An Empirical Study on China's Regional Tax Revenue Performance

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DECLARATION

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Abstract

This research aims to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. The econometric quantitative method is applied in this study for these purposes. The data used in this study covers the period between 1995 and 2013 on 31 provinces, autonomous or municipal cities directly under the control of the Central Government. Differing from the previous research, a new dependent variable, the current revenue ratio is used in addition to the conventional tax ratio. The current revenue is the sum of tax revenue and non-tax soured revenue excludes State Owned Enterprises revenues and expenditures. Eleven independent variables falling into six categories were selected. These six categories were: The traditional tax handles, GDP decomposition, Population factors, Income inequality, Governmental factors, and Corruption.

The contributions of this study are: Firstly, for the first time the author constructed the current revenue ratio as the second dependent variable to represent the broader fiscal revenue and true tax-like revenue performance for studying tax effort index in China. Secondly, this study constructed the rural-urban income disparity Theil index as one of the explanatory variables in the tax effort index models for the first time in China's tax performance study. Thirdly, for the first time in the tax effort index literature, this study used country specific data on corruption in a single country tax effort index model.

The main results of this study are: 1) tax revenue capacity is mainly determined by the economic factors whereas the current revenue capacity is determined by both the economic and social factors; 2) tax revenue performance is diluted by the existence of non-tax sourced revenues; 3) the current revenue ratio is a better indicator for true tax performance; 4) There exists a regional disparity of tax or current revenue capacity among provinces. 5) tax/current revenue capacities and tax/current revenue efforts are mismatched in some provinces.

Table of Contents

List of Tables

List of Figures

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Chapter one: Introduction

1.1 Introduction

This research has used the econometric quantitative method to investigate the key determinants of the tax revenue capacity, and evaluate the tax revenue performance at provincial level in China during the period of 1995 to 2013. In this chapter, the background and rationale of the study, the research objectives, research method, main contribution and the structure of this thesis are presented.

1.2 Background and rational of the study

1.2.1 China's administrative division system

Since this study is focused on the regional tax revenue performance in China, it is important to understand China's administrative division system. According to the State Council of the People's Republic of China, the administrative units of China include the central government, provinces, autonomous regions, municipalities directly under the Central Government, autonomous prefectures, counties, autonomous counties, cities, townships, ethnic minority townships, and towns, and the administrative division of all units are under a three-tier system (The State Council, 2016). The chart 1-1 below illustrates the relationship between all units under the three-tier system.

Chart 1-1: The three-tier administrative division system
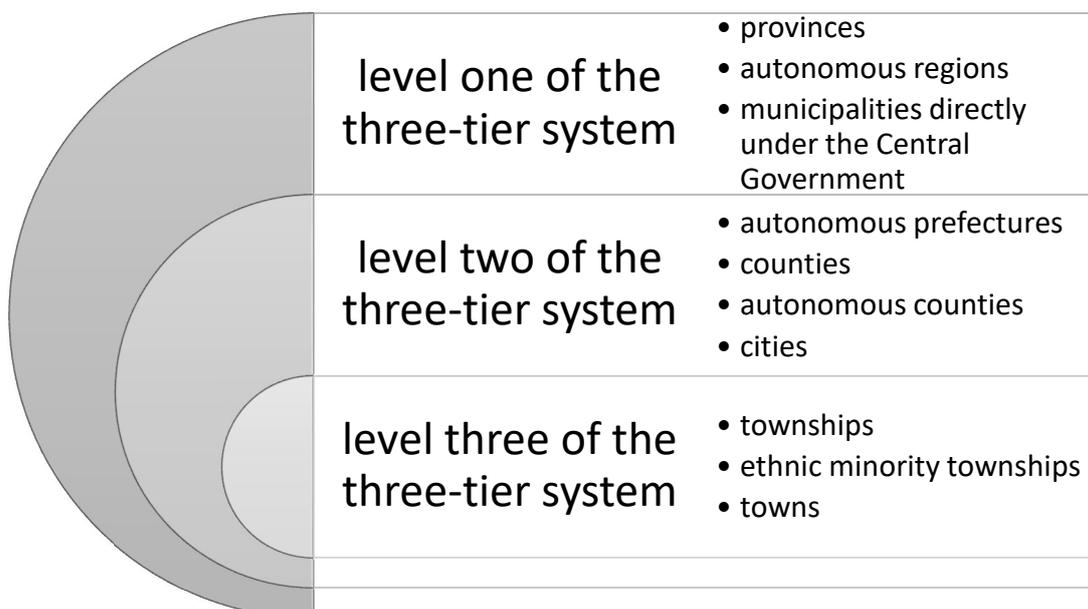
level one of the three-tier system	• provinces • autonomous regions • municipalities directly under the Central Government
level two of the three-tier system	• autonomous prefectures • counties • autonomous counties • cities
level three of the three-tier system	• townships • ethnic minority townships • towns

Due to the availability of the data, level one of administrative units in mainland China are used for this thesis. According to the State Council, currently in mainland China, there are 31 level one administrative regions that include 22 provinces, 5 autonomous regions, and 4 municipalities that are directly under the Central Government. The table 1-1 below lists all 31 level one administrative regions that are used in this study.

Table 1-1: 31 Level one administrative regions in China

Provinces	Anhui, Fujian, Gansu, Guangdong, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, and Zhejiang
Autonomous regions	Guangxi, Inner Mongolia, Ningxia, Tibet, and Xinjiang
municipalities	Beijing, Chongqing, Shanghai, and Tianjin

For the convenience of the reader, all 31 level one administrative provinces, autonomous regions, and municipalities that are directly under the Central Government are collectively referred to as "provinces" Throughout this thesis.

1.2.2 Taxation, tax capacity, and tax effort

Taxation, as one of the oldest activities in human history, has been playing a key role in civilised societies for thousands of years. Tax can be defined as a compulsory levy made by tax authorities on income, expenditure, wealth or people, for which nothing is received by the individual tax payer directly or specifically in return (James & Nobes, 2012, 2013; Lymer & Oats, 2013, 2014).

As the basic financial support for the states' basic functions, tax is a key element in the running of a state and regime, especially for developing countries like China, and the influence of taxes in economy and society is profound (Levi, 1988; Cheibub, 1998; Feger & Asafu-Adjaye, 2014).

Government tax revenue performance has drawn the attention of many scholars for decades. However, there is still some debate on how to measure the tax revenue performance, the potential tax revenue, and how government units utilize the tax revenue potential to generate tax revenue.

Starting from the mid-20th century, in order to examine the tax revenue performance, numerous scholars have tried to use econometric techniques to examine the potential of taxation and the extent to which tax authorities utilize their potential. This has led to the emergence of two key concepts in taxation studies: the tax capacity and tax effort (Bird, et al., 2006).

Tax capacity is defined as the hypothetical ability of a tax authority to raise tax revenue for the purpose of public finance within the existing available tax base; and the tax effort is the extent to which an area or government is able to collect tax from its taxable capacities (Bahl, 1971, 1972; Akin, 1973; Mertens, 2003; Wang, Shen, & Zou, 2009; Le, Moreno-Dodson, & Bayraktar, 2012).

