impacts of the explanatory or control variables on response variable, and is the key technique used for analysis of panel data. And the error is uncorrelated with the explanatory variables which mean the ordinary least squares model (OLS) is consistent if the explanatory variables are not asymptotically perfectly collinear (Murray, 2006).

Random Effects Models

Another way to investigate panel data is by using the random effects model. In such models the intercept is a random variable with a mean value. The rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the independent variables included in the model. Also random effects assume that the entity's error term is not correlated with the predictors, which allows for time-invariant variables to play a role as explanatory variables (Torres- Reyan, 2003). An advantage of the random effects model over the fixed effects model is that it is efficient in terms of degrees of freedom. The random effects model is suitable in a situation where the random intercept is uncorrelated with the regressors. The researcher used a Hausman test to select which model-Fixed or Random- effects would be appropriate for this study.

Hausman Test

This is a test of the equality of the coefficients estimated by the fixed effect and the random effect estimators. For details see Baltagi (2001. In selecting between fixed and random effects approach, the crucial consideration is whether response and explanatory or control variables are correlated. Therefore, it is vital to have a method for testing this assumption. Hausman (1978) suggested a test depending on the difference between the effects fixed and random effects estimates.

For panel data, the Hausman test has to be applied before using the multiple panel regression analysis to specify the right model; random effects or fixed effects. Also to identify the best model for the collected data the test checks a more efficient mode against a less efficient but consistent model to ensure that the more efficient model also gives consistent results. The

Hausman test therefore examines if the coefficients estimated by the consistent fixed effects estimator are the same as those estimated by the efficient random effects estimator (the null hypothesis). If Prob>chi2 value smaller than.05, however, fixed effects model should be used. If there is insignificant Prob>chi2 larger than.05, then it is safe to use random effects.

This study will use multiple regression analysis, which can be adapted to random effect or fixed effect. Fixed effects are a reasonable model to do with panel data but it may not be the most efficient model to estimate the relationship between the variables. Random effects can give a better P-value as they are a more efficient estimator. In addition, sometimes the difference in coefficients between fixed effect model and random effect is systematic for that the researcher could be selecting any one of them.

6.5.2 Instrumental variables:

Since the mid-1970's there has been a great deal of concern for regression models in which some explanatory variables are endogenous, that is, they are correlated with the regression error term (Chmelarova, 2007). Traditionally such problems had been considered within the context of simultaneous equations models, in which explicit assumptions about endogeneity and exogeneity were required, and multiple equation regression systems were built and estimated (Chmelarova, 2007).

Although instrumental variables methods are still widely used to estimate systems of simultaneous equations and to counteract bias from measurement error, a flowering of recent work uses instrumental variables to overcome omitted variables problems in estimates of causal relationships. If the error term of the classical regression model is correlated with the explanatory variables, researchers have biased and inconsistent ordinary least squares (OLS) parameter estimates. In such circumstances, researchers need to use another estimation methods, two stages least squares (2SLS), see Angrist & Krueger, (2001).

In order to check the endogeneity problem it is necessary to run the Durbin-Wu-Hausman procedure (DWH) to check whether the independent variables are subject to this concern. If yes, it is necessary to use an instrumental variable panel model, otherwise ordinary panel model is used depending on the P-value as will be indicated in the empirical chapter.

6.5.2.1 Ordinary Least Squares Method (OLS):

The ordinary least squares method is one of the most popular and widely used methods for regression analysis. It is used to compute estimations of parameters and to fit data. The method was developed by Carl Friedrich Gauss (1821) and has subsequently evolved to become the Classical Linear Regression Model (Kllza, 2007). It is mainly used to establish whether one variable is dependent on another or a combination of other variables.

6.5.2.2 Two-Stage Least Squares (2SLS):

The method of two-stage least squares is the most common method used for estimating models (Greene, 2002). The 2SLS estimator gets its name from the result that it can be obtained by two consecutive OLS regression, as the name suggests the two stage least squares is a two stage process. Initially, the endogenous variable is regressed on all the exogenous variables and the estimated value of this regression is calculated. Secondly, in the equation, predicted values replace the original endogenous variables and estimation is carried out (Keshk, 2003). The most usual method adopted is to create an instrument, using the method of two-stage least squares (2SLS). According to the theory behind instrumental variable estimation, the purpose of 2SLS is to create an instrument that is correlated with the endogenous variable while uncorrelated with the disturbance term. Thus, the endogenous variable is separated into two parts, one correlated with the disturbance term and another uncorrelated with the disturbance term. To estimate the model, the approach then uses the latter, in place of the original endogenous variable (Keshk, 2003).

The Hausman Test, which is used for selecting random effect or fixed effect models will also be involved here to test endogeneity. The null hypothesis is of no correlation between the random per capita income (RY) and investment (IY) - specific effects and any one of the explanatory variables. In this instance both the OLS and 2SLS estimates are consistent. However, due to autocorrelation in the disturbance terms the former are inefficient.

Under the alternative hypothesis the OLS estimates are consistent. However, the 2SLS estimates are inconsistent. This is because of the correlation between the explanatory variables and the disturbance terms. Actually, if the two estimators give the same answer, it is likely that interest as a variable and the error term are independent.

6.5.3 Multicolinearity

The predictors in a regression model are called the independent variables, but this term does not imply that the predictors are themselves independent statistically from one another. In fact, for natural systems, the predictors can be highly intercorrelated. “Multicolinearity” is a term reserved to describe the case when the intercorrelation of predictor variables is high. It has been noted that the variance of the estimated regression coefficients depends on the intercorrelation of predictors. Haan (2002) concisely summarises the effects of multicolinearity on the regression model.

Multicolinearity does not invalidate the regression model in the sense that the predictive value of the equation may still be good as long as the prediction is based on combinations of predictors within the same multivariate space used to calibrate the equation. But there are several negative effects of multicolinearity. First, the variance of the regression coefficients can be inflated so much that the individual coefficients are not statistically significant – even though the overall regression equation is strong and the predictive ability good. Second, the relative magnitudes and even the signs of the coefficients may defy interpretation. Third, the values of the individual regression coefficients may change radically with the removal or addition of a predictor variable in the equation. In fact, the sign of the coefficient might even switch.

However, when choosing a predictor variable the researcher should select one that might be correlated with the criterion variable, but that is not strongly correlated with the other predictor variables. However, correlations amongst the predictor variables are not unusual. Severe multicollinearity leads to incorrect inferences about the relative contribution of each predictor variable to the success of the model (Brace, Kemp and Snelgar, 2003).

There are several sources of multicollinearity. As Gujarati (1995, 2003) notes, multicollinearity may be due to the following factors:

1. Constraints on the model or in the population being sampled.
2. Model specification, for example, adding polynomial terms to a regression model, especially when the range of the X variable is small.

3. An over determined model. This happens when the model has more explanatory variables than the number of observations.

If the multicollinearity is serious the main options to solve this problem is to drop one of the collinear variables, whereas, in dropping a variable specification bias may arise from incorrect specification of the model used in the analysis. Hence the remedy may be worse than the disease in some situations. In addition new data which sometimes simply increases the size of the sample may attenuate the collinearity problem. But obtaining additional data is not always easy (Julmanuri, 2000).

Stata Statistical Package

Several standard software packages are used for panel data models, among those statistical packages that excel in programs for panel data analysis is Stata. Each statistical package has procedures dedicated to panel data analysis; Stata appears to have a particularly rich variety of panel analytic procedures. This package has fixed and random effects models, can handle balanced or unbalanced panels, and can estimate one or two-way random and fixed-effect models (Ketchen and Bergh, 2004). In addition, Stata provides automated commands to calculate the test statistic value and the corresponding P-value. Finally Stata is relatively inexpensive and contains features that are not found in other programs. It also includes numerous data management features and a very rich set of graphics options. (See Rabe-Hesketh & Skrondal, 2008; Hills and De Stavola, 2002; Cleves, Gould and Gutierrez, 2002), for the advantage mentioned above, Stata has been used in this study. The following chapter, chapter seven, focuses on the analysis and discussion of the main finding of the relationship between the variables in selected Arab countries.

Chapter Seven: Empirical Results and Finding

7.1 Introduction

This chapter presents the empirical results of the study and investigates the relationship between external debt and economic growth and external debt services and investment in selected Arab countries on the basis of the developed model by Chowdhury (1994), as presented in the methodology chapter. The researcher employed several econometrics methods such as fixed effects, random effects and instrumental variable models and tried to identify or investigate the relationship between external debt and growth; and external debt service to investment, taking into account all the results from different models and specifications. The study checks for robustness of the model as well as restricting the sample only to the selected countries.

Before making any conclusions, it is necessary to make some assumptions about the findings. It is assumed that this study used theory to show the true relationship between the variables considered, and further assumed that this study specified the econometric model, and that the relationships will hold true in the near future. If all of these assumptions hold simultaneously, this study can make certain conclusions for economic growth. In addition, the economic growth rate is measured in this study as the growth of real GDP.

7.2 Empirical Results

In order to see the impact of external debt on economic growth, and external debt service on investment, aggregate output equation and investment equations are solved using appropriate tests, either the OLS or 2SLS method.

In the system of equations, there are two endogenous variables, which are RY and IY. There are also eight exogenous variables namely; TED, L, XM, IY, MPK, EDY, TDS and POP. The two equations are estimated, each incorporating an error correction term. This study employs the natural logarithm of the independent variables in two equations. See table 11 and 15 for details of computer output (estimation) of the two equations.

Multiple Regression analysis

Multiple Regression analysis is employed to analyze the relationship between a single dependent (response) variable and several independent (explanatory or predictors) variables (Hesketh & Skrondal, 2008). This technique is applied to use the independent variables whose values are known in order to predict a given variable.

7.2.1 Statistical Tools for Aggregate output equation

Aggregate output equation: ..... equation (1)

The model can be written as follows:

$$RY_{it} = \alpha_0 + \alpha_1 IY_{it} + \alpha_2 TED_{it} + \alpha_3 L_{it} + \alpha_4 XM_{it}.$$

Where α0 is constant and the αi are the respective parameters of independent variables, and P is the number of parameters to be estimated in the linear regression. The aggregate output equation specified as:

$$\log(RY_{i,t}) = \log(IY_{i,t}) + \log(TED_{i,t}) + \log(LL_{i,t}) + XM_{i,t} + V_i + \varepsilon_{i,t}$$

Where i= 1, 2, 3 and t = 1982,… , 2005, the country and year respectively. v_i is the fixed and $\varepsilon_{i,t}$ the overall error term.

This model is called linear because the relation of the dependent variable (RY) to independent variables is assumed to be a linear function of the parameters.

Multi-collinarity:

When predictor variables are, linearly, perfectly correlated, not all parameters of regression model can be numerically identified and this will result in a noninvertible matrix of cross-product predictor variables. Some statistical packages such as STATA will drop the variables causing this issue until all parameters are estimated. Sometimes, linear correlation between some predictors is high (near-collinearty), and as a result, this may lead to change in the values of parameter's estimates.

Table 7 : Correlation matrix between the predictor variables of the aggregate model. NB the value between parentheses represent p-value.

Variable	$\log(IY_{i,t})$	$\log(TED_{i,t})$	$\log(LL_{i,t})$	$XM_{i,t}$
$\log(IY_{i,t})$	1.000			
$\log(TED_{i,t})$	0.9242 (<.001)	1.000		
$\log(LL_{i,t})$	.7666 (<.001)	0.7432 (<.001)	1.000	
$XM_{i,t}$	-.5751 (<.001)	-0.4922 (<.001)	-0.4492 (<.001)	1.000

For aggregate model, correlation between IY and TED is observed to be high (0.924) and significant, but it is not perfect, see table (7). So, it may cause some impact on the estimated parameters. For the rest of variables, the correlation can be considered between moderate and low.

Hausman test

For panel data, the Hausman test has to be applied before using the multiple panel regression analysis to specify the right model, as is shown in table (8): it estimates both random and fixed effects and proceeds further in order to discriminate between them by means of the Hausman test. In this model, Ry (growth) played a dependent variable role, and the rest of the variables are independent. The Hausman test determines the coefficients of both fixed and random effects and calculates the different value between them.

1. Hausman test

Hausman test to select fixed or random effect model (for multiple regression)

Table 8: Hausman test

	Panel model (fixed- effects)	Panel model (random- effects)	Difference in coefficients
Logarithm of total investment ($IY_{i,t}$)	0.851	0.877	-0.025
Logarithm of total external debt ($TED_{i,t}$)	-0.013	0.018	-0.031
Logarithm of labor force ($L_{i,t}$)	0.124	0.228	-0.104
Ratio of export to import ($XM_{i,t}$)	0.627	0.671	-0.045
H_0 : difference in coefficients not systematic $\chi^2(4) = 5.43$ Prob.> $\chi^2 = 0.246$			

The Hausman test shown in the above figure the results, the probability of accepting H0 is 0.246, implying that the difference in coefficients between fixed effect model and random effect model is not systematic. In other words, either model can be used. However, the random effect model is more efficient.