1.2.3 Taxation, and tax revenue performance in China

In parallel, since the establishment of the tax system in China in the early 1950s, the Chinese tax system has gone through many reforms. Before the open door policy in 1978, China was under the planned economy system. The government controlled production and allocation of almost all resources, in other words, all the economic resources were in the state's hands rather than in private hands (Yueh, 2010), and the role of taxation was relatively small in China's economic activities (Wang, 1984; Easson & Li, 1987; Liu, 2000; Zeng, Li, & Li, 2013). It was not until 1978 that the Chinese authorities launched the market-oriented economic reform and the Chinese tax system began to be recognized as a vital part of the economic reform (Lin, 2000). Subsequently, China's tax system has gone through huge development and expansion (Easson & Li, 1987; Liu, 2008; Xu & Cui, 2011). But what laid the foundation of the current Chinese tax system was the 1994 tax sharing system reform, which fundamentally re-shaped the Chinese tax system and constructed the

revenue relationship between central and local government (Liu, 2008; Shen, Jin, & Zou, 2012; Shen, Zhao, & Zou, 2014).

Tax revenue is the main support for government spending in China, hence its influence is touching every corner of China's economy (Lü & Guo, 2012). As a result, the studies on China's tax system and its performance has mushroomed in recent decades (Shen, Jin, & Zou, 2012). For decades, a number of researchers have tried to identify the source of tax revenue growth and the reasons behind the rise and fall of tax revenue (Liu, 2000; Wong, 2000; Yang, 2001; Ahmad, Keping, Singh, & Richardson, 2002; Liu, 2008; Wong & Bird, 2008; Wang, Shen, & Zou, 2009; Xu & Cui, 2011; Huang, Lo, & She, 2012; Lü & Guo, 2012; Shen, Jin, & Zou, 2012; Tong, Li, & Wang, 2013; Zeng, Li, & Li, 2013; Shen, Zhao, & Zou, 2014).

1.2.4 The rationale of the study

This research shows that some issues urgently needed to be resolved regarding the analysis of China's tax revenue performance, including defining the tax revenue and its determinants.

Firstly, the existence of the non-tax sourced revenue in the fiscal revenue system of China's local governments is widely ignored, despite the size and importance of the non-tax sources, which is so vital in the local government fiscal revenue system; it was often referred to as "the second budget" or "half the mountain" around the 1990s (Jia & Liu, 2005, p. 24; Guifen, 2007, p. 64).

Although similar, there are differences between the tax revenue and the non-tax sourced revenue in China (Wong & Bird, 2008). Tax revenue and its usage is well organized and administered by the central government. However, the non-tax sourced revenues are collected by the local government, which lacks transparency and is often without a legal basis. It has been pointed out that since the local governments are granted most of the power regarding the establishment, adjustment, and collection of non-tax sourced revenue, this has resulted in local government collecting a noticeable amount of revenue as a major component of the local fiscal revenue system

(Lin, 2000; Ma, 2005; Wong & Bird, 2008; Shen, 2011; Shen et al., 2012; Tong et al., 2013; Zheng & Wang, 2013).

In fact, the issue of non-tax sourced revenue is not unique in China, neither is it a new phenomenon in developing countries. Fauvelle-Aymar (1999) argues that non-tax sourced revenues are mostly generated from public enterprises in developing countries. Even though tax revenue and non-tax sourced revenue are inherently different based on their respective definitions, given the important position of the public enterprises in developing countries, it is possible that the non-tax sourced revenue is similar to the tax revenue in political terms (Fauvelle-Aymar, 1999). Bird, Martinez-Vazquez, and Torgler (2006) also point out that the misclassification of a state's revenue between tax and non-tax sourced revenues often exists among developing and transitional economies (Bird et al., 2006). Some scholars claim that a large portion of non-tax sourced revenue in China matches the content of taxes in concept (Lin, 2002; Wu, 2002; Jia & Liu, 2005; Lin, 2005).

Secondly, in the literature, finding China's tax revenue performance determinants using tax effort index method, the special social and political characteristics of China has been widely ignored.

Since the introduction of the tax effort index model method for the relative tax capacity/effort measurements in the early 1960s, the method has been well-developed in many ways in the analysis of inter-county studies (Ghura & Hadjimichael, 1996; Ghura, 1998; Fauvelle-Aymar, 1999; Teera & Hudson, 2004; Le et al., 2012). The scale of finding of determinants has focused on not only the economic conditions, but also on other social and political conditions (Bird et al., 2006, 2008). Hence, a great expansion of social, political, and cultural variables, such as the cultural differences indicators, variation of government efficiencies, education levels, foreign grants, income distribution and corruption were adopted in the tax effort index models (Ghura, 1998; Piancastelli, 2001; Teera & Hudson, 2004; Bird et al., 2006; Gupta, 2007; Bird et al., 2008).

The same model can also take in the inner-country analysis. However, relevant studies are in the minority in the literature. In addition, when conducting the inner-country tax effort analysis, researchers have revealed that different countries have their own special features. In other words, each country is unique from others in some ways. The same variables in different countries reveal a different story. The characteristic variations of countries have demonstrated that there is no such thing as the "standard components" in the construction of explanatory variables; one must work with each country's particular characteristics when applying the tax effort index model (Badu & Li, 1994; Wang et al., 2009; Chaudhry & Munir, 2010; Huang et al., 2012; Karagöz, 2013; yao & Lin, 2013).

The tax effort index study in the intra-country analysis are very few, and even rarer in China. Moreover, the existing few tax effort index studies in China have been mainly focused on the economic perspective (Wang et al., 2009). The special social and political characteristics of China have been widely ignored in the tax literature.

The debate and the ambiguity of the salient feature of non-tax source and the tax revenue determinants in China continues, and a gap has clearly grown, which is the lack of a holistic and comprehensive inner-country tax effort index study in the literature on the tax performance in China. This is why the author of this study has chosen this topic in an attempt to close the gap in the literature.

1.3   Research aim, questions, objectives and hypotheses

The aim of this study is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. Therefore, the primary purpose of this study is to seek answers to questions regarding the following:

1. What are the key determinants affecting the tax capacity in China at provincial level?

2. How did the tax revenue perform in China at provincial level?
3. Is there any regional variation of tax performance at the provincial level?
4. What policies may be suggested to improve the tax revenue performance in China?

Similar to the research questions, the following objectives are set out:
1. To explore the relationship between the tax capacity and certain economic and social factors.
2. To evaluate the tax revenue performance at provincial level in China
3. To examine the variation of regional tax revenue performance in China.
4. To make suggestions for policy makers to improve the tax performance in China.

As the outcomes of the literature reviewed, the testable hypotheses in this study can be formulated as follows:

H1: The stage of development is positively related to the tax revenue performance at provincial level in China.

H2: Development in the industrial sector is positively related to the tax revenue performance at provincial level in China.

H3: The development of the service sector is positively related to the tax revenue performance at provincial level in China.

H4: The openness level is positively related to the tax revenue performance at provincial level in China.

H5: The population growth rate is negatively related to the tax revenue performance at provincial level in China.

H6: The population density is positively related to the tax revenue performance at provincial level in China.

H7: The shrinking of agricultural sector activities is positively related to the tax revenue performance at provincial level in China.

H8: The resident income inequality is negatively related to the tax revenue performance at provincial level in China.

H9: The external grants received by the local governments is negatively related to the tax revenue performance at provincial level in China.

H10: The anti-corruption effort is positively related to the tax revenue performance at provincial level in China.

H11: The government capacity is positively related to the tax revenue performance at provincial level in China.

1.4   The research method

The research aim of this study is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level.

The nature of this research is to prove several causal relationships, and the researcher believes one reality exists objectively, and knowledge can only gained from observation and analysis of the external reality through scientific experiments based on a hypothesis. Hence positivism is the underpinning paradigm of this research. The variables needed for this research are measurable and therefore quantifiable, the quantitative methodology is adopted in this research. To achieve the research aim, the statistical analysis methods should be compatible and essential for this study. The data used in this study

are collected from statistics yearbooks and reports published by the Chinese government authorised organizations. The more detailed philosophy position discussion is presented in Chapter 5, section 5.2.

Specifically, the econometric modelling is used in this study. The model building, variable selections, and data sources can be described as follows:

Firstly, the author constructed the current revenue capacity along with the conventional tax revenue capacity as the two dependent variables in the tax effort index model for all 31 provinces. The tax revenue capacity is measured as the predicted ratio of tax revenue collection in GDP, also known as the tax ratio or tax share in the regression model; and the current revenue capacity is measured as the predicted ratio of current revenue collection in GDP, where the current revenue is the sum of tax revenue and non-tax sourced revenue excludes State Owned Enterprises revenues and expenditures. In this research, the term of tax revenue capacity, tax capacity, tax ratio and tax share are used interchangeably. The same principle is also applied for terms of the current revenue.

Secondly, In terms of the independent variables, eleven variables falling into six categories were selected for the purpose of the comprehensive study on the determinants of tax capacity. These six categories are: The traditional tax handles, GDP decomposition, population factors, income inequality, corruption, and governmental factors. The rationale for the six categories and selection are discussed in detail in Chapter 5 section 5.6.

Thirdly, the data needed to generate all the variables for all 31 provinces are secondary data collected from statistical yearbooks published by China's statistical authorities.

Fourthly, three regression models: pooled OLS, random effect, and fixed effect regression model were built and run for both tax revenue ratio and current revenue ratio. In order to identify the best appropriate model for this study, two tests were also performed: Breusch-Pagan LM test for the random

effect model against the pooled OLS model, and the Hausman test for the fixed effect model against the random effect model.

Finally, according to the regression results from the best appropriate model, the determinants of the tax and current revenue capacity are identified and discussed. These estimated tax and current revenue capacity are then used for calculating the tax effort and the current revenue effort index to evaluate China's tax revenue performance at provincial level. More specifically, the tax effort index is calculated as the ratio of actual tax share and predicted tax share according to the definition of the tax effort index model. The current revenue effort index is calculated using the same approach.

1.5   Contribution of this study

This section highlights the main contribution of this study to the literature.

The main contribution of this study is that it is the first of its kind that a holistic and comprehensive tax effort index study has been undertaken contextualised in China at provincial level, taking the consideration of China's fiscal, economic and social salient features.

In the existing literature, most studies have used only the tax revenue as the indicator of tax performance with a few exceptions (Fauvelle-Aymar, 1999; Bird, et al., 2006). In addition, in the previous studies, the researchers were mainly focused on economic factors such as the stage of economic development, GDP decomposition and openness level; hardly any studies considered the social and political factors. This study has filled this gap by constructing a broader tax-like revenue indicator, and also includes a wide range of social and political factors such as rural-urban income inequality, urbanization, migration, and corruption.

In detail, the specific contributions made in this study are:

Firstly, for the first time the author has constructed the current revenue ratio as the second dependent variable to represent the broader fiscal revenue and true tax-like revenue performance for studying the tax effort index in China.

Secondly, this study has constructed the rural-urban income inequality as one of the explanatory variables in the tax revenue and current revenue models for China's tax performance study.

Thirdly, for the first time in the tax effort index literature, this study has used country specific data on corruption in a single country's tax effort index model.

1.6   The structure of this thesis

This thesis consists of seven chapters.

Following the introduction, which presents the background and rationale, research objectives, hypotheses and research methods of this study, the literature review is presented in chapter two. In this chapter, firstly, the concept of taxation and its classification is discussed. Secondly, three important terms: tax capacity, tax effort, and tax effort index, and their theoretical measurements are presented. Thirdly, two important empirical measurements of tax capacity and tax effort, namely, the Representative Tax System and the regression approach of tax effort index are discussed. Fourthly, the empirical studies on the tax performance and the use of the regression approach of tax effort index are examined. This is followed by the outcomes of the literature reviewed, and eleven hypotheses for this study are presented.

Chapter three provides the reader with an evolution of China's tax system and its reforms. Based on the focus and the characteristics of reform, the evolution and reforms of the Chinese tax system are divided into five stages in this study. The first stage is the establishment of the tax system for the new government between 1950 and 1952; the second stage is the taxation simplification processes between 1953 and 1977 under the centrally planned economic system. The third stage is the development and expansion process of the tax system between 1978 and 1993, which was against the background of the

market-oriented economic reforms. Stage four commenced in 1994 when a tax-sharing reform took place, which was viewed as the most important tax reform in China. The final stage was after 1995 until the present day, when a series of simplification and adjustment processes were carried out.

Chapter Four discusses in detail the fiscal revenue performance and its main characteristics of China's central and local governments, a particular focus is placed on the revenue relationship between central and local governments. This starts with the explanation of the classification of the fiscal revenue categories in China. The concepts and scales of budgetary revenue, off-budgetary revenue, and extra budgetary revenue in China are explained. Subsequently, the development of the central transfer system and the performance of tax revenue and non-tax sourced revenue are illustrated and discussed. Here the existence, the cause and the main characteristics of the off-budgetary revenue and extra-budgetary revenue at provincial government level are examined. The discussion on the existence and the contents of the non-tax sourced revenue reveal that some items in the non-tax sourced revenues in China possibly match the concept and function of taxes.

Chapter five focuses on the chosen methodology and the method that has been adopted in this research. Firstly, the philosophical position of this research is presented. This is followed by the model structuring and variable selections that are used in this study. The rationale of building three alternative models to generate the estimates for tax revenue capacity and current revenue capacity thus obtaining the tax effort index and the current revenue effort index are provided.

Chapter six presents the statistical results and interpretation of these results. It begins with a description of the statistics of the data adopted in the models. Followed are the data processing and multicollinearity tests. This is followed by a comparison of the three regressions used in this study: pooled OLS regression, random effect regression, and the fixed effect regression. Along with the results of the three regressions, the Breusch and Pagan Lagrangian Multiplier Test and the Hausman Test are performed in order to identify the best

fit regression model for this study. Based on the result, the fixed effect regression model is the most appropriate model in this study. After the hypotheses testing and regression results, the discussion and interpretation of the results of each of the variables used in the regressions is then presented. By doing so, the determinants of the tax capacity and revenue capacity in China are identified. Based on the regression results, the tax/current revenue capacity and tax/current revenue effort indices of each province are computed and discussed; hence the tax revenue and current revenue performance in China at provincial level governments are evaluated. It is in this chapter that the regional disparities of tax performance are found and discussed.

Chapter seven summarises the main findings of this research, highlighting the author's contribution to the knowledge and provides recommendations in the conclusion.

Chapter two: Literature review

2.1 Introduction

Since the focus of this study is find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level, it is essential to understand what the nature and importance of taxation is; how the tax revenue performance within the social and economic context can be measured; and review previous empirical studies.

In this chapter, firstly, the concept of taxation and its classification is discussed. Secondly, two important terms: tax capacity and tax effort, and their theoretical measurements will be represented. Thirdly, two important empirical measurements of tax capacity and tax effort, namely, the representative tax system and the regression approach of tax effort index will be discussed. Fourthly, the previous studies on the use of regression approach of tax effort index are examined. The discussion of previous studies is divided into two sections: the inter-country comparison of studies on international tax effort using the tax effort index regression approach, and the intra-country tax effort index regression studies on a single-country basis. Finally, as the outcome of the literature reviewed, the hypotheses for this study are presented in the final section.