In order to check the endogeneity problem the researcher ran the Durbin-Wu-Hausman procedure (DWH) to check whether the variables were subject to an endogeneity problem, in other words to test whether the variable investment (IY) was endogenous. If yes, it was necessary to use an instrumental variable panel model, otherwise ordinary panel model is used. To do that, the researcher estimated the investment equation to instrument investment (IY). One-year lagged values of regressors all of variables and other exogenous variables are used as instrumental variables. And from the investment equation the researcher removed the variable (EDY) for the following reasons. First, the introduction of RY and TED is equivalent to that of their ratio EDY = TED / RY. Then EDY is never significant in the estimation. The results show that, p-value is high enough to show that the investment is endogenous, as shown in tables 9 and 10.

2. Durbin-Wu-Hausman test for the endogeneity of the variable "Total investment"

Table 9: Estimation of investment equation

Dependant variable: logarithm of total investment

	Random effects model	Fixed effects model
Logarithm of real income ($RY_{i,t-1}$)	0.821***	0.751***
	(4.93)	(4.67)
Logarithm of total external debt ($TED_{i,t-1}$)	0.009	0.178
	(0.06)	(1.16)
Ratio of export to import (XM)	-0.571***	-0.640***
	(-3.19)	(-3.67)
Marginal productivity of capital (MPK)	0.007	0.010
	(1.03)	(1.45)
Logarithm of labor force ($L_{i,t-1}$)	-0.050	0.150
	(-1.21)	(1.47)
Ratio of total external public debt to GDP	0.003	0.001
	(1.23)	(0.46)
Ratio of external debt service to exports of goods and services(TDS)	-0.008***	-0.009***
	(-3.37)	(-2.96)
Constant	1.603***	-2.303
	(2.33)	(-1.34)
R^2		
Within	0.836	0.850
Between	1.000	0.996
Overall	0.968	0.957
Number of observations	69	69

Note: All independent variables take one-year lagged value. t-statistics in brackets. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 10: Estimation of the main equation

Dependant variable: logarithm of real per capita GDP

	Random effects model	Fixed effects model
Logarithm of total investment ($IY_{i,t}$)	0.950***	0.929***
	(19.27)	(12.58)
Logarithm of total external debt ($TED_{i,t}$)	-0.028	-0.063
	(-0.91)	(-1.43)
Logarithm of labor force ($L_{i,t}$)	0.212***	0.075
	(9.57)	(0.99)
Ration of export to import ($XM_{i,t}$)	0.598***	0.616***
	(5.89)	(4.69)
Residual from investment equation	-0.359***	-0.283***
	(-3.70)	(-2.68)
Constant	-1.640***	1.065
	(-5.66)	(0.89)
H_0 : Residual from investment equation=0		
$\chi^2(1)$	13.72	7.20
$prob. > \chi^2$	0.0002	0.0094
R^2		
Within	0.880	0.878
Between	1.000	0.996
Overall	0.988	0.979
Number of observations	69	69

Note: t-statistics in brackets. *** significant at 1%; ** significant at 5%; * significant at 10%.

Output Equation (aggregate output equation)

The multiple regression analysis was used to forecast, describe and evaluate the relationship between the dependent variable and 4 independent variables which are hypothesized to influence the dependent variable.

According to the result from previous presented tables (9) and (10), the investment (IY) is endogenous; therefore, the researcher followed the instrumental variable panel model as shown in table (11).

Table (11) Regression coefficient obtained by the results of two stage least squares for random-effects regression model

Table 11: Estimation of the final equation
Dependant variable: logarithm of GDP

	Instrumental variable panel model		Ordinary panel model	
	Random effects	Fixed effects	Random effects	Fixed effects
Logarithm of total investment (IY)	0.958***	1.013***	0.877***	0.851***
	(17.15)	(10.94)	(20.3)	(15.21)
Logarithm of total external debt (TED)	-0.025	-0.097*	0.018	-0.013
	(-0.75)	(-1.88)	(0.63)	(-0.37)
Logarithm of labour force (L)	0.215***	0.025	0.228***	0.124*
	(8.71)	(0.28)	(10.7)	(1.95)
Ratio of export to import (XM)	0.737***	0.822***	0.671***	0.627***
	(6.49)	(5.04)	(6.48)	(4.86)
Constant	-1.894***	1.259	-1.720***	0.510
	(-5.77)	(0.94)	(-5.72)	(0.47)
R^2				
Within	0.859	0.849	0.890	0.894
Between	1.000	0.986	0.999	0.999
Overall	0.984	0.960	0.987	0.983
Number of observations	69	69	72	72

Note: t-statistics in brackets. *** significant at 1%; ** significant at 5%; * significant at 10%.

In this model the real income is entered to regress against the dependent variable (growth). The result of p-value indicates that it is strongly significant for correlated with the dependent variable.

RY= -1.894 + 0.958 IY – 0.025 TED + 0.215 L + 0.737 XM

(-5.77) (17.15) (-0.75) (8.71) (6.49)

R^2: within = 0.859 between = 1.000 overall = 0.984

Where figures in parentheses are t-values.

In the aggregate output equation, the explanatory variables included together explain (R^2: overall) over 98% percent of the systematic variations in real income during the period being studied. The $\chi 2$ - value of (13.72) as shown by the estimation of the main equation in table (10) is highly significant, passing the significance test at the 1% level. Thus, the hypothesis of a significant linear relationship between real income and the explanatory independent variables is validated.

As can be seen from the result, including the constant term, three variables (IY, L and XM) became significant at the 1% level. That means all three have the expected sign and are strongly significant. However, the total external debt variable (TED) is not significant enough to explain the relationship with real income and does not support the hypothesis. That means external debt variable has no significant effect directly on growth of output. This is because according to many economic theories, external debt affects output through the investment channel.

Investment: The investment output ratio has been included as an explanatory variable in almost all the economic growth research. The growth rate of output is a function of the investment-output ratio (the savings rate) in the Harrod-Domar theory of economic growth. In the Solow-Style growth model, temporary higher growth is the result of higher savings. In the model the investment is highly significant with real income. The strong relationship between investment and growth for the selected countries is shown by the coefficient of (0.958***) at positive, significant at 1% level of significance. Investment in the growth equation shows evidence that significance on growth (t-ratio= 17.15) is predicted to be positive, since a higher domestic investment, all things being equal, is expected to contribute positively to economic growth.

This result empirically supports the results of other studies, such as Caselli et al. (1996), who suggested that the investment ratio will exert a positive and statistically significant effect on economic growth. This means that these countries do not need to further encourage the investor and the government to invest year by year. However, it is possible these countries are not taking full advantage of investment, because the development of infrastructure and other factors has not matched the required level yet. Therefore, the impact of investment is really strongly significant, because investment is the key determinant of economic growth identified by the neoclassical growth theory model of Solow (1956), Swan (1956), Hunt (2007) and Petrakos et al. (2007). Countries that invest a substantial part of their GDP are countries which grow quickly, and countries that fail to invest are countries that fail to grow (Martin et al., 2002). The importance attached to investment by this theory has led to a number of empirical researchers examining the relationship between investment and economic growth, such as Barro (1991), Levine and Renelt (1992), Mankiw (1992), Sala-I-Martin (1997), Xavier Sala-i-

Martin and Artadi (2002). It is also true that in other studies, such as Ajayi (1997) and Chowdhury (1994), the growth rate of investment affected the growth rate of output positively and significantly. Oleksandr (2003), studied the impact of external debt on economic growth of post-Soviet countries, for the period 1994-1999, using panel data on 21 transition countries, and he found that investment positively affects economic growth. Therefore, the study results in line with the previous studies and support the neoclassical theory indicated in literature review chapter.

Total external debt: external borrowing can help relieve resource shortages and if used to finance productive investment activities, will stimulate investment and therefore, promote growth. The effect of external debt on economic growth depends crucially on how external funds are utilized; the negative relationship between external debt and economic growth in the selected countries suggests inefficient uses of external funds. In these countries, inefficient and unproductive use of funds (as mentioned in chapter four in the purpose of loans), the buttressing of consumption, delayed adjustment or investment in projects with low rates of returns, heavy interest payment and large repayment of external debt, and corruption might all serve as explanations of the inverse relationship. Whereas, as mentioned by Cline (1995) who asserted that one of the conditions essential for external loans to have a positive impact on economy is to insure that the marginal productivity of each foreign loans is, at least greater than the cost of principal and interest payment.

This study indicates that total external debt variable (TED) has a negative effect on real income and it is not significant. That means total external debt is insignificant on economic growth which means that, a 1% rise in total external debt leads to 0.25% decrease in economic growth. This does not suggest that the rate of total external debt significantly affects the growth rate of real income directly. The negative effects of external debt on economic growth are caused by the crowding out of public investment and to the disincentive effects, due to debt overhang.

Cohen (1993) asserted that the adverse effect of debt on growth is caused not only through the impact of stock debt, but also via the flow of service payments, which are likely to crowd out investment. In Chowdhury (1994), both private external debt (P) and public, publicly

guaranteed external debt (D) had a positive and significant effect on output. This means this study is not in line with Chowdhury's results. The traditional neoclassical theory suggests that reasonable levels of foreign indebtedness are expected to have a positive impact on growth as mentioned in chapter three. However, the negative relationship between total external debt and growth in this study may be due to these funds not being utilized in product investments or spent on consuming goods and services; and this result concurs with the findings of Fosu (1999) who used the augmented production function, finding a negative correlation between debt and economic growth, in Sub-Saharan Africa during 1980-1990. Also Claessens et al., (1996) who suggested that large debt could lead to capital flights, high tax rates and a continuous over borrowing, with a negative effect on growth.

Labour force: The effect of labour force on real income (growth) can be either negative or positive, but in neoclassic theory an increase in the labour force, tends to increase output. The labour force always plays an indispensable role in economic growth. There is a strong relationship between labour force and growth.

For these countries, as shown by the coefficient of (0.215***) which is positive and highly significant at 1%; the main reason which can explain why labour force has a high impact on growth is that these countries are now developing countries, therefore, labour force or human resource is an important factor. In other words it is because the labour force is used as factors of production and the higher the growth rate of labour force, the higher the growth of real income (positive relationship). When the result is compared with studies done in the Sub-Saharan African countries, the finding is in line with the finding of Iyoha, (2000). That is, in Sub-Saharan African countries, growth rate of income is significantly and positively affected by growth rate in labour force. On the other hand, labour force (L) can become slightly significant. The countries import more than they export. While higher exports create jobs, higher imports tend to displace domestic workers, and therefore, the output per worker will be reduced. Labour force is always a fundamental requirement for a developing country.

The ratio of exports to imports: as mentioned in chapter six, this is calculated by the rate of exports divided by the rate of imports, where a higher growth rate of the ratio of export prices to import prices enhances economic growth. The ratio is intended to reflect the external shocks

to these economies, since selected countries depend mainly on the export of primary products and are expected to have either positive or negative coefficients, depending on the international market forces. Positive coefficients indicate that favourable terms of trade contribute positively to growth; the positive impact of an improvement in the terms of trade on real income therefore reflects increases in factor employments or productivity, while negative coefficients would affect growth conversely. In this study, as shown by the results from the above figure (11), trade balance has a positive and very highly significant coefficient during the period. (0.737***), which shows that terms of trade is crucial in affecting real income in the countries under study. The higher the terms of trade, the more contribute to economic growth and vice versa. On the other hand, if the ratio of exports to imports were negative this would lead to deficits of balance of payment caused by high world interest rates and the increased protectionism by developed countries, which tends to discriminate against these countries' exports (Zupi, 2002). The influence of trade balance on GDP growth is confirmed by the results; even though the coefficient is relatively small, it is statistically significant. And, to compensate national budget deficit occurs when a government spends more money than it takes in. An accumulated deficit over several years is referred to as the government debt. This result is consistent with Barro (1997) who finds in his study for a panel of 100 countries from 1960 to 1990, that terms of trade (measured as a ratio of export to import price) have a positive and significant effect on growth.