2.2 Taxation and its classification

2.2.1 The concept and importance of taxation

Tax can be defined as a compulsory levy enforced by tax authorities on income, expenditure, wealth or people, for which nothing is received by the taxpayers directly or specifically in return (James & Nobes, 2012, 2013; Lymer & Oats, 2013, 2014). Among the many ways that governments can generate revenues, tax revenue is recognized as the most important financial source for governmental public expenditures (Allan, 1971; James & Nobes, 2013; Lymer & Oats, 2013).

However, the influence of taxes in economy and society is wide and deep; raising taxes sometimes does not benefit the government, but harms the economy and society. This is caused by the income effect and substitution effect. The income effect means the changes in the taxpayers' spending power due to the influence of taxes and the substitution effect stands for the price changes due to taxes that may lead to consumers altering their choices. A combination of both the income effect and substitution effect is the well-known excess burden of taxation (James & Nobes, 2012, 2013).

2.2.2 Tax classification

According to the specification, final taxpayers, and the level of centralization, there are three major classification methods of taxes, namely, the ad valorem vs. specific excise taxes, direct vs. indirect taxes, and central vs. local taxes (Gruber, 2011).

2.2.2.1 Ad valorem taxes and specific excise taxes

According to different specification of taxes, different taxes can be classified into two categories: ad valorem tax and specific excise tax. Ad valorem tax is a fixed percentage of the sales price on a specific commodity, whereas specific excise tax stands for a fixed amount of tax on a specific commodity (Gruber, 2011). Based on these definitions, the ad valorem tax can be calculated as the total price of taxable base multiplied by the ad valorem tax rate, and the specific excise tax can be calculated as the total size or weight of the taxable base multiplied by the specific excise tax rate.

Therefore, according to the definition and the calculation methods of both types of taxes, the main difference between the ad valorem tax and specific excise tax is that the ad valorem taxes rely on the total value of the taxable base, whereas the specific excise taxes are based on the size or weight of the taxable base. Typical examples of ad valorem taxes are turnover taxes and income taxes, which are variates according to the price changes. Specific excise taxes can be represented by typical examples such as resource taxes, vehicle and vessel usage taxes, where the tax revenues vary according to the

changes in size and weight rather than their prices (Gruber, 2011; Lymer & Oats, 2013).

2.2.2.2 Direct taxes and indirect taxes

Depends on whether tax can be transferred to others; taxes can also be categorised into two different types: direct and indirect tax.

Direct taxes are assessed directly on individuals who are intended to bear it, and cannot be shifted to others, whereas indirect taxes are taxes on transactions, and are not directly assessed on individuals (Gruber, 2011). Hence, in the former tax burdens are transferable between individuals or groups. On the other hand, indirect tax is the tax levied on the production of goods, transactions, and distribution. Therefore, the burden of indirect taxes can be shifted to other individuals or groups involved in the process. Typical examples for indirect taxes are those acting in the form of consumption taxes, such as value-added tax. The tax raised on certain consumption goods is shared by both producers and consumers; hence, the tax burden can be shifted between these two groups. Direct taxes are best represented by income type taxes, such as taxes on payrolls, incomes and wealth because the taxpayers of these types of taxes are the only units responsible, and the tax burdens in such cases cannot be shifted to other individuals or groups (Lymer & Oats, 2013).

2.2.3 Central taxes and local taxes

According to the different level or degree of centralization of local and national government units, tax revenues can also be categorised into central government tax revenues and local government tax revenues (Gruber, 2011). The fundamental difference between the central taxes and local taxes is the authority given for collection and expenditure. The central government holds the authority to collect and spend the central taxes, whereas the collection and expenditure power of local taxes is in the hands of local governments (Gruber, 2011).

2.3 Basic concepts of tax capacity and tax effort

The aim of this research is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. Hence, it is important to discuss the two fundamental concepts in the measurement of tax revenue performance: tax capacity and tax effort.

Tax revenue, as the key revenue form in the government's fiscal budgetary revenue system, has drawn the attention of many scholars for decades. In terms of the measurement of the tax performance, two questions emerge: what is the potential of tax revenue, and how do the government units utilize the tax revenue potential to generate tax revenue? Hence, two important terms are presented: the tax capacity, which measures the potential tax revenues; and the tax effort, which indicates the efficiency of tax collection (Le, Moreno-Dodson, & Bayraktar, 2012).

2.3.1 Tax capacity

To what extent can government raise its tax revenue to achieve a perfect balance with economic growth? Answering this question brings us into the concept of tax capacity.

Tax capacity is the hypothetical ability of tax authority units to raise revenue for the purpose of public finance within the existing available tax base (Bahl, 1971, 1972; Akin, 1973; Wu, 2002; Teera & Hudson, 2004; Wang et al., 2009; Le et al., 2012).

2.3.2 Tax effort

Given the hypothetical ability to collect tax revenue, how do tax collection authority units direct their effort to collect taxes? This question leads to the definition of tax effort.

Tax effort refers to the extent to which an area or governmental body generates tax revenue from its tax capacity (Bahl, 1972; Mertens, 2003; Teera

& Hudson, 2004; Wang et al., 2009; Le et al., 2012); thus, the expression function of tax effort is

$$te = \frac{tr}{tc}$$

Equation 2-1

Where:

$te = tax\ effort$

$tr = actual\ tax\ revenue\ collection$

$tc = tax\ capacity$

2.4 Measurement of tax capacity, tax effort and tax effort index

2.4.1 Differences of absolute and relative tax capacity

Tax capacity is recognized by many scholars as one of the most important terms in a national economy; it is important because the magnitude of tax capacity will provide crucial information to both citizens and policy makers (Bahl, 1971). Many researchers have tried various ways of obtaining such capacity. However, because calculating the tax capacity is based on hypothetical calculations, the estimation of tax capacity is difficult, both conceptually and empirically (Akin, 1973; Wang et al., 2009; Le et al., 2012).

On the one hand, tax capacity is the ability of the government to raise revenue, but on the other hand, the purpose of raising revenue is to better finance public services (Gruber, 2011). As Lewis (1949) and Tanzi and Zee (2000) argue, tax capacity should be identified as the ability of the government to raise revenue without excessive intervention on economic activities and operations (Lewis, 1949; Tanzi & Zee, 2000).

As a theoretical concept, tax capacity is traditionally referred to as the absolute tax capacity (Lewis, 1949). The absolute tax capacity can be defined as the limit or absolute quantity of taxation which can be imposed on tax payers without causing unpleasant effects (Dalton, 2003). However, such a

level of taxation is difficult to calculate. As the American Advisory Commission on Intergovernmental Relations[1] (ACIR) state, the absolute tax capacity is probably impossible to calculate in the absolute term without endless specified assumptions (ACIR, 1962). Moreover, as Tanzi and Zee (2000) point out, to calculate the absolute tax capacity is conceptually equivalent to the calculation of optimum government expenditure (Tanzi & Zee, 2000). In addition, the tax system and revenue performance related studies in developing countries is "often the art of the possible rather than the pursuit of the optimal" (Tanzi & Zee, 2000, p. 300).

Hence, the study on the relative tax capacity is more empirically realistic and therefore adopted in this research.

2.4.2 Approaches of relative tax capacity, tax effort measurement

Since the early 19th century, many scholars have contributed much to the study of relative tax capacity, especially on the topic of tax capacity calculation. At present, there are two main methods to calculate relative tax capacity. Two different approaches are well acknowledged and widely used; one is the Representative Tax System (RTS), which was introduced by the ACIR in 1962, and the other is the Regression-based Tax Effort Index Model (TE/R), which is used in the researches by the International Monetary Fund (IMF) (ACIR, 1962; Bahl, 1972; Akin, 1973; ACIR, 1987; Kim, 2007).