When this study is compared with studies done in the Sub-Saharan African countries, the finding is in line with the finding by Iyoha, (2000). That is, in Sub-Saharan African countries growth rate of income is significantly and positively affected by growth rate in labour force and lagged value of investment variable. Finally, this result indicates that the selected economies are highly vulnerable to external shocks, since they rely mainly on the export of primary agricultural products as their foreign exchange earner. However, the external shocks that are reflected in the terms of trade depend on international market forces. When these forces are in their favour, the prices of their export commodities rise relative to other commodities in the world market, and vice versa. The investment and economic growth are simultaneously affected by the impact of external indebtedness. In brief, since investment has been seen as a main determinant of growth, estimating simply the growth equation would underestimate the impact of external indebtedness on economic growth.

7.2.2 Statistical Tools for investment equation

The following is the answered the second question which is what is the impact of external debt service on investment?

The public investment models for selected Arab countries are also estimated using a model to determine the impact of external debt stocks and external debt-service on investment for the period covering 1982-2005. Additionally, other variables are included as explanatory variables to control other factors that may affect investment in these countries.
The model can be written as follows:

Investment equation: ..... Equation (2)

$$IY_{it} = \beta_0 + \beta_1 RY_{it} + \beta_2 MPK_{it} + \beta_3 EDY_{it} + \beta_4 TDS_{it} + \beta_5 POP_{it}.$$

Where β o is constant and the β 1, β 2, β 3, β 4 and β 5 are the respective parameters of independent variables, and P is the number of parameters to be estimated in the linear regression. And investment equation, all independent variables take one-year lagged values and it is specified as:

$$\log(IY_{i,t}) = \log(RY_{i,t-1}) + \log(EDY_{i,t-1}) + \log(TDS_{i,t}) + MPK_{i,t} + POP_{i,t} + V_i + \varepsilon_{i,t}$$

Where i= 1, 2, 3 and t = 1982,… , 2005, the country and year respectively. v_i is the fixed and $\varepsilon_{i,t}$ the overall error term. This model is called linear because the relation of the dependent variable (IY) to independent variables is assumed to be a linear function of the parameters.

Multi-collinarity for the investment equation:

Table 12: Correlation matrix between the predictor variables of investment model. Notice the value between parentheses represent p-value.

Variable	$\log(RY_{i,t-1})$	$\log(EDY_{i,t-1})$	$\log(TDS_{i,t})$	$MPK_{i,t}$	$POP_{i,t}$
$\log(RY_{i,t-1})$	1.000				
$\log(EDY_{i,t-1})$	0.2350 (.0439)	1.000			
$\log(TDS_{i,t})$	-0.2059 .0827)	0.5292 (<.001)	1.000		
$MPK_{i,t}$	0.0231 (.8474)	0.0265 (0.8250)	0.0095 (.9368)	1.000	
$POP_{i,t}$	0.8637 (<.001)	-0.0066 (.9565)	-0.3038 (.0095)	-0.0564 (.6378)	1.000

For investment model, it is observed from Table (12) that the majority of correlation between the predictors is low and not significant. The highest correlation which is 0.8637 is found between RY and POP, and hence, since this value is not so high, it effect on estimating parameters can be low.

Hausman test

For panel data, Hausman test has to be applied again in the second equation before using the multiple panel regression analysis to specify the right model, as is shown in table (13): it estimates both random and fixed effects and proceeds further with test in order to discriminate between them by means of Hausman test. In this model, IY played a dependent variable role, and the rest of the variables are independent. The Hausman test determines the coefficients of both fixed and random effects and calculates the different value between them.

Hausman test to select fixed or random effect model

3. Hausman test

Table 13: Hausman test

	Panel model (fixed-effects)	Panel model (random-effects)	Difference in coefficients
Logarithm of GDP ($RY_{i,t}$)	1.006	1.114	-0.107
Ratio of Marginal productivity of capital ($MPK_{i,t}$)	-0.003	-0.004	0.001
Ratio of external debt to income ($EDY_{i,t}$)	0.001	0.002	-0.001
Ratio of external debt service to exports of goods and services ($TDS_{i,t}$)	-0.004	-0.003	-0.001
Ratio of population (P)	-0.020	-0.009	-0.011
H_0 : difference in coefficients not systematic $\chi^2(5) = 3.72$ Prob.> $\chi^2 = 0.590$			

The Hausman test shown in the above figure is used once again to test which estimator is suitable. In the investment equation, the investment is used as a dependent variable and the other 5 variables are independent variables. The Hausman test results show that P-value (0.590) is insignificant and larger than 0.05, therefore, the Chi-square statistics for the Hauman test pointed in favour of an alternative hypothesis: that fixed effect is not a consistent and efficient estimator, so the researcher proceeded with the random effect model, as it is a more appropriate model to employ in this study.

In order to check the endogeneity problem, the researcher again used the Durbin-Wu-Hausman procedure (DWH) to check whether the variables were subject to an endogeneity problem, in other words to test whether the variable real income (RY) was endogenous. If it is, it is necessary to use instrumental variable panel model, otherwise ordinary panel model is used. The results show that p-value is high enough to show that the real income is endogeneous as a result, the researcher used instrumental variable panel model.

4. Durbin-Wu-Hausman test for the endogeneity of the variable "GDP"

Table 14: Estimation of real income equation

Dependant variable: logarithm of real income

	Random effects model	Fixed effects model
logarithm of total investment ($IY_{i,t-1}$)	0.483***	0.469***
	(4.03)	(3.71)
Logarithm of total external debt ($TED_{i,t-1}$)	0.292***	0.284**
	(2.54)	(2.20)
Ration of export to import (XM)	0.361*	0.341
	(1.71)	(1.55)
Ration of Marginal productivity of capital (MPK)	0.004	0.004
	(0.62)	(0.67)
Logarithm of labour force ($L_{i,t-1}$)	0.199***	0.246*
	(2.77)	(1.84)
Ration of external debt to income (EDY)	-0.004***	-0.005**
	(-2.44)	(-2.40)
Ration of external debt service to exports of goods and services (TDS)	-0.001	-0.001
	(-0.23)	(-0.01)
Ration of population (P)	0.001	-0.001
	(-0.33)	(-0.11)
Constant	0.170	-0.284
	(0.15)	(-0.17)
R^2		
Within	0.778	0.779
Between	1.000	1.000
Overall	0.978	0.978
Number of observations	69	69

Note: All independent variables take one-year lagged value. t-statistics in brackets. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 15: Estimation of the main equation
Dependant variable: logarithm of investment

	Random effects model	Fixed effects model
Logarithm real income ($RY_{i,t}$)	1.356***	1.259***
	(24.21)	(16.19)
Ratio of Marginal productivity of capital ($MPK_{i,t}$)	-0.000	-0.000
	(-0.03)	(-0.08
Ratio of external debt to income ($EDY_{i,t}$)	0.001	-0.001
	(0.61)	(-0.45)
Ratio of external debt service to exports of goods and services ($TDS_{i,t}$)	-0.001	0.001
	(-0.75)	(0.31)
Ratio of population (P)	-0.015***	-0.021***
	(-7.92)	(-3.31)
Residual from real income equation	-1.352***	-1.279***
	(-9.00)	(-8.36)
Constant	-4.811***	-3.567***
	(-9.10)	(-3.70)
H_0 : Residual from investment equation=0		
$\chi^2(1)$	81.09	69.94
$prob. > \chi^2$	0.0000	0.0000
R^2		
Within	0.895	0.898
Between	0.999	1.000
Overall	0.978	0.956
Number of observations	69	69

Note: t-statistics in brackets. *** significant at 1%; ** significant at 5%; * significant at 10%.

Investment equation

According to the result from previous presented tables (14) and (15), the real income (RY) is endogenous, for that the researcher followed instrumental variable panel model as appropriate to use for checking the results as shown in table (16)

Table (16) Regression coefficient obtained by the results of two stage least squares for random-effects regression model

Table 16: Estimation of the final equation
Dependant variable: logarithm of investment

	Instrumental variable panel model		Ordinary panel model	
	Random effects	Fixed effects	Random effects	Fixed effects
Logarithm of real income (RY)	1.251***	1.265***	1.113***	0.976***
	(15.53)	(10.22)	(15.05)	(9.55)
Ration of Marginal productivity of capital (MPK)	-0.009	-0.011	-0.006	-0.008
	(-0.97)	(-1.22)	(-0.70)	(-0.97)
Ration of external debt to income (EDY)	0.002**	0.003*	0.004***	0.002
	(1.96)	(1.69)	(3.02)	(0.99)
Ration of external debt service to exports of goods and services (TDS)	-0.002	0.003	-0.003	0.002
	(-0.70)	(0.75)	(-1.07)	(0.45)
Ration of population (P)	-0.012***	-0.004	-0.007***	-0.016
	(-4.25)	(-0.37)	(-2.90)	(-1.79)
Constant	-3.888***	-4.439***	-2.580***	-0.822
	(-5.08)	(-2.79)	(-3.67)	(-0.62)
R^2				
Within	0.762	0.749	0.763	0.778
Between	0.998	0.989	0.997	0.997
Overall	0.947	0.943	0.949	0.886
Number of observations	69	69	69	69

Note: t-statistics in brackets. *** significant at 1%; ** significant at 5%; * significant at 10%.

Notice: if debt overhang variable (D/Y) and crowding out effect variable (Ds/X) are highly significant and their sign is negative, there is clear evidence of both debt overhang effect and crowding out effect.

In the investment equation, the researcher hypothesized regressed log of investment on log real income, ratio of marginal product of capital, ratio of total debt to income, ratio of total debt service to exports of goods and services and rate of population.
Accordingly;

LIY = -3.888+1.251 LRY – 0.009 RMPK + 0.002 REDY – 0.002 RTDS – 0.012 RPOP

(-5.08) (15.53) (- 0.97) (1.96) (-0.70) (-4.25)

R2: within = 0.762 between = 0.998 overall = 0.947 $\chi 2 = 81.09$

Where figures in parenthesis are t-values.

From the investment equation it can be concluded that the independent variables in this equation explain by (R2: overall) nearly 95% percent of the systematic variations in investment during the period under study. Moreover, the $\chi 2$ value is highly significant (81.09) at the 1% level, indicating that there is a significant linear relationship between the independent variables taken together and rate of investment. All the signs are correct with a priori expectation.

Gross domestic product: the gross domestic product proxied by real income (RY) is incorporated in the investment equation due to it being expected to capture the investment accelerator effect, a higher gross domestic product leads to higher saving, which in turn leads to higher investment, thus growth rate of gross domestic product is expected to affect the investment positively. The result shows that, real income has a positive and statistically significant impact on investment. This indicates that the higher the growth of real income the more the growth of investment. Thus, there is evidence of the hypothesized "investment accelerator" effect of output.

Marginal productivity of capital: the rate of marginal productivity of capital became insignificant at 5 % level of insignificance with negative sign. Therefore, as expected, when marginal productively of capital increased, it discouraged growth rate of investment. Jonathan (1993) asserted that if the marginal productivity of capital is higher than the world interest rate for developing countries, then such countries would benefit from external borrowing. Therefore, these countries benefit from borrowing and as mentioned in chapter five when described the countries separately and from the first equation.

Ratio of external debt to income: the ratio of external debt to income is a conventional debt indicator that compares a country's productive capacities with its debt stock. By implication, the greater the debt burden or indebtedness of a country the higher that country's debt stock is, compared with its output. A country suffering from debt overhang will invest less than it might do otherwise. Therefore, it may forego projects with a positive net present value, obtaining new loans, investing as much as it should since it is unable to service its debt. In addition, as asserted by Goldman and Olin (1987) who note that debt overhang exists in the third world countries as a result of unproductive utilization of borrowed funds.

The debt overhang hypothesis posits that the accumulated external debt of these countries acts as a tax on the output in the future, which discourages investment. According to this theory, it is necessary to incorporate in the investment equation, the total debt to income to measure the debt overhang. The results show that, the growth of debt overhang variable (EDY) is strongly significant at 5% level of significance with positive sign. This clearly indicates that in the countries selected, external debt encourages growth rate in domestic investment rather than creating disincentive (depressing); and the result shows that the levels of debt do not explain the slowdown of investment. The significant positive sign implies that current external debt stock promotes investment and growth by increasing capital imports and other tradable goods that drive the economy during the period of accumulating external debt. That means the external debt encourages investment in countries under study because the positive relationship means the returns from utilizing loans in these countries is greater than the principle and interest payment as mentioned in chapter four in productive loans.

Empirical support for the debt overhang hypothesis is achieved if the debt ratio has a negative and significant effect on investment equation, and investment has a positive and significant effect on growth equation. Thus, from the result above it is concluded that there is no sign of the theoretically hypothesized debt overhang affecting investment. However, the total debt stock to income ratio is found to have a positive relationship with investment in the period under study. It could be because the loans are used for productive purposes and investors did not anticipate a higher future tax to finance the foreign debt service payments, which suggests that relying on foreign capital to boost growth and investment could be a productive utilization of borrowed funds in some Arab countries.

This result does not offer a confirmation to support the debt overhang argument by Krugman (1988) and Sachs (1989) which was the most commonly used argument to establish a negative relationship, as mentioned in the literature review chapter three. These authors argued that debt overhang is the main reason to reduce investment and slow economic growth in developing countries. As mentioned before the external debt to income in the investment equation shows evidence of significant effect on growth (t-ratio= 0.002**) and does not have the correct sign (negative). This concluded that debt overhang effect might not hold in the Arab countries selected situations.

The above result is in line with the findings of the study by Oks and Wijnbergen (1995) test the debt overhang hypothesis for Mexico and conclude that it does not exist. Cohen (1993) rejected the debt overhang theory, arguing instead, that the important debt problem is crowding out of investment caused by debt service payments in 81 developing countries over the period 1965-1987. In addition Oks and Wijnbergen (1995) test the debt overhang hypothesis for Mexico and conclude that it does not exist. Borensztein (1990), using data for the Philippines have suggested that the debt overhang effect is expected to be strong when considering private investment and private debt. This hypothesis could not be tested in this study due to the unavailability of the requisite data.

In contrast with Suma, Dauda Foday, (2007), who found that the external debt to income has a negative impact on public investment in Ecowas countries, Andre Habimana (2005) found that, the debt to income has an adverse effect on investment in the case study of Rwanda. Amin & Audu (2006) found supportive evidence for debt overhang hypotheses in Nigeria. Maureen in Kenya (2001) using time series data for the period 1970-95, his empirical results indicated that external debt accumulation has a negative impact on economic growth and private investment.

This confirms the existence of a debt overhang problem in Kenya. Deshpande (1997) using data for 13 severely indebted countries found that the debt overhang hypothesis was largely valid. Green & Villanueva (1991) found evidence indicating a negative relation between the debt to income and investment in 99 developing countries during 1975-1987. This confirms the existence of a debt overhang problem in the developing countries studied. Fosu (1999), in his empirical study of thirty-five sub-Saharan African countries, finds support for the debt overhang hypothesis. Iyoha (1997, 1999) used a simultaneous equation and simulation method on sub-Saharan African countries for 1970-1994. An important finding was the significance of debt overhang variables in the investment equation, because of the excessively high stock of external debt that depresses investment and lowers the rate of economic growth. Mbanga and Sikod (2001) using data for Cameroon, found that there exists a debt overhang and crowding out effects on public investments.

External debt service to exports and imports of goods and service: the ratio of debt service indicates how much the debtor country is losing in debt service. The higher the ratio the more likely that debt could be unsustainable, and vice verse, which means, if a significant portion of government revenue is devoted to debt servicing, there is consequently a reduction in total investment and a fall in the productivity of investment because of lost externalities from certain types of public investment; in order to test the idea that debt service payments have a crowding out effect on investment, the investment equation includes the ratio of external debt service to export of goods and services as an explanatory variable. As mentioned in the literature review chapter (three) by Edelman (1983) the external debt does not automatically become debt burden when loans are utilized optimally, in favourable conditions the marginal return on investment is greater than or equal to the cost of borrowing. The cost of borrowing and returns on investment are the crucial factors that affect debt service capacity.

The crowding-out hypothesis predicts that external debt service payments adversely affect the growth rate, because the external debt service payments reduce investment. In other words, the external debt service payment adversely affects economic growth indirectly by reducing the investment rate. From the investment equation, as mentioned, this effect is illustrated by the ratio of external debt service to export of goods and services. Because of the crowding out effect, the expected coefficient of this variable was to be negative. For the selected countries the estimated coefficient has the expected sign but it is statistically insignificant. This implies that the direct effect of debt service payments on the investment is not significant.

However, in this study total debt service ratio (TDS) is statistically insignificant, even though it has the correct sign (negative), it does not show clear evidence of the crowding out effect of debt service payment on investment. The negative sign, as postulated by theory, is to depress the level of investment. This implies that substantial portions and new borrowings are used to service the high debt service requirements instead of investing in productive projects. Large debt service obligations use up foreign exchange and capital as they are transferred to lenders to repay interest and principal funds. A country only benefits partially from an increase in output, or exports, due to a growing fraction of the increase being used to promptly service obligations, the debtor countries are considered high risk countries and they find it difficult to borrow. As a result, debtor countries have to pay high interest rates to obtain new credit.

The result also does not provide confirmation of the existence of a crowding out effect in the selected countries. The coefficient of the crowding out effect variable, proxied by the ratio of total debt service payments to exports of goods and services, is negative and significantly different from zero at the 1% level.

From the result above, this study is in line with Iyoha (2000) who found that, for the Sub-Saharan African countries the debt service variable has a negative effect on growth through the crowding out effect of public investment and appears statistically insignificant. In addition, some authors as Suma, Dauda Foday, (2007), found that the external debt service has no impact on public investment in Ecowas countries. Cohen (1993) rejects empirically the debt overhang hypothesis and supports the crowding out effect, whose magnitude is 0.35. Pattillo et al. (2002, 2004) did not find evidence of a significant crowding out effect

In contrast, this study is not in line with Ajayi (1997), who suggested that external debt service can be positive or negative while negative coefficient signifies a crowding out effect. Also Presbitero (2005) found the empirical evidence supporting the crowding out effect in Rwanda, a negative relationship between debt service and investment due to the burden of debt service payments on budget constraint. Clements et al (2003), find a crowding out effect of debt service on public investment, in their study of a number of heavily indebted poor countries (HIPCs). Cohen (1993) looks at 81 developing countries over the period 1965-87, supporting the crowding out effect. Cohen finds the debt service is significantly negatively correlated with investment. Karagol (2002) found a negative relationship between debt service and investment in the case of Turkey during 1956-1996. Amin and Audu (2006) found supportive evidence for the crowding out hypotheses in Nigeria. Maureen in Kenya (2001), his empirical results indicated that, debt servicing affects growth and private investment adversely. This confirms the existence of the problem in Kenya. Serieux and Samy (2001) find external debt service dampens total investment. Savvides (1992) finds that debt service crowds out public investment spending, using a panel of 24 African developing countries. Green & Villanueva (1991) found evidence indicates that a negative relationship between the debt service ratio and investment, in developing countries during 1975-1987. This confirms the existence of the crowding out effect in the developing countries under study.

Population: population became strongly significant at 1 % level of significance with negative sign. This indicates that growth rate of population decreases growth of investment through discouraging domestic saving. That means the larger the population the smaller the share of income allocated to saving and hence investment. This is in line with Chowdury's (1994) findings. Economics suggest a negative relationship between population growth and economic growth. Population growth lowers the average human capital and the steady-state capital-labour ratio for a given investment, and thereby lowers steady-state economic growth in the neoclassical growth framework. The empirical works by Kormendi and Meguire (1985); Mankiw et al. (1992); Kelley and Schmidt (1995) and Bloom, Sachs (1998) record a negative and statistically significant effect of population growth on economic growth. The next chapter will present the conclusion of this research. The manner in which the research has contributed and present a number of recommendations that can be made as a result of the study, and suggestion

Chapter Eight: Conclusion and recommendations

8.1 Introduction

The aim of this chapter is to answers to summaries the two main questions associated with the study which are: what are the impacts of external debt on economic growth in the selected Arab countries? And what are the impacts of external debt service on investment in the selected Arab countries? The purpose of these two questions is to investigate the relationship between external debt indicators, investment and growth in the period 1982-2005. These three Arab countries selected have relied on foreign capital, mostly in the form of external loans not only to finance temporary falls in consumption, but also to supplement their low domestic savings, finance their budget deficits, increase investment and boost growth. In other words, in the selected Arab countries the level of domestic savings is not sufficient to fund the investment necessary to ensure economic growth. The scarcity of domestic financial resources for development is not only persistent, but also acute in many Arab countries including these in this study, culminating in what is referred to as the financing gap problem. The financing gap model predicts that injecting foreign capital, even in the form of external loans, into a domestic economy generates economic growth.

Reasonable levels of borrowing by a less developed country are likely to boost its economic growth, as suggested by economic theory. Thus, some suggest that, at reasonable levels of debt, further borrowing would be expected to have a favourable effect on growth. Others contend that large accumulated debt stocks can impede growth. This study aimed to find support for or against the economic theory. It focused on a separate analysis of growth and investment in order to capture both the direct and indirect effects of external debt on growth, and external debt service on investment. Therefore, this study attempts to fill the gap in research in this area for the selected Arab countries.

Since the explosion of the debt crisis, the debtor countries have transferred billions of dollars in debt service payments to creditors. The debt crisis in some developing countries was blamed on many factors, some of them external: rising real interest rates, fluctuating oil prices, deteriorating conditions of commercial exchange for the developing countries, the effects of the economic recession in the industrial countries and increasing customs protection measures and trade barriers faced by exports from developing countries; and the others are internal factors which were: increasing dependence on foreign funding, deficiency or lack of proper

policies for development mismanagement, capital flight from the developing countries and domestic inflation and deterioration of exchange rates. From the results of this study, the role of some of these factors in the countries under study can be confirmed through the two equations empirical testing of the data.

A major part of the loans was officially contracted from bilateral and multilateral creditors. Bilateral loans are credit advances from governments of developed countries while multilateral cover loans are provided by multilateral development finance institutions, such as the World Bank, the IMF, and the African Development Bank, among others. Relative to commercial bank and other private credit flows, the rate of interest on official debt flows are lower. Bilateral loans are usually directed at financing essential projects and/or acquisition of equipment and plants needed for economic growth and development of typically Selected Arab countries. Most of bilateral loan flows are tied to the purchase of capital goods from the donor country. Multilateral finance flows are also largely utilized for the financing of economic and social development programmes or specific projects, such as power generation, construction of educational infrastructure, road, railway networks, and processing of exports, among others to improve economic circumstances the selected countries.

The relationship between economic growth and external debt is not straightforward and it is possible that many of the variables that are used for estimation are endogenous. The impact of external debt on economic growth may also have direct and indirect effects. Moreover, a single equation model is not effective in analyzing the relationship between economic growth, debt servicing, and capital inflows due to the nature of the relationship being circular. Therefore, two equations have shown the effect of each variable separately.

The complete equation model consisted of two equations (output and investment equations) and four independent variables for the first equation, which were: investment (IY); total external debt (TED); labor force (L); and exports to imports (XM) and five independent variables for the second equation: real income (RY); marginal of capital (MPK); external debt to income (EDY); total debt service to exports of goods and services (TDS); and population (POP) showed results answered the main equation . It employed several econometric methods such as fixed effects, random effects, and proceeded further in order to discriminate between

them by means of a Hausman test, and instrumental variable models were used to identify the relationship between the dependent and independent variables.

Investment is an important ingredient of economic growth in the selected countries; the investment ratio exerts a positive and statistically significant effect on economic growth. This means that the countries under study invest a substantial part of their GDP that helps them to grow quickly. In addition, the investment channeled to sectors that contribute highly to economic growth in order to increase the future local savings that could serve the external debt this is in line with neoclassical growth theory, which suggests that investment is the most fundamental determinant of economic growth. This is because external debt can be used to finance investment, which in turn increases the growth rate and as expected to have a positive effect on growth. Investment is the driving force of economic growth as it leads to capital accumulation and increases the productive capacity of an economy.

External debt has no significant direct effect on the growth of output. External debt may be found to be insignificant because its effect is on investment, which is itself an explanatory variable of the model. The increase in investment meant a boost to economic growth, and growth in investment facilitates faster economic growth. Thus it is not surprising for external debt to be insignificant in the output equation. Regardless of the high rate of population growth in the chosen countries, a high rate of explanatory in the labour force, especially the skilled labour force, is assumed to give an impetus to growth in the selected countries' economies. Therefore, the labour force stimulates economic growth.

The effect of a change in the terms of trade is measured as the ratio of export to import as estimated. The results show that the terms of trade have a positive and statistically significant effect on growth during the period selected. Changes in terms of trade have often been stressed as important influences on less developed countries, which specialize their exports in a few primary products. Generally, Arab countries are mainly exporters of a few raw materials, and they import food and many manufacturing products. Furthermore, for Arab countries, export products are not complements but rather substitutes. Exports play a favourable role in the growth process by raising total factor productivity. Moreover, the terms of trade variable is influenced by the domestic resources available. This indicates that a trade surplus raises real

domestic incomes and consumption, and increases the rates of investment and growth in the countries under study. In other words, a rise in the commodity price of a country's principal export is considered to be a vital contribution to the increase in the countries revenue.