By comparison, the relative tax capacity in the RTS method is defined as "the dollar amount of revenue that each state would raise if it applied a nationally uniform set of tax rates to a common set of tax bases" (ACIR, 1987, p. 4); and in the TE/R method, the relative tax capacity is defined as the estimated tax-income ratio from the tax effort index model (Tanzi & Zee, 2000).

2.4.2.1 Representative Tax System method

In the report published in 1962 by ACIR, the Representative Tax System (RTS) method was formally introduced as a measurement of tax capacity.

The initial inspiration of the RTS method was to follow the idea of constructing a tax structure applied uniformly in each of the governmental units, then examine and compare tax revenues of different units based on the calculation of the fiscal capacity (ACIR, 1962). Using the RTS method, the theoretical relative tax capacity is expressed as the equation 2-2 below:

$$tax\ capacity = \ legal\ tax\ rate * legal\ tax\ base$$

Equation 2-2

Two steps are involved. Firstly, estimation of the tax bases. The second step is to define a set of representative tax rates by calculating the total revenue collection divided by the estimated aggregate tax base. This results in the estimated tax capacity from RTS method in equation 2-3

$$estimated\ tax\ capacity = estimated\ tax\ base * representative\ tax\ rates$$

Equation 2-3

In practical use, a single tax system is designed through a selection of particular taxes as well as the definition of the tax bases for each of the taxes; hence, this single tax system appears as a uniform tax system, which represents an average of the existing tax structures in all the governmental units. The variation of tax efforts are then acquired by the comparison of the actual tax revenue and the averaged "representative" tax revenue (Tanzi, 1968; Stotsky & WoldeMariam, 1997).

For more than twenty years after the introduction of the RTS method, it has been improvised in many ways through the later reports published by the ACIR. Many concepts and definitions associated with RTS methods have been standardized, and the application of the RTS method has become much

clearer over the time (Akin, 1973; Kincaid, 1989; Hy, Boland, Hopper, & Sims, 1993; Berry & Fording, 1997).

In the 1987 report, tax capacity in the RTS method is defined as "the dollar amount of revenue that each state would raise if it applied a nationally uniform set of tax rates to a common set of tax bases" (ACIR, 1987, p. 4); and the tax effort is the ratio of the state's actual tax collections and the estimated tax capacity (ACIR, 2987).

The practical calculation of the tax capacity and tax effort of tax i in state j is presented as equation 2-4 below:

$$tc_{ij} = tb_{ij} * utr_i$$

Equation 2-4

Where:

$tc = estimated\ tax\ capacity$

$tb = tax\ base\ or\ taxable\ property$

$utr = calculated\ national\ uniform\ representative\ tax\ rate$

$i = taxes$

$j = states$

Then the tax capacity of state j is:

$$tc_j = \sum_{n=i}^{n} tc_{ij} * utr_i$$

Equation 2-5

Then the tax effort of state j can be calculated by the equation 2-6 below:

$$te_j = \frac{\sum_{n=i}^{n} rt_{ij}}{tc_j}$$

Equation 2-6

Where:

$te = tax\ effort$

$rt = actual\ tax\ revenue\ collection$

$tc = estimated\ tax\ capacity$

$i = taxes$

$j = states$

Since its introduction, the RTS method has been improved in many ways through later reports published by the ACIR. Many concepts and definitions regarding the RTS method have been increasingly standardized, and the application of the RTS method has become much clearer over time The importance of this measurement of fiscal capacity has been widely recognized and accepted (Akin, 1973; Kincaid, 1989; Hy et al., 1993; Berry & Fording, 1997). Since the release of the RTS method, the method has been widely used for estimating the tax capacity and the tax effort level in the United

States and other areas around the world (Ma, 1997; Tannenwald & Cowan, 1997; Sobarzo, 2004).

However, this is not to say that the RTS method is perfect. Akin (1973) argues that what really matters in a regression analysis in measuring fiscal capacity is the coefficients of variations between the tax base and total tax revenues, whereas the method of RTS is biased to the variation in tax rates as individually considered bases vary. The other major problem pointed out by Bahl (1972) is the estimating process of the tax base. This is because one of the main components of the RTS method suffers from a certain degree of subjective judgment because proxy measures for the tax base are selected on subjective grounds (Bahl, 1972).

2.4.2.2 Tax effort index using regression analysis (TE/R)

The concept of tax effort is tightly coupled with the concept of tax capacity. Tax effort can be accurately estimated only under the condition of the ability to raise revenue i.e. tax capacity, is known (Akin, 1973).

As described by the ACIR in 1962, the tax effort is calculated by the ratio of the unit's actual tax collection and the estimated tax capacity. The IMF researchers adopted the conceptual idea of tax effort, but by using a tax ratio regression approach.

The method involves finding a proper proxy variable as the taxable income. A widely used proxy variable, for instance, is the Gross Domestic Income, mostly the GDP or GNP (Lotz & Morss, 1967; Thorn, 1967; Bahl, 1971; Truong & Gash, 1979; Fauvelle-Aymar, 1999; Teera & Hudson, 2004; Kim, 2007; Pessino & Fenochietto, 2010; Le et al., 2012).

In the equation below T is the actual tax revenue, Y denotes the proxy of income (GDP, GNP or GRP) and $X_1, X_2, X_3 \cdots X_n$ are factors affecting tax effort or tax capacity, U is the error term; this gives the regression function

$$\frac{T}{Y} = f\left(X_1, X_2, X_3, \cdots X_n, U\right)$$

Equation 2-7

The choosing of explanatory variables in the early stage of development of the tax effort analysis is also known as the constructing of the "tax handles" (Bahl, 1971). Tax handles are explained as the elements of tax bases that lend themselves to taxation (Leuthold, 1991, p. 175; Ghura, 1998), Later, in the development of tax effort analysis, other control variables are also introduced gradually into the function, such as the macroeconomic policies, and social factors (Bird, Martinez-Vazquez, & Torgler, 2008).

Based on the regression estimation analysis, one can obtain the estimated tax ratio, which is the estimated tax capacity. The tax effort index is then calculated as the ratio of the actual tax ratio and the estimated tax ratio:

$$Tax\ effort\ index = \frac{\frac{T}{Y}}{\frac{\hat{T}}{Y}} = \frac{T}{\hat{T}}$$

Equation 2-8

It is worth noting that the concept of the tax effort index in equation 2-8 is different from the tax effort in equation 2-1, which is defined as the ratio of actual tax revenue and the tax capacity.

The tax ratio approach, as Bahl (1971) states, is an approach to explain tax effort variance. In other words, instead of answering what the tax effort level is, the tax ratio approach is an attempt at explaining the differences between the observations in the whole sample (Bahl, 1971). Moreover, even though an expected level of tax capacity is presented in the regression analysis, it is

dangerous to use this to infer the feasibility of the extent of the actual tax capacity by absolute value. This is because the tax ratio approach indicates the degree of variation of tax effort, and should not be used to reflect the optimal taxation (Tanzi & Zee, 2000).

The regression tax ratio approach is based on the purpose of inter-regional tax revenue performance comparison, and the nature of the regression analysis is to inspect the relationship between the dependent variables and independent variables. Linked to this research, the regression approach tax effort index model is the most suitable for this study; thus, this is the method of this research.

2.5   Tax effort and capacity using regression approach: previous studies on international comparison

The main purpose of this section is to examine previous tax capacity and effort research using the regression approach from the perspective of inter-country comparison. By doing so, it helps to determine the appropriate methodologies and variables in this study to achieve the research aim of finding the determinants of China's tax capacity and tax effort.