The positive and statistically significant effect on growth in these countries could be due to the high price of exported raw materials and the demand from other countries for the primary products produced by these countries. In addition, these countries have reduced their imports of food and many manufacturing products because domestic production of these goods increased, and this stimulated a change in domestic employment and increased the balance of payments. Also the price of imports decreased relative to export prices.

The results further suggest that, the real income which is incorporated in the investment equation due to being expected to capture the investment accelerator effect is positively related to investment through the accelerator mechanism, which supports the a priori expectation in this study; the higher the real income, the higher the savings, which in turn leads to higher investment as suggested by endogenous growth theory. The endogenous and Harrod-Domar growth models that higher savings rate are associated with higher levels of growth of real income.

The total debt to income and debt-service to exports of goods and services, are the key variables that capture the impact of external debt on economic growth and investment in the selected countries, contrary to what much of the literature has shown. The debt overhang hypothesis suggests that an accumulation of external debt is regarded by potential investors as being a tax on future income, and therefore stifles investment. According to this theory, it is necessary to incorporate in the investment equation the total debt to income to measure the debt overhang.

And in order to test the idea that debt service payments have a crowding out effect on investment, the investment equation includes the external debt service to export ratio as an explanatory variable. The crowding-out hypothesis predicts that external debt service payments adversely affect investment and growth because the external debt service payments reduce investment. In other words, the external debt service payment adversely affects

economic growth indirectly by reducing the investment rate. In addition, the impact of crowding out effects on investment and growth arises when the foreign debt service payments take resources away from domestic investment and the level of investment falls.

Empirical support for the debt overhang hypothesis is achieved if the coefficient of the debt to income has a negative sign with statistical significance. Whereas, the crowding out effect on investment occurs when the coefficient of the debt-service to exports in the investment model has a negative sign in the same period. However, the total debt stock to income in this study is found to be a statistically significant positive relationship with investment in most periods, which supports the assumption that external loans may contribute positively to investment and growth. Therefore, this indicates that the growth rate of external debt encourages investment; this implies that external resources do not create a disincentive through the expectation of higher tax. This suggests that the results show that mounting external debt increases investment and does not impact on the quality of investment. This means that either the external debt encourages investment in the countries under study because the positive relationship means the returns from utilizing loans in these countries is greater than the principal and interest payment, or because most of the revenue generated by production and exports are not used to repay current debt obligations.

In this study, the total debt to income is significantly and positively correlated with investment. This result implies that the more external loans were received by these countries, the more public investment was encouraged. In other words, the acquired external debt was either invested domestically or the investments were productive enough to be sustainable in the longer-term.

Debt service payment creates crowding out effect on investment by transferring resources out of the country in the form of interest and principal repayment as mentioned by Clements et al., (2005). Large debt services discourage public investment due to reducing the amount of money available for productive investment. This means that what the debtor country is losing in the debt service could have been used to increase investment. The higher the ratio of debt service to investment, the more the likelihood that debt could become unsustainable, and vice versa

In this study the debt service to exports variable has a negative effect on investment through the crowding out effect and it appears statistically insignificant related to investment, thus contradicting the prescription of the crowding out hypothesis in the countries under study; even though it has the correct sign (negative), it does not show clear evidence of a crowding out effect on debt servicing in these countries.

The reason for this could be that the gross inflow of foreign capital in the form of new loans to these countries was much larger than the debt service payment during this period. In other words, despite their debt servicing obligations, these countries may have received more external capital than they paid out to their creditors. This could be because, the debt service ratio of the selected countries has not been particularly high, and that a reduction in their external debt service might provide an indirect boost to growth through its effect on investment. Investment might accelerate in these countries if debt-service relief were provided for such purposes without increasing the budget deficit.

A reduction in debt service should lead to an increase in investment for any given level of future indebtedness. In addition, the external debt in these countries does not necessarily become part of their debt burden. This may be the case in situations where loans are being optimally used, in optimal conditions, or the cost of borrowing is less than, or equal to, the marginal return on investment. Perhaps due to a smaller portion of government revenue being devoted to debt servicing, there was not any reduction in total investment and the productivity of investment did not fall.

Lastly, these countries did not face the difficulties entailed in foreign borrowing, because the increased debt service ratio was being serviced regularly, therefore there were no distortions in the making of investment decisions, as in the onset of the global debt crisis in 1982. As previously mentioned in this regard, the crucial factors which affect debt service capacity are the cost of borrowing and returns on investment.

The population in the investment equation was negative and statistically significant. This clearly indicates that the higher population discourages investment by discouraging domestic saving. That means the larger the population the smaller the share of income allocated to

saving and hence investment. On the other hand, a lower population encourages investment encouraging domestic saving. Because as mentioned, countries with population growth are high, resources will be diverted from productive purposes to growth population. Moreover as the population increases, part of an economy's investment is used to supply capital for the growing labor will fall.

In summary, the results indicate that external debt has not been a major obstacle to the selected Arab countries economic growth over the past thirty years. This is presumably because these countries have not reached sufficiently high magnitude of external debt to induce a debt overhang problem. The empirical findings reveal that external debt does not affect growth directly. The results indicate that external debt affects investment positively and is statistically significant, indicating external debt in the selected countries' encourages investment rather than depresses it. Furthermore, the results indicate that borrowing in itself is not harmful to an economy; rather what matters is how the borrowed fund is used. Thus, from the result above it is possible to conclude that there is no sign of the theoretically debt overhang and crowding out effect on these countries, and that their debt was channeled to positively affect investment and hence output.

8.2 Limitations of the study

The success of all econometric analysis relies ultimately on appropriate data availability. Therefore, it is vital to investigate the data source and its nature. The research utilizes secondary data from external sources. The quality of the data available can limit the results of this study. The period was chosen due to published data being available for all variables involved in the model across the entire period. Various publications displayed different figures in the same period for the same variable. Data obtained from the Arabic Monterey fund are not consistent with the data from the World Bank (World Debt Tables) or Global Development Finance. Therefore, some important variables are missing as a result; sources are used jointly as discussed in the methodology chapter to resolve these issues if possible. These limitations arise from the difficulty of finding consistent data that is reported by several institutions. Data from a single institution can at times provide different figures for the same year.

As mentioned above, the difficulty in obtaining data was not limited to its availability, but included the fact that data from different sources concerning the same variable often conflicted, and that on some occasions, data from the same organisation in different publications sometimes conflicted. In addition, data for some variables was impossible to obtain, either from international or domestic sources. Moreover, the lack of long term data available limits the findings because long term data indicates more information which makes the findings more reliable. However, this study is still able to provide value to the academic community and it is the first to consider the three Arab countries, and these variables using a novel approach of a modified version of the Chowdury model.

8.3 Contribution of study

In brief, the major contribution of the research is the investigation of the relationship between external debt and economic growth, external debt service and investment in the context of the three Arab countries that have previously received little attention, and filling a research gap. Another contribution is the application of the adapted two equations from Chowdury model (1994) using data for these Arab countries. The use of this technique affords a new approach for other researchers in this area and will enable a broader examination of a range of countries to take place.

8.4 Recommendations

In general, from the analysis it is possible to recommend that the governments of the selected countries should further increase the effective and appropriate utilization of external resources by investing in selected productive investment including basic infrastructural developments that facilitate the productivity of other sectors of the economy.

According to the results this does not mean that the government should continue to depend on external resources, dependence, especially for the purposes of development, is both perilous and unreliable. However, currently, as far as there is a high resource gap between domestic saving and domestic investment, to achieve some growth target, a government may be forced to finance the gap by available options at hand, among which foreign resource, particularly debt, is one. Arab countries, therefore, need to channel their external resources in a way that

can help to create new opportunities for investment and attract more investors to their countries. Therefore, wise and proper utilization of foreign resource given its short-run and long-run macroeconomic implications and management is recommended.

Also it is suggested that governments should pay more attention to debt management, to items of expenditure and try to direct it to productive use. Also, the IMF and World Bank should modify their international debt relief programme to enable more countries such as those selected to become beneficiaries.

8.5 Further study

Further studies of the relationship between debt and economic growth are required by incorporating additional variables, such as private investment and other variables that will help to illuminate the channels through which kinds of debt causes growth (and vice-versa) and contribute to broader efforts in the literature to tease out the complex relationship between external debt and economic growth because foreign borrowing is continuing and the relationship to growth is still not clear.

In addition, further research on the impact of external debt on private investment in the same countries should also be undertaken using a simultaneous equation approach to develop a further perspective on the relationships under investigation.

This research has offered insight into three Arab countries that have previously received little attention. It has done so through the development of an adapted approach to shed light on a complex set of relationships. In doing so it has sought to develop the understanding of external debt and investment – two issues that will continue in their importance for developing and increasingly developed countries alike.

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Appendix

Country Tunisia

Table (15), Expenditure on the gross domestic product (at purchaser's prices)

Figures in Millions of US Dollars, at current prices

Item / Year	Exports of goods and services (X)	Imports of goods and services (M)	(TOT)	Private consumption	Public consumption	Total consumption (C)	Total Investment (IY)	Cross domestic product (RY)
1982	3002.0	3858.5	-856.4	5074.0	1343.8	6417.8	2572.0	8133.4
1983	2869.5	3567.2	-697.7	5059.2	1365.4	6424.6	2371.8	8098.7
1984	2721.4	3659.9	-938.5	5077.2	1326.0	6403.2	2568.2	8033.0
1985	2699.8	3206.7	-506.9	5219.9	1368.5	6588.4	2198.9	8280.4
1986	2721.9	3364.0	-642.1	5875.3	1532.7	7408.1	2076.6	8842.6
1987	3377.0	3472.8	-95.8	6183.2	1575.2	7758.4	1987.5	9650.1
1988	4242.9	4206.0	37.0	6507.3	1616,9	8124.3	1963.5	10124.7
1989	4480.9	4881.8	-400.9	6552.2	1727.6	8279.8	2298.1	10177.0
1990	5364.0	6232.0	-868.0	7835.0	2014.0	9849.0	3333.0	12314.0
1991	5251.0	5896.0	-645.0	8116.0	2156.0	10272.0	3382.0	13010.0
1992	6127.0	7201.0	-1074.0	9567.0	2480.0	12047.0	4525.0	15497.0
1993	5909.0	7007.0	-1099.0	9060.0	2376.0	11436.0	4272.2	14609.0
1994	7025.0	7483.0	-450.0	9687.0	2552.0	12240.0	3852.0	15633.0
1995	8105.0	8810.0	-705.0	11356.0	2939.0	14296.0	4459.0	18050.0
1996	8239.0	8543.0	-304.0	11921.0	3042.0	14963.0	4904.0	19563.0
1997	8287.0	8752.0	-465.0	11407.0	2986.0	14393.0	5005.0	18934.0
1998	8633.0	9307.0	-674.0	12192.0	3138.0	15330.0	5398.0	20054.0
1999	8474.0	8919.0	-445.0	12025.0	3096.0	15121.0	5235.0	19911.0
2000	8582.0	9267.0	-686.0	11785.0	3033.0	14818.0	5302.0	19434.0
2001	9562.0	10481.0	-919.0	12247.0	3128.0	15375.0	5599.0	20055.0
2002	10470.0	11460.0	-990.0	14479.0	3706.0	18184.0	5949.0	23143.0
2003	11771.0	12812.0	-1042.0	16892.0	4320.0	21211.0	6733.0	26903.0
2004	13049.0	14010.0	-961.0	18354.0	4633.0	22987.0	7227.0	29253.0
2005	13830.0	14592.0	-762.0	18593.0	4471.0	23064.0	6514.0	28816.0

Sources: Arab Monetary Fund, National Accounts of Arab Countries, several reports

Table 34, 1982 to 1989 (from report 1982-1992, pp41), 1990 to 1994(from report 1990-2000, pp41), 1995 to 2005 (from report 1995-2005, pp41)

Country Egypt

Table (16), Expenditure on the gross domestic product (at purchaser's prices)

Figures in Millions of US Dollars, at current prices

Item / Year	Exports of goods and services (X)	Imports of goods and services (M)	(TOT)	Private consumption	Public consumption	Total consumption (C)	Total Investment (IY)	Cross domestic product (RY)
1982	7730.0	11450.0	-3720.0	20787.0	5185.7	25972.9	8072.9	30325.7
1983	7405.3	10081.8	-2676.4	19606.8	4994.6	24601.4	7934.4	29859.3
1984	7660.2	11700.1	-4039.9	24159.0	5960.1	30119.0	8308.3	34387.4
1985	5071.5	7689.5	-2618.0	18780.2	4390.5	23170.6	5743.3	26295.9
1986	4468.6	6913.3	-2444.6	20193.3	4527.1	24720.4	6029.8	28305.6
1987	4281.1	7706.0	-3424.9	23644.9	4840.9	28485.8	8881.6	33942.6
1988	4812.7	9760.3	-4947.6	19588.0	3868.1	23456.1	9211.5	27720.1
1989	5482.5	9852.6	-4370.1	21493.0	3853.6	25346.6	9522.9	30499.4
1990	7166.0	11599.0	-4433.0	25471.0	4008.0	29479.0	10443.0	35489.0
1991	9538.0	12246.0	-2708.0	24892.0	3831.0	28723.0	8212.0	34228.0
1992	12131.0	13302.0	-1171.0	30328.0	4354.0	34682.0	8245.0	41755.0
1993	15535.0	15069.0	466.0	33311.0	4632.0	37.943.0	8487.0	46896.0
1994	11840.0	14527.0	-2687.0	38532.0	5315.0	43847.0	10502.0	51661.0
1995	13561.0	16657.0	-3096.0	44782.0	6338.0	51120.0	12117.0	60142.0
1996	14036.0	18017.0	-3981.0	53373.0	7018.0	60392.0	11235.0	67646.0
1997	14761.0	19505.0	-4744.0	59075.0	7690.0	66765.0	13760.0	75781.0
1998	13754.0	21812.0	-8058.0	65053.0	9593.0	74646.0	18241.0	84829.0
1999	13638.0	21119.0	-7482.0	67982.0	10515.0	78498.0	19588.0	90604.0
2000	15821.0	22282.0	-6461.0	74080.0	10940.0	85020.0	19094.0	97654.0
2001	15782.0	20161.0	-4380.0	67959.0	10219.0	78178.0	16486.0	90284.0
2002	15699.0	19431.0	-3732.0	63127.0	10677.0	73804.0	15654.0	85725.0
2003	17763.0	19539.0	-1776.0	59384.0	10404.0	69788.0	13488.0	81499.0
2004	22431.0	22722.0	-291.0	56041.0	9710.0	65752.0	13044.0	78505.0
2005	27617.0	29096.0	-1479.0	63315.0	11549.0	74864.0	15786.0	89171.0

Sources: Arab Monetary Fund, National Accounts of Arab Countries, several reports, Table 106, 1982 to 1989(from report 1982-1992, pp137) and 1990 to 1994(from report 1990-2000, pp137), 1995 to 2005 (from report 1995-2005, pp137).

Country Morocco

Table (17), Expenditure on the gross domestic product (at purchaser's prices), Figures in Millions of US Dollars, at current prices

Item / Year	Exports of goods and services (X)	Imports of goods and services (M)	(TOT)	Private consumption	Public consumption	Total consumption (C)	Total Investment (IY)	Cross domestic product (RY)
1982	3011.3	4971.6	-1960.3	-10209.2	2822.3	13031.5	4352.6	15423.9
1983	2967.1	4066.6	-1099.5	9358.3	2338.0	11696.3	3344.8	13941.6
1984	3059.0	4302.6	-1243.6	8787.0	1983.8	10770.8	3224.1	12751.3
1985	3199.8	4254.0	-1054.2	8395.0	2039.0	10434.0	3490.5	12870.3
1986	3626.6	4606.8	-980.2	11502.5	2608.8	14111.3	3863.4	16994.5
1987	4249.1	4974.4	-725.3	12572.1	2946.3	15518.5	3952.9	18746.1
1988	5466.5	5473.5	-6.9	14129.1	3415.1	17544.2	4661.0	22198.3
1989	5036.5	6168.9	-1132.4	14985.5	3582.8	18568.3	5411.8	22847.7
1990	6341.0	7710.0	-1369.0	16675.0	4001.0	20676.0	6519.0	25826.0
1991	6156.0	7517.0	-1361.0	18570.0	4329.0	22899.0	6297.0	27835.0
1992	6399.0	8116.0	-1717.0	18781.0	4784.0	23565.0	6603.0	28451.0
1993	6104.0	7494.0	-1390.0	17327.0	4845.0	22172.0	6019.0	26801.0
1994	7555.0	9377.0	-1822.0	20495.0	5200.0	25695.0	6479.0	30351.0
1995	6294.0	9519.0	-3225.0	23760.0	5771.0	29531.0	6879.0	33184.0
1996	7991.0	9410.0	-1420.0	24709.0	6175.0	30884.0	7175.0	36639.0
1997	7721.0	8980.0	-1259.0	21815.0	5842.0	27757.0	6917.0	33415.0
1998	8092.0	9735.0	-1643.0	23070.0	6456.0	29525.0	7936.0	35818.0
1999	6687.0	9702.0	-3015.0	23370.0	6748.0	30117.0	8152.0	35254.0
2000	6698.0	10492.0	-3795.0	22829.0	6357.0	229186.0	7886.0	33278.0
2001	6726.0	10042.0	-3316.0	22316.0	6559.0	28875.0	7588.0	33147.0
2002	7834.0	11239.0	-3405.0	24132.0	7285.0	31417.0	8229.0	36241.0
2003	8997.0	13495.0	-4498.0	28551.0	9203.0	37755.0	10558.0	43815.0
2004	10438.0	16997.0	-6560.0	33568.0	10493.0	44061.0	12530.0	50031.0
2005	10613.0	18968.0	-8356.0	35896.0	11478.0	47374.0	13005.0	52023.0

Sources: Arab Monetary Fund, National Accounts of Arab Countries, several reports, Table 112, 1982 to 1989(from report 1982-1992, pp145) and 1990 to 1994(from report 1990-2000, pp145)

Table (18), Total official creditors' share in the debt outs, disbursed of Arab countries at the year end (Multilateral official creditors'+ bilateral official creditors') (TED), (Million of US dollar)

Countries / Year	Tunisia	Egypt	Morocco
1982	2275.00	19733.00	6118.00
1983	2394.00	21855.00	7112.00
1984	2495.00	24113.00	7927.00
1985	3031.00	28513.00	9769.00
1986	3620.00	30495.00	11605.00
1987	4329.00	37129.00	14054.00
1988	4269.00	37563.00	14615.00
1989	4556.00	35516.00	15496.00
1990	5233.00	26584.00	17305.00
1991	5836.00	24470.00	14982.00
1992	5898.00	24676.00	15588.00
1993	6248.00	25445.00	15487.00
1994	6886.00	27734.00	16127.00
1995	7400.00	28795.00	16515.00
1996	7480.00	27518.00	15964.00
1997	6987.00	25729.00	14220.00
1998	7059.00	26749.00	14255.00
1999	6414.00	25469.00	13157.00
2000	6030.00	23741.00	12031.00
2001	6159.00	23355.00	11756.00
2002	7218.00	24658.00	11722.00
2003	8541.00	26372.00	11688.00
2004	9365.00	26367.00	11802.00
2005	8362.00	23226.00	10117.00

Sources: Arab Monetary Fund, Balance of payments and external public debt of Arab countries, Table 24, 1985 to 1990(from report 1982- 1992, pp103) and 1991 to 2000, (from report 1991- 2001, pp103), and 2001 to 2005 sum by the researcher.

Table (19), Ratio of total external public debt outstanding disbursed to gross domestic product for Arab countries (EDY) in (In percent)

Countries / Year	Tunisia	Egypt	Morocco
1982	43.01	79.29	66.44
1983	47.12	88.46	78.73
1984	46.12	84.21	92.63
1985	53.79	133.02	107.42
1986	59.73	120.72	93.21
1987	62.86	103.48	99.27
1988	58.80	136.26	87.01
1989	60.79	119.21	89.68
1990	54.10	77.06	86.08
1991	54.64	84.60	71.81
1992	46.47	67.67	71.36
1993	50.69	60.57	74.22
1994	51.25	59.11	68.55
1995	51.05	51.58	70.88
1996	47.93	42.94	61.25
1997	49.29	35.60	61.23
1998	47.34	32.76	58.02
1999	47.62	28.99	53.59
2000	49.83	25.69	57.52
2001	50.79	28.75	52.72
2002	53.22	30.95	46.07
2003	54.95	33.84	40.30
2004	55.53	34.84	34.90
2005	65.40	33.00	27.50

Sources: Arab Monetary Fund, Arab Countries Economic Indicators, several reports
Table 50, 1982 (from report 1982-1992, pp58) and 1986 to 1994(from report 1986-1996, pp58), and 1995 to 2005 (from report 1995-2005, pp58), and 2005 from Global development, finance, summary and country table 2009.

Table (20), Ratio of total external public debt service to exports of goods and services for three Arab countries (TDS), (In percent)

Countries / Year	Tunisia	Egypt	Morocco
1982	15.94	17.34	46.35
1983	19.47	21.51	41.45
1984	23.25	24.27	24.27
1985	24.79	32.88	31.52
1986	28.83	37.43	34.57
1987	29.33	13.90	29.06
1988	22.46	23.74	25.56
1989	21.98	28.28	34.34
1990	23.03	23.15	23.71
1991	21.88	17.34	30.49
1992	19.93	17.74	49.17
1993	20.51	14.84	42.39
1994	19.12	13.81	40.55
1995	17.40	14.55	39.03
1996	16.65	13.32	33.55
1997	15.81	10.01	31.36
1998	15.33	11.46	27.52
1999	15.81	11.44	28.38
2000	23.01	9.17	24.05
2001	13.25	10.13	23.00
2002	13.50	11.44	29.03
2003	13.13	12.69	29.18
2004	13.96	08.25	17.35
2005	12.70	06.30	11.30

Sources: Arab Monetary Fund, Arab Countries Economic Indicators, several reports, Table 51, 1985(from report 1982-1992, pp59) and 1986 to 1994(from report 1986-1996, pp59), and 1995 to 2005 (from report 1995-2005, pp59), and 2005 from Global development finance, summary and country table 2009.

Table (21), Exchange Rates Domestic currency per US Dollar for three Arab countries (RER), (End of period)

Countries / Year	Tunisia	Egypt	Morocco
1982	0.62	0.70	6.27
1983	0.73	0.70	8.06
1984	0.87	0.70	9.55
1985	0.76	0.70	9.62
1986	0.84	0.70	8.71
1987	0.78	0.70	7.80
1988	0.90	0.70	8.21
1989	0.90	1.10	8.12
1990	0.84	2.00	8.04
1991	0.86	3.33	8.15
1992	0.95	3.34	9.05
1993	1.05	3.37	9.65
1994	0.99	3.39	8.96
1995	0.95	3.39	8.47
1996	1.00	3.39	8.80
1997	1.15	3.39	9.71
1998	1.01	3.39	9.26
1999	1.25	3.41	10.09
2000	1.39	3.70	10.62
2001	1.47	4.50	11.56
2002	1.33	4.50	10.17
2003	1.20	6.15	8.75
2004	1.20	6.13	8.22
2005	1.36	5.73	9.25

Sources: Arab Monetary Fund, Arab Countries Economic Indicators, several reports, Table 54, 1985(from report 1982-1992, pp64) and 1986 to 1994(from report 1986-1996, pp64), 1995 to 2005 (from report 1995-2005, pp64).

Table (22), Population of three Arab countries, (In million)

Countries / Year	Tunisia	Egypt	Morocco
1982	6.70	42.84	20.31
1983	6,84	44.02	20.91
1984	7.03	45.23	21.46
1985	7.26	46.47	22.03
1986	7.46	46.43	22.35
1987	7.64	47.63	22.88
1988	7.77	48.81	23.41
1989	7.91	49.98	23.95
1990	8.07	51.41	24.49
1991	8.24	52.61	25.02
1992	8.41	53.81	25.55
1993	8.57	54.97	26.07
1994	8.73	56.18	26.59
1995	8.96	57.07	26.39
1996	9.12	58.23	26.85
1997	9.22	59.44	27.31
1998	9.33	60.71	27.78
1999	9.46	61.99	28.24
2000	9.56	63.31	28.71
2001	9.67	64.65	29.17
2002	9.78	65.99	29.63
2003	9.84	67.31	30.11
2004	9.93	68.65	30.58
2005	10.03	70.02	31.07

Sources: Arab Monetary Fund, Arab Countries Economic Indicators, several reports, Table 56, 1982(from report 1982-1992, pp66) and 1986 to 1994(from report 1986-1996, pp66), 1995 to 2005 (from report 1995-2005, pp66).