The international inter-country tax effort study using the tax effort index regression approach commenced as early as the 1960s. In fact, the study of the relationship between the tax revenue and various factors is a rather ancient topic. In 1956, to analyse the patterns of both expenditure and sources of revenues between countries that have different levels of economic development, Martin and Lewis (1956) used the data from sixteen countries and analysed the relationship between income and tax revenue, where the income was measured as the gross national product per capita. However, even though some statistical analyses were applied in their study, the regression approach was not adopted in their study.

In order to determine the relationship between the levels of income or development and the share of public expenditure or revenue in gross national product in 33 countries, Williamson (1961) followed the study by Martin and

Lewis (1956), and applied an additional statistical test by introducing the regression approach in the study.   Income, as the explanatory variable in the regression function, was measured as the GNP per capita, and the share of public revenue in GNP, also known as the tax ratio, was the explained variable. In Williamson's study of 33 developed and developing countries, the relationship between the tax ratio and the per capita GNP was significantly and positively related to each other. Since this study, Williamson's regression approach on the relationship between the level of income and tax ratio has been recognized as the first research to quantify a systematic relationship between tax ratio and stage of income (Bahl, 1971), where the stage of income was later referred to as the proxy of the stage of economic development (Plasschaert, 1962).

Williamson's findings provide strong evidence that the tax revenue is largely determined by the stage of development in both developed and developing countries. A similar result was also arrived at by Plasschaert (1962).

In addition to using the stage of economic development, Plasschaert (1962) investigated the relationship between the tax ratio, and the per capita GNP and foreign trade share in GNP, from a sample of 20 developing countries. He concluded that the per capita income was a good proxy for the stage of economic development as the significant positive relationship between per capita GNP and tax ratio was found in his research (Plasschaert, 1962).

A similar result was also found by Hinrichs (1966). Hinrichs addressed the relationship between the size and structure of the government revenue system and the socio-economic development. In his study, through a multiple-regression approach of 60 countries, he concluded that the openness level, which is defined as the ratio of imports and GNP, was the most significant determination of the tax ratio rather than the per capita income for developing countries.

More precisely, Hinrichs divided his whole sample into three groups according to their stage of development. The countries with per capita income of less

than $300 were classified as the less developed group; the transitional group was made up of the countries with per capita income between $300 and $750; all other countries with per capita income higher than $750 were grouped into the developed countries category.

The per capita GNP variables were significantly related to the tax ratio, especially in the transitional and developed countries; however, in the less developed countries, the stage of development was not the key determinant of tax ratio; instead, the openness level played the key role in the raising of tax ratio in less developed countries. In addition, the general trend to transform the tax structure was also detected. In less developed countries, the traditional direct taxes seem to have more power in terms of generating tax revenues. However, when development has reached the transitional stage, indirect taxes played a key role in the tax structure rather than direct taxes, and the openness level also contributed significantly to this process. Once a country has transformed from a transitional stage to the developed stage, the order of importance between direct and indirect taxes reversed again (Hinrichs, 1966; Taylor, 1967).

The findings of Hinrichs' study (1966) supports his hypothesis that there is no single tax system or structure which suits all countries; no one system would suit a single country at all its development stages. Instead, the taxation should be adjusted and reformed according to the different stages and special characteristics of the country during different periods.

 Hinrichs's study (1966) also adopts the consideration of the effect of cultural differences between countries during the developing of the tax structure, though investigation of the cultural differences between countries lacked empirical support (Lotz & Morss, 1970). However, this inspiration was carried out in later studies. Typical works that have taken cultural differences into consideration of   is the study by Thorn in 1967 and Weiss in 1969.

Focused on the general social and economic factors on the tax ratio in under-developed countries, Thorn (1967) in his study confirms that the social factors

are also the determinants of the tax ratio. Alongside the finding of the significance of per capita income and the openness level as two factors in the regression function, Thorn (1967), in his study of 32 countries, also implanted several qualitative dummy variables as indicators of the cultural differences between countries. The dummy variables adopted in the study are mainly composed of four perspectives, namely, the social variances, regional differences, political characteristics, and cultural preference. The results reveal that the social factors in the process of development are also among the most important determinants of the tax ratio. Thorn (1967) further concluded from the results that culturally more centralized countries tend to have a higher level of tax ratio.

Weiss (1969) took a step forward from the study by Thorn (1967). Weiss focused on the government revenue performance in less developed countries, and included 66 samples where the actual tax ratio was lower than 16%. In his study, to better capture the influences on the tax ratio from the socioeconomic factors, in addition to the traditional economic variables such as the per capita GNP and the openness level, he constructed four socioeconomic variables to indicate the influence from social, political, and cultural aspects. The four variables were urbanization, literacy rate of population aged fifteen years and over, percentage of employment in the agricultural sector, and an indicator of degree of mass communications. Alongside the finding of the significant relationship between the tax ratio and per capita GNP and openness level, four socioeconomic variables also showed expected signs.

Following the previous studies, Shin (1969) acknowledged that the different variables performed differently in low and high-income countries or groups in different periods, especially the per capita GNP and the openness level. However, he was more concerned about the reasons for these differences. Hence, Shin (1969) constructed the tax ratio regression model to investigate the reason behind the different performances of variables in different countries and periods. A total of 47 countries were included in his study in which there

were 16 high income countries with an average per capita GNP higher than $777; the remaining 31 were low income countries.

Shin (1969) selected and constructed five explanatory variables in his regression model. These variables are per capita GNP, the size of foreign trade measured as the ratio of the sum pf export and import, and the GNP, agricultural income ratio measured as the income from the agricultural sector divided by GNP, the change rate in the level of consumer prices, and the population growth rate.

As Shin (1969) argues, a higher per capita GNP level would raise the tax ratio because of the increase in the surplus of the total income where the government generates tax revenues. However, this hypothesis is under the assumption that a progressive tax system exists, i.e., the marginal tax rate rises when the income rises (Shin, 1969). The agricultural income ratio indicates the degree of industrialization, urbanization, and commercialization. The hypothesis of this is that there is a negative relationship between the agricultural sector and private surplus for taxes. Higher consumer prices are a sign of a higher inflation rate, which in Shin's study is positively related to the tax ratio if the country is under the progressive tax system; because a higher inflation rate would result in a higher tax rate. Shin states that the variable of the population growth rate has two different influences depending on the tax structure of the country. A higher population growth rate might decrease the tax ratio because of the increase in tax exemption. However, if the country's income tax is rather small in its tax system, the increase of the population growth rate might have a positive influence on the tax ratio due to the increase of consumption and expenditures (Shin, 1969).

The results of Shin's study (1969) reveals that the per capita GNP has a strong positive influence on the tax ratio in the whole sample. In addition, the agricultural income ratio was also significantly positive related to the tax ratio. Moreover, the result also indicates the significant negative relationship between the tax ratio and the population growth rate for the whole sample of 47 countries, and especially for the 31 low-income countries. Based on this

result, Shin (1969) argues that the difference in performance of variables in different countries may not only be due to the variation of the stage of development and openness of these countries, but also due to the differences in the degree of industrialization and population factors. This finding has inspired further study by taking into consideration population factors, as well as the GDP/GNP decomposition in tax studies.

Lotz and Morss (1967) in their early study analysed 72 developed and developing countries. They considered the stage of development, measured as per capita GNP, and the openness level measured as the foreign trade share in GNP, which were both included in the regression model. Similar to previous studies, the significance of the relationship between both the stage of development and the openness level to the tax ratio were found. Lotz and Morss (1970) continued their research on 52 countries that have a per capita income of less than $800. They included explanatory variables—not only the per capita income and foreign trade share, but also the degree of monetization measured by the per capita coins and notes, and government centralization level, which takes the proxy of the ratio of local tax to total tax.