Table (23), Capital account balance for all countries, for three Arab countries

Countries / Year	Tunisia	Egypt	Morocco
1982	718.00	1474.00	1421.00
1983	385.00	285.00	639.00
1984	622.00	1718.00	798.00
1985	381.00	1381.00	849.00
1986	440.00	1936.00	592.00
1987	139.00	-332.00	188.00
1988	198.00	1307.00	-188.00
1989	193.00	361.00	811.00
1990	382.00	-11039.00	1925.00
1991	336.00	-4342.00	1457.00
1992	1043.00	-168.00	1351.00
1993	1297.00	-762.00	973.00
1994	1123.00	500.00	1244.00
1995	990.00	1107.00	-189.00
1996	853.00	1098.00	31.00
1997	776.00	3390.00	465.00
1998	553.00	2585.00	231.00
1999	1142.00	-987.00	1679.20
2000	651.00	-1066.00	-54.90
2001	1178.00	897.00	1992.40
2002	1197.00	1028.00	1327.00
2003	1150.00	1236.00	987.00
2004	1214.00	915.00	1120.00
2005	1260.00	1012.00	820.00

Sources balance of payments and external public debt of Arab countries, Arab monetary fund, reports 1982- 1992 and 1991- 2001, pp 37, 49, 85, 89, for two reports

Table (24), Total labour force for three Arab countries (L), (In Million)

Countries / Year	Tunisia	Egypt	Morocco
1982	1863554	12802799	5261399
1983	1935995	13274095	5544866
1984	2008436	13745391	5828333
1985	2080877	14216687	6111800
1986	2153318	14687983	6395267
1987	2225759	15159279	6678734
1988	2298200	15630575	6962201
1989	2370641	16101871	7245668
1990	2443082	16573167	7529135
1991	2515523	16101871	7812602
1992	2599377	16287268	8062785
1993	2685722	16688377	8339842
1994	2766728	17471726	8662973
1995	2851147	17507924	8869823
1996	2934911	17810866	9153972
1997	3019265	18082682	9414394
1998	3122635	18357484	9716290
1999	3224178	19596134	9984629
2000	3329894	20021302	9954001
2001	3432365	20315482	9926573
2002	3531525	20697132	10190959
2003	3624896	21390077	10613716
2004	3730152	21943164	10849217
2005	3835173	22533123	11075373

United Nation development programme, Arab statistics, World Babk- world development indicators, http://www.arabstats.org

Table (25), Marginal productivity of Capital for three Arab countries (MPK),

Countries / Year	Tunisia	Egypt	Morocco
1982	0.00	0.00	0.00
1983	9.60	2.55	0.53
1984	-3.61	0.32	-0.13
1985	-0.97	0.04	0.43
1986	0.10	0.28	-0.06
1987	-0.37	-0.40	-0.23
1988	0.12	-0.26	-0.11
1989	-0.10	-0.34	1.54
1990	0.09	-2.28	0.37
1991	-0.07	-5.31	-0.23
1992	0.28	0.55	-0.17
1993	-0.29	-0.12	0.23
1994	-0.17	0.26	0.08
1995	-0.06	0.07	-0.51
1996	-0.09	-0.01	0.06
1997	0.12	0.28	-0.13
1998	-0.20	-0.09	-0.10
1999	-4.12	-0.62	-2.57
2000	1.03	-0.01	0.88
2001	0.85	-0.27	-15.63
2002	0.01	-0.03	-0.22
2003	-0.01	-0.05	-0.04
2004	0.03	0.11	0.02
2005	-0.1	0.01	-0.15

Multi-collinearly test:

	liy	lted	ll	xm
liy	1.0000			
lted	0.9242	1.0000		
	0.0000			
ll	0.7666	0.7432	1.0000	
	0.0000	0.0000		
xm	-0.5751	-0.4922	-0.4493	1.0000
	0.0000	0.0000	0.0001	

	lry	edy	tds	mpk	pop
lry	1.0000				
edy	0.2350	1.0000			
	0.0469				
tds	-0.2059	0.5293	1.0000		
	0.0827	0.0000			
mpk	0.0231	0.0265	0.0095	1.0000	
	0.8474	0.8250	0.9368		
pop	0.8637	-0.0066	-0.3038	-0.0564	1.0000
	0.0000	0.9564	0.0095	0.6378	

Stata program file

Output Equation:

```
Hausman test
. xtreg lry liy lted ll xm,fe    // fixed-effects model

Fixed-effects (within) regression               Number of obs      =        72
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8935                         Obs per group: min =        24
       between = 0.9989                                        avg =      24.0
       overall = 0.9830                                        max =        24

                                                F(4,65)            =    136.31
corr(u_i, Xb)  = 0.9068                         Prob > F           =    0.0000
```

lry	Coef.	Std. Err	t	P>|t|	[95% Conf.	Interval]
Liy	.8511522	.0559543	15.21	0.000	.7394038	.9629007
Lted	.0132866	.0363207	-0.37	0.716	-.085824	.0592508
Ll	.1241765	.0637292	1.95	0.056	-.0030994	.2514525
Xm	.6265013	.1289449	4.86	0.000	.3689806	.884022
_cons	.5096691	1.093371	0.47	0.643	-1.673943	2.693281
sigma_u	.14960938					
sigma_e	.08798067					
rho	.74303843	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(2, 65) =     2.68              Prob > F = 0.0759


. estimates store model_fe

. xtreg lry liy lted ll xm,re    // ramdon-effects model


. estimates store model_fe

. xtreg lry liy lted ll xm,re    // ramdon-effects model

Random-effects GLS regression                   Number of obs      =        72
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8897                         Obs per group: min =        24
       between = 0.9999                                        avg =      24.0
       overall = 0.9867                                        max =        24

Random effects u_i ~ Gaussian                   Wald chi2(4)       =   4962.80
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
```

lry	Coef.	Std. Err	t	P>|t|	[95% Conf.	Interval]
Liy	.876615	.0431875	20.30	0.000	.7919691	.9612609
Lted	.0181142	.0289134	0.63	0.531	-.038555	.0747833
Ll	.2282696	.0213372	10.70	0.000	.1864495	.2700897
Xm	.6711509	.1034936	6.48	0.000	.4683072	.8739946
_cons	-1.720423	.3006036	-5.72	0.000	-2.309595	-1.131251
sigma_u	0					
sigma_e	.08798067					
rho	0	(fraction of variance due to u_i)				

```
. estimates store model_re

. hausman model_fe model_re // Hausman test

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |   model_fe     model_re      Difference          S.E.
-------------+----------------------------------------------------------------
         Liy |    .8511522     .876615      -.0254627        .0355771
        Lted |   -.0132866     .0181142     -.0314008        .021982
          Ll |    .1241765     .2282696     -.1040931        .0600511
          xm |    .6265013     .6711509     -.0446496        .0769147
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        5.43
                Prob>chi2 =      0.2460
                (V_b-V_B is not positive definite)
```

```
. * Durbin-Wu-Hausman test for the endogeneity of "Investment" (iy) --------------
. * random effects model
. xtreg liy lry_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1,re

Random-effects GLS regression                   Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8362                         Obs per group: min =        23
       between = 1.0000                                        avg =      23.0
       overall = 0.9678                                        max =        23

Random effects u_i ~ Gaussian                   Wald chi2(7)       =   1836.16
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000

------------------------------------------------------------------------------
lry          |      Coef.   Std. Err      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lry_1        |   .8206668   .1663197     4.93   0.000     .4946862    1.146647
lted_1       |    .009201   .1452574     0.06   0.949    -.2754983    .2939003
xm_1         |  -.5706379   .1786848    -3.19   0.001    -.9208537   -.2204222
mpk_1        |   .0070208   .0068228     1.03   0.303    -.0063517    .0203932
ll_1         |  -.0497862   .0412367    -1.21   0.227    -.1306086    .0310362
edy_1        |   .0029404   .0023834     1.23   0.217    -.001731     .0076117
_cons        |  1.602694    .6868245     2.33   0.020     .2565426   2.948845
-------------+----------------------------------------------------------------
sigma_u      |          0
sigma_e      |   .1256399
rho          |  0   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

```
. xtreg lry liy lted ll xm riy_res,re

Random-effects GLS regression                   Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8786                         Obs per group: min =        23
       between = 1.0000                                        avg =      23.0
       overall = 0.9878                                        max =        23

Random effects u_i ~ Gaussian                   Wald chi2(5)       =   5114.90
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
```

lry	Coef.	Std. Err	z	P>|z|	[95% Conf.	Interval]
Liy	.9501129	.0493114	19.27	0.000	.8534644	1.046762
Lted	-.0277172	.0304851	-0.91	0.363	-.0874668	.0320325
Ll	.2124877	.0222129	9.57	0.000	.1689513	.2560241
Xm	.5978359	.1014227	5.89	0.000	.3990511	.7966208
riy_res	-.3593714	.0970345	-3.70	0.000	-.5495555	-.1691872
cons	-1.640433	.2897229	-5.66	0.000	-2.208279	-1.072586
sigma_u	0					
sigma_e	.08441018					
rho	0 (fraction of variance due to u i)					

```
. test riy_res

 ( 1)  riy_res = 0

           chi2(  1) =   13.72
         Prob > chi2 =    0.0002


. * fixed effects model
. xtreg liy lry_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1,fe

Fixed-effects (within) regression               Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8504                         Obs per group: min =        23
       between = 0.9961                                        avg =      23.0
       overall = 0.9567                                        max =        23

                                                F(7,59)            =     47.89
corr(u_i, Xb)  = -0.9404                        Prob > F           =    0.0000
```

Liy	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lry_1	.7512434	.1607899	4.67	0.000	.4295035	1.072983
lted_1	.1779094	.1535051	1.16	0.251	-.1292535	.4850724
xm_1	-.63989	.1743515	-3.67	0.001	-.9887665	-.2910134
mpk_1	.0095462	.0065875	1.45	0.153	-.0036354	.0227277
ll_1	.0011199	.0024138	0.46	0.644	-.00371	.0059499
edy_1	.0011199	.0024138	0.46	0.644	-.00371	.0059499
tds_1	-.0085311	.002885	-2.96	0.004	-.0143039	-.0027583
cons	-2.303193	1.714142	-1.34	0.184	-5.733184	1.126798
sigma_u	.30303224					
sigma_e	.1256399					
rho	.85331467 (fraction of variance due to u i)					

```
F test that all u_i=0:     F(2, 59) =     3.93               Prob > F = 0.0250
```

```
. predict fiy_res,e
(3 missing values generated)

.
. xtreg lry liy lted ll xm fiy_res,fe

Fixed-effects (within) regression               Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8783                         Obs per group: min =        23
       between = 0.9956                                        avg =      23.0
       overall = 0.9787                                        max =        23

                                                F(5,61)            =     88.08
corr(u_i, Xb)  = 0.8855                         Prob > F           =    0.0000
```

Lry	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
liy	.929379	.073878	12.58	0.000	.7816509	1.077107
lted	-.0627717	.043749	-1.43	0.156	-.1502532	.0247099
ll	.0746683	.0752541	0.99	0.325	-.0758116	.2251482
xm	.6164076	.1314515	4.69	0.000	.3535542	.8792611
fiy_res	-.2830599	.1054697	-2.68	0.009	-.4939595	-.0721602
_cons	1.065298	1.201878	0.89	0.379	-1.338006	3.468602
sigma_u	.18387256					
sigma_e	.08522749					
rho	.82315018	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(2, 61) =     2.93               Prob > F = 0.0609

. test fiy_res

 ( 1)  fiy_res = 0

       F(  1,    61) =    7.20
            Prob > F =    0.0094

.
. *  Instrumental variables and two-stage least squares for panel-data models ----
. * random effects model
. xtivreg lry lted ll xm (liy=lry_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1),re

G2SLS random-effects IV regression              Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8590                         Obs per group: min =        23
       between = 1.0000                                        avg =      23.0
       overall = 0.9844                                        max =        23

                                                Wald chi2(4)       =   4016.73
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
```

Lry	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
liy	.9578802	.0558562	17.15	0.000	.8484041	1.067356
lted	-.0252716	.033679	-0.75	0.453	-.0912811	.040738
ll	.2153735	.0247271	8.71	0.000	.1669093	.2638377
xm	.7367905	.1134985	6.49	0.000	.5143374	.9592435
_cons	-1.894196	.3285065	-5.77	0.000	-2.538057	-1.250335
sigma_u	0					
sigma_e	.09420357					
rho	0	(fraction of variance due to u_i)				

```
Instrumented:   liy
Instruments:    lted ll xm lry_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1
```

```
. * fixed effects model
. xtivreg lry lted ll xm (liy=lry_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1),fe
Fixed-effects (within) IV regression         Number of obs      =          69
Group variable: code                         Number of groups   =           3
R-sq:  within  = 0.8489                      Obs per group: min =          23
       between = 0.9857                                     avg =        23.0
       overall = 0.9599                                     max =          23