The assumption behind the adoption of the monetization degree variable was that a country with higher monetization , as one of the dimensions of economic development, would positively affect the taxable capacity, hence raising the tax ratio (Lotz & Morss, 1970).

In Lotz and Morss's (1970) study, the inclusion of the political variable was rather inspiring. In the study, the authors argued that the overall tax level was also highly affected by the relative importance of local governments. Argued by the authors, local governments are more efficient on tax collection and more responsive to public demands (Lotz & Morss, 1970). Hence, the author included the government centralization level as one of the explanatory variables in the tax regression model.

The result from Lotz and Morss's study shows that the decentralization level has a direct impact on the tax level In addition, the degree of monetization

could be another partial proxy of the stage of development instead of the per capita income due to the fact that the degree of monetization shows high collinear relationship with per capita income, yet with stronger explanatory power to the tax ratio. Finally, the authors conclude that for developing countries, the lower tax ratio is mainly caused by the limitation of taxable bases whereas for developed countries, the raising of the tax ratio is largely determined by the demand for government services (Lotz & Morss, 1970).

Bahl (1971) in his study presents a detailed evaluation of earlier studies, as well as the regression approach to the tax effort of 49 less developed countries.

Bahl present a detailed discussion of the rather popular explanatory variables in the previous tax ratio studies, including the stage of development and the size of the foreign trade sector. Bahl acknowledges that the stage of development and the degree of foreign trade have been historically the widely accepted main factors of the tax effort. The size of the foreign trade was expected to positively relate to the tax ratio because a larger export share in national economy indicates a greater level of monetization and industrialization; and the import activities are rather easier to tax due to minimum administrative difficulty (Bahl, 1971).

However, the use of proxies for this stage of development is facing some problems. Bahl (1971) points out that the use of per capita income as the proxy of the stage of development resulted in different outcomes in various previous studies. The per capita income explained satisfactorily the variations between developed and less developed countries in terms of tax ratio. However, when the study focused on developing countries only, the power of the per capita income yields different results. Bahl (1971) argues that this is due to the fact that the per capita income might ignore an important sector: the non-monetized sector. The other possible reason is that when conducting an inter-country tax ratio comparison, the per capita income is usually represented in U.S. dollars rather than the local currency to international comparison. This has resulted in a problem due to the model inherently taking

in the exchange rate as one of the determinants of the taxable capacity (Bahl, 1971).

Taking into consideration the previous studies and the problems that might exist in the model, such as the per capita income being the proxy of the stage of development, Bahl (1971) considered the agricultural sector share in the GNP as the proxy of the state of the development, and also the other sectoral composition of income produced, which was measured as an explanatory variable of the mining share. Apart from the finding that both the agricultural share and export share are significantly related to the tax ratio but negatively and positively correlated respectively, a positive significant relationship between the mining share and the tax ratio was also detected through the inter-correlation of the mining share and the export ratio.

The contribution of the study of Bahl (1971) is that he pointed out that different sections constituting the national income have their own taxable surpluses. For example, the mining share in the GNP has a taxable surplus mainly generated from industrialization; the agricultural sector has a rather small taxable surplus because it is more difficult to tax the agricultural sector. All these different sections of the national income together affect the overall taxable capacity significantly (Bahl, 1971).

A study by Truong and Gash (1979) focusing on the impact of economic integration is rather interesting. Specifically focused on the tax ratio performance in less developed countries, Truong and Gash (1979) highlighted the importance of the openness level in the tax ratio model as shown in the previous studies by Hinrichs (1966). The high level of openness also appears to be highly related to the amount of international integration. In 1968, approximately half of the less developed countries around the world were involved in various international economic integration schemes (Wionczek, 1969). Truong and Gash (1979) point out the gap in the tax ratio study literature that few researchers had tested the importance of economic integration as a factor in the tax ratio model.

Truong and Gash (1979) constructed the cross sectional multiple regression model of tax ratio for 43 countries with three explanatory variables, namely the per capita income, total foreign trade share in GNP, and dummy variables indicating the participation of particular economic integration. During the regression process, the authors further divided the 43 countries into two groups based on their per capita income ranking: group A with 24 countries, and group B with 19 countries. The results from both groups indicated a negative relationship between the joining of economic integration and countries tax effort. The statistical evidence of this conclusion was that in the tax ratio regression result, countries with different levels of per capita incomes were equally heavily reliant on custom duties. However, joining international economic integration schemes significantly reduced customs duties, hence lessening a country's taxable capacity (Truong & Gash, 1979).

The empirical contribution from Truong and Gash's study is that they did not limit their analysis to between developed and developing countries, but also included the different stages of development within the developing countries. This finding supports Hinrichs's argument in his study in 1966: there is no single tax system or structure which suits all countries; no one system will suit a single country in all its development stages. In addition, the importance of the foreign trade sector as one of the explanatory variables in the tax ratio regression model has been extended.

The study carried out by Leuthold (1991) was theoretically and empirically inspiring from three aspects. First, Leuthold adopts the combination of welfare function and the tax ratio model to yield an optimal tax ratio instead of the traditional ratio of actual tax revenue and GDP/GNP. Secondly, Leuthold adopts the panel data analysis rather than the traditional popular cross-county data. Thirdly, in the choice of variable, other than the traditional factors within the country, such as the per capita income, mining share in national income, and agricultural share in national income, Leuthold includes the variables that indicate the share of foreign grants, loans and domestic borrowing in income to detect the influence of external environmental factors in a country's tax ratio.

The purpose of constructing the optimal tax ratio in Leuthold's study (1991) was due to many criticisms regarding the tax ratio regression approach. Traditionally, if the ratio between the actual tax collection and the estimated tax collection is less than one, then the country is recognized as a low tax effort country. If the ratio is higher than one, the country is identified as a country with a high tax effort (Leuthold, 1991, p. 1). However, the tax effort index regression approach is a method of estimating relative tax capacity and tax effort and explaining the tax effort variance; it is not appropriate to use this to infer the feasibility of the extent of the actual tax revenue by absolute value due to the lack of theoretical justification (Bahl, 1971; Bird, 1976). Hence, Leuthold took an approach by combining the welfare function and the tax ratio model to present a stronger theoretical basis for the optimal tax ratio.

The other criticism is that the data used in the tax ratio model was less convincing. . The widely used cross-sectional data in the tax ratio model lacked explanatory ability because it did not take into account the changes that occurred over time (Bird, 1976). Therefore, in Leuthold's (1991) study, the sample size covered eight African countries during the time period between 1973 and 1981, and the panel data analysis was applied.

The other main contribution of Leuthold's (1991) study is the extent of the explanatory variable. Following the previous empirical studies, in Leuthold's study, the per capita income, agricultural income share in GNP, and mining income share in GNP, and the foreign trade share in GNP are all included in the tax ratio model. However, different from all previous studies, Leuthold also includes the share of foreign grants, loans, and domestic borrowing in the share of GNP to detect the influence from external financial environments on the tax ratio.

The results from Leuthold's study reveal a negative and significant relationship between the per capita income and the tax ratio when other economic development measurements were included in the model. Bahl (1971) points out that as the per capita income as the proxy of the stage of

development yields different results from previous literature, particularly between less developed countries, the explanatory power of per capita income as a variable in the tax ratio model reveals various results, either significant or not relevant. The findings from Leuthold's (1991) study further verified this conclusion.