                                             Wald chi2(4)       =   900293.61
corr(u_i, Xb)  = 0.8129                      Prob > chi2        =      0.0000
```

Lry	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
liy	1.013118	.0926419	10.94	0.000	.8315429	1.194693
lted	-.0974678	.0518191	-1.88	0.060	-.1990314	.0040958
ll	.0245699	.0869374	0.28	0.777	-.1458243	.194964
xm	.821768	.1631488	5.04	0.000	.5020023	1.141534
_cons	1.259049	1.332625	0.94	0.345	-1.352847	3.870946
sigma_u	.22070551					
sigma_e	.09420357					
rho	.84589257	(fraction of variance due to u_i)				

```
F  test that all u_i=0:     F(2,62) =     2.95            Prob > F    = 0.0599

Instrumented:   liy
Instruments:    lted ll xm lry_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1
```

```
. * ordinary panel model
. xtreg   lry liy lted ll xm, re

Random-effects GLS regression                   Number of obs      =        72
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8897                         Obs per group: min =        24
       between = 0.9999                                        avg =      24.0
       overall = 0.9867                                        max =        24

Random effects u_i ~ Gaussian                   Wald chi2(4)       =   4962.80
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
```

Lry	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
liy	.876615	.0431875	20.30	0.000	.7919691	.9612609
lted	.0181142	.0289134	0.63	0.531	-.038555	.0747833
ll	.2282696	.0213372	10.70	0.000	.1864495	.2700897
xm	.6711509	.1034936	6.48	0.000	.4683072	.8739946
_cons	-1.720423	.3006036	-5.72	0.000	-2.309595	-1.131251
sigma_u	0					
sigma_e	.08798067					
rho	0	(fraction of variance due to u_i)				

```
. xtreg   lry liy lted ll xm, fe

Fixed-effects (within) regression               Number of obs      =        72
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8935                         Obs per group: min =        24
       between = 0.9989                                        avg =      24.0
       overall = 0.9830                                        max =        24

                                                F(4,65)            =    136.31
corr(u_i, Xb)  = 0.9068                         Prob > F           =    0.0000
```

lry	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Liy	.8511522	.0559543	15.21	0.000	.7394038	.9629007
Lted	-.0132866	.0363207	-0.37	0.716	-.085824	.0592508
Ll	.1241765	.0637292	1.95	0.056	-.0030994	.2514525
Xm	.6265013	.1289449	4.86	0.000	.3689806	.884022
_cons	.5096691	1.093371	0.47	0.643	-1.673943	2.693281
sigma_u	.14960938					
sigma_e	.08798067					
rho	.74303843	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(2, 65) =     2.68               Prob > F = 0.0759
```

Investment equation:

```
. hausman model_fe model_re // Hausman test
```

	(b) model_fe	(B) model_re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Lry	1.006428	1.113854	-.1074262	.0552857
mpk	-.003214	-.0035135	.0002995	
edy	.000144	.001615	-.0016006	.0008229
tds	-.0038111	-.0031809	-.0006302	.0016588
pop	-.0198364	-.0086752	-.0111612	.005989

```
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        3.72
                Prob>chi2 =      0.5904
                (V_b-V_B is not positive definite)
```

```
. * Durbin-Wu-Hausman test for the endogeneity of "Real incomet" (ry) --------------
. * random effects model

Random-effects GLS regression                   Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.7784                         Obs per group: min =        23
       between = 1.0000                                        avg =      23.0
       overall = 0.9779                                        max =        23

Random effects u_i ~ Gaussian                   Wald chi2(8)       =   2657.36
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
```

lry	Coef.	Std. Err	z	P>|z|	[95% Conf.	Interval]
liy	.4828931	.119922	4.03	0.000	.2478503	.7179359
lted_	.2922642	.1149615	2.54	0.011	.0669437	.5175847
xm_1	.3607755	.2104882	1.71	0.087	-.0517737	.7733247
mpk_1	.0037402	.0060601	0.62	0.537	-.0081375	.0156178
ll_1	.1992193	.0720345	2.77	0.006	.0580343	.03404043
edy_1	-.0044923	.0018442	-2.44	0.015	-.008107	.000877
tds_1	-.0005618	.0024522	-0.23	0.819	-.0053681	.0042445
pop_1	.0011491	.0034418	0.33	0.738	-.0055968	.0078949
_cons	.1695286	1.139711	0.15	0.882	-2.064263	2.49332
sigma_u	0					
sigma_e	.117803399					
rho	0 (fraction of variance due to u_i)					

```
Random-effects GLS regression                   Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8946                         Obs per group: min =        23
       between = 0.9993                                        avg =      23.0
       overall = 0.9780                                        max =        23

Random effects u_i ~ Gaussian                   Wald chi2(6)       =   2756.22
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
```

liy	Coef.	Std. Err	z	P>|z|	[95% Conf.	Interval]
Lry	1.356144	.0560058	24.21	0.000	1.246375	1.465914
mpk	-.0001828	.0057336	-0.03	0.975	-.0114204	.0110548
edy	.0005212	.0008589	0.61	0.544	-.0011622	.0022047
tds	-.0014561	.0019468	-0.75	0.454	-.0052718	.0023595
pop	-.0149486	.0018886	-7.92	0.000	-.0186503	-.011247
riy_res	-1.352036	-1501437	-9.00	0.000	-1.6463312	-1.057759
cons	-4.81103	.5285625	-9.10	0.000	-5.846994	-3.775067
sigma_u	0					
sigma_e	.11178885					
rho	0 (fraction of variance due to u_i)					

```
. test riy_res

 ( 1)  riy_res = 0

           chi2(  1) =   81.09
         Prob > chi2 =    0.0000
```

```
. * fixed effects model
. xtreg liy lry_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1,fe

Fixed-effects (within) regression               Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.7790                         Obs per group: min =        23
       between = 0.9995                                        avg =      23.0
       overall = 0.9775                                        max =        23

                                                F(8,58)            =     25.55
corr(u_i, Xb)  = -0.8372                        Prob > F           =    0.0000
```

Liy	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
liy_1	.4694487	.1265334	3.71	0.000	.2161645	.7227328
lted_1	.2835236	.1291482	2.20	0.032	.0250053	.5420419
xm_1	.3410313	.2200619	1.55	0.127	-.0994704	.781533
mpk_1	.0041864	.0062477	0.67	0.505	-.0083198	.0166926
ll_1	.2461197	.1338345	1.84	0.071	-.0217793	.5140186
edy_1	-.0045335	.001891	-2.40	0.020	-.0083188	-.0007481
tds_1	-.0000408	.0028218	-0.01	0.989	-.0056891	.0056076
pop_1	-.0011313	.0103574	-0.11	0.913	-.0218638	.0196013
_cons	-.2835772	1.657109	-0.17	0.865	-3.600642	3.033487
sigma_u	.03748444					
sigma_e	.11780339					
rho	.09193935 (fraction of variance due to u_i)					

```
F test that all u_i=0:     F(2, 58) =     0.09               Prob > F = 0.9128
```

```
Fixed-effects (within) regression               Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.8975                         Obs per group: min =        23
       between = 1.0000                                        avg =      23.0
       overall = 0.9560                                        max =        23

                                                F(6,60)            =     87.58
corr(u_i, Xb)  = 0.8254                         Prob > F           =    0.0000
```

Liy	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Lry	1.258924	.0777604	16.19	0.000	1.10338	1.414468
mpk	-.0004653	.0057361	-0.08	0.936	-.0119392	.0110086
edy	-.0005387	.0012055	-0.45	0.657	-.00295	.0018726
tds	.0007716	.0025016	0.31	0.759	-.0042323	.0057755
pop	-.0209329	.006323	-3.31	0.002	-.0335808	-.0082849
fiy_res	-1.278674	.1529013	-8.36	0.000	-1.584522	-.9728255
_cons	-3.566738	.9647291	-3.70	0.000	-5.496484	-1.636993
sigma_u	.24185333					
sigma_e	.11299546					
rho	.82082804	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(2, 60) =     2.10               Prob > F = 0.1309

. test fiy_res

 ( 1)  fiy_res = 0

       F(  1,    60) =    69.94
            Prob > F =    0.0000



*  Instrumental variables and two-stage least squares for panel-data models ----
. * random effects model
. xtivreg lry lted ll xm (liy=lry_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1),re

G2SLS random-effects IV regression              Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.7623                         Obs per group: min =        23
       between = 0.9981                                        avg =      23.0
       overall = 0.9471                                        max =        23

                                                Wald chi2(5)       =   1142.59
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
```

Liy	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Lry	1 .25114	.0805425	15.53	0.000	1.09328	1.409001
mpk	-. 0085765	.0088349	-0.97	0.332	-.0258927	.0087396
edy	.0024319	.0012412	1.96	0.050	-7.38e-07	.0048646
tds	-.0020981	.0030071	-.70	0.485	-.0079919	.0037957
pop	-.00116878	.0027485	-4.25	0.000	-.0170749	-.0063008
cons	-3.887934	.7660063	-5.08	0.000	-5.389279	-2.386589
sigma_u	0					
sigma_e	.17539518					
rho	0	(fraction of variance due to u_i)				

```
Instrumented:   lry
Instruments:    mpk edy tds pop liy_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1
```

```
. * fixed effects model
. xtivreg liy mpk edy tds pop liy_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1,fe

Fixed-effects (within) IV regression         Number of obs      =          69
Group variable: code                         Number of groups   =           3

R-sq:  within  = 0.7490                      Obs per group: min =          23
       between = 0.9894                                     avg =        23.0
       overall = 0.9432                                     max =          23

                                             Wald chi2(5)       =   195275.39
corr(u_i, Xb)  = -0.8523                      Prob > chi2        =      0.0000
```

Liy	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Lry	1.265359	.1237564	10.22	0.000	1.022801	1.507917
mpk	-.0107407	.0088119	-1.22	0.223	-.0280116	.0065302
edy	.0031269	.0018483	1.69	0.091	-.0004957	.0067495
tds	.0029216	.0038882	0.75	0.452	-.0046991	.0105423
pop	-.0037159	.0101224	-0.37	0.714	-.0235553	.0161236
cons	-4.438523	1.590749	-2.79	0.005	-7.556334	-1.320713
sigma_u	.210492					
sigma_e	.17539518					
rho	.5902048	(fraction of variance due to u_i)				

```
F  test that all u_i=0:     F(2,61) =     2.02            Prob > F    = 0.1413

Instrumented:   lry
Instruments:    mpk edy tds pop liy_1 lted_1 xm_1 mpk_1 ll_1 edy_1 tds_1
```

```
. * ordinary panel model
. xtreg   liy lry mpk edy tds pop, re

Random-effects GLS regression                   Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.7629                         Obs per group: min =        23
       between = 0.9971                                        avg =      23.0
       overall = 0.9492                                        max =        23

Random effects u_i ~ Gaussian                   Wald chi2(5)       =   1177.82
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
```

liy_1	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Lry	1.112929	.073941	15.05	0.000	.9680071	1.25785
mpk	-.0059966	.0085859	-0.70	0.485	-.0228247	.0108315
edy	.0035888	.0011883	3.02	0.003	.0012599	.0059178
tds	-.0031284	.0029206	-1.07	0.284	-.0088526	.0025958
pop	-.0073881	.0025496	-2.90	0.004	-.0123852	-.002391
_cons	-2.580239	.7036705	-3.67	0.000	-3.959407	-1.20107
sigma_u	0					
sigma_e	.16491488					
rho	0	(fraction of variance due to u_i)				

```
. xtreg  liy lry mpk edy tds pop, fe

Fixed-effects (within) regression               Number of obs      =        69
Group variable: code                            Number of groups   =         3

R-sq:  within  = 0.7781                         Obs per group: min =        23
       between = 0.9974                                        avg =      23.0
       overall = 0.8864                                        max =        23

                                                F(5,61)            =    42.77
corr(u_i, Xb)  = 0.7690                         Prob > F           =    0.0000

------------------------------------------------------------------------------
 Liy_1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------+----------------------------------------------------------------------
 Lry   |   .9762779   .1022092     9.55   0.000        .771898    1.180658
 mpk   |   -.007983   .0082683    -0.97   0.338     -.0245165    .0085506
 edy   |   .0016916   .0017158     0.99   0.328     -.0017393    .0051225
 tds   |    .001656   .0036477      .45   0.651     -.0056381    .0089501
 pop   |  -.0164753   .0091955    -1.79   0.078     -.0348628    .0019123
 _cons |  -.8224699   1.324047    -0.62   0.537     -3.470065    1.825125
-------+----------------------------------------------------------------------
 sigma_u | .36728664
 sigma_e | .16491488
 rho     | .83221763   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(2, 61) =     3.98               Prob > F = 0.0237
```