The agricultural share in GNP and foreign trade share in GNP were both significantly related to the tax ratio in Leuthold's study (1991). The agricultural share was negatively related and the foreign trade share in GNP was positively related. This finding is consistent with previous tax ratio studies, as the larger agricultural sector indicates a lower level of tax base, and the higher foreign trade sector reflects the wider tax handles (Leuthold, 1991). However, different from the previous studies, Leuthold found no relationship between the mining share in GNP and tax ratio. Leuthold argued that this might due to the fact that mining was not an important industrial sector in the countries studied (Leuthold, 1991).

Finally, Leuthold's results reveal a significantly negative relationship between the tax ratio and the variable which measures foreign grants and loans and in domestic borrowing. Leuthold concluded this as the displacement effect between foreign financial support and tax ratio.

Based on the regression results, Leuthold (1991) constructed the tax effort indices for eight African countries and found out that two countries' tax effort indices were statistically greater than one, and two countries' tax effort indices were lower than one. The other four countries' tax effort indices were statistically equal to one. However, Leuthold points out that it is rather dangerous to identify "bad guys" and "good guys" from such statistical results because there is no guarantee that all variables that influence the tax ratio are included in the model. The policy guide from this analysis is still very helpful, but only in relative terms: a high tax effort index for a country indicates that this country finds it relatively more difficult to raise more revenue through taxation for greater government spending compared to other countries and vice versa (Leuthold, 1991, pp. 18-19).

In the study by Leuthold (1991), the author states that further study should be carried out with a wider database and from a longer period, as well as the consideration of a better theoretical model compared to the welfare function. This recommendation has been taken into account by Ghura in 1998.

Taking into consideration large fiscal deficits among sub-Saharan Africa countries in the 1990s, and acknowledging the fact that the tax ratio studies in previous literature lacked attention to influences of economic policies and corruption on tax revenue, Ghura (1998) presented his study on tax revenue performance among 39 countries in sub-Saharan Africa during the period of 1985 to 1996. In addition, Ghura improved Leuthold's (1991) model by adopting the utility function, which was produced by Heller (1975). By doing so, Ghura has structured the reduced form of Leuthold's desired tax ratio to give a stronger theoretical base, and an unbalanced panel data analysis was adopted in the study.

One of the main contributions from Ghura's study is the extension of the explanatory variables. Tanzi (1989) in his article "the impact of macroeconomic policies on the level of taxation and the fiscal balance in developing countries" points out that to achieve a satisfactory explanation of the wide fluctuations of the tax ratios, researchers should not only focus on the traditional determinants of tax revenue, but also beyond that. Ghura (1998) follows Tanzi's argument. In his study, not only are the traditional explanatory variables, such as per capita income, openness level and agricultural share in GDP included, but also other factors that focus on the economic policy-related explanatory variables like inflation, percentage change in the real effective exchange rate, structural reforms, government provision of public services, and the corruption level, which yielded the desired results. By doing so, Ghura (1998) was able to question whether economic policies and corruption can influence the tax revenue performance.

More precisely, the explanatory variables constructed by Ghura (1998) can be classified into five major components, namely, the income, tax base, macroeconomic policies, corruption, and external environment.

Taking into consideration the previous studies' findings concerning the influence of per capita income on the tax ratio, Ghura (1998) predicted an ambiguous influence from the increase of per capita income on the tax ratio. As argued by Ghura (1998), the increase of per capita income would result in the increase in different categories of tax revenues. More specifically, an increase of per capita GDP would raise the revenue of indirect tax categories, but lower the trade tax revenues (Ghura, 1998, p. 9). Thus, whether a higher stage of development would increase the tax ratio is highly related to the tax structure of the country: whether it is indirect tax based or trade tax based.

The tax base in Ghura's tax ratio model includes the agriculture sector income share in GDP, the income share of mining share in GDP, and also the openness level, measured as the ratio of the sum of exports and imports to GDP. The agricultural sector income share in GDP was expected to be negatively related to the tax ratio, as Ghura argued that the agricultural sector involves largely informal activities that are difficult to monitor and hence difficult to tax. By contrast, the mining share is usually easy to administer and tax; hence, the positive sign was expected. The total foreign trade was also expected to positively relate to the tax ratio because it is usually well-organized and monetized (Ghura, 1998).

The macroeconomic policy was measured by the inflation rate, the percentage change in the real effective exchange rate, structural reforms, and the government's provision of public services in Ghura's study.

The inflation rate was expected to be negatively related to the tax ratio for three reasons. Firstly, a higher inflation rate might cause a lag effect in tax collection; secondly, some excise duties, whose tax rates are based on a particular price, might not be adjusted in line with inflation; thirdly, a higher inflation rate might affect the behaviour of economic agents. With a higher

inflation rate, people might tend to move to assets such as land, jewels and foreign capital, and escape the domestic tax net (Ghura, 1998).

The percentage change in the real effective exchange rate was expected to be negatively related to the tax ratio. A higher exchange rate would increase imports and lower exports, and tax revenues were dependent on the imports being greater than exports (Ghura, 1998).

The structural reforms are measured by Ghura (1998) using dummy variables, and a positive sign was expected. The theoretical support for this expectation was that the structural reforms would improve economic efficiency, external competitiveness, and economic productivity, hence widen the tax base and increase the tax revenue (Abed, 1998; Ghura, 1998).

Ghura (1998) argues in his study that the higher government expenditure in public services, the higher the level of the willingness of taxpayers to pay taxes. Hence, the measure of a government's provision of public services are highly correlated to the raising of tax revenues. In Ghura's study, the government's provision of public services was measured as an index of human capital development level.

Ghura (1998) states that the previous literature had tried various determinants of the tax revenue performance; however, the study on the relationship between the corruption and tax revenue were rather rare, in addition, a wide range of literature had proven the strong relationship between corruption and other aspects of economic performance (Ghura & Hadjimichael, 1996; Bardhan, 1997; Mauro, 1997; Ghura, 1998). Ghura (1998) uses the index of corruption provided by the International Country Risk Guide (ICRG) to proxy the corruption level. The corruption index published by the ICRG was the index to measure the level of expectation of bribe activities that involved governmental officials in relation to tax assessments, trade licenses, and exchange controls (Ghura, 1998).

Finally, the external financial environment was also adopted in Ghura's tax effort index model. This was measured by the ratio of external grants in GDP and the change in the debt stock-GDP ratio.

The result from the Ghura's tax ratio regression model is consistent with previous tax ratio studies. Per capita income, mining share in GDP, and the openness level were positively significantly related to the tax ratio, and the agricultural sector income share in GDP was negatively significantly related to the tax ratio.

Similar to the findings by Leuthold (1991), the significant influence of the external financial factors on tax ratio was also detected in Ghura's study. The percentage change in the real effective exchange rate was not relevant to the tax ratio in the regression result; however, the external grant was significantly negative related to the tax ratio.

Economic policies are also highly related to the tax ratio in Ghura's regression model. In all four explanatory variables, three of them, namely, the inflation rate, structural reform dumpy variables, and provision of public services measured by the human capital index, were all significantly related to the tax ratio. The inflation level was negatively related to the tax ratio, and structural reforms and provision of public services were all positively related to the tax ratio.

The human capital index variable in the author's regression model was also significant and positive. The statistical result proved that the provision of public services by the government, or broadly speaking, the government's expenditure behaviour, is also one of the determinants of a country's tax revenue performance (Ghura, 1998).

Finally, the relatively high statistical significance of the corruption level variable in the regression result also revealed that the increase of corruption level brings damage to the tax revenue performance. Hence, the author

concludes that greater anti-corruption actions would improve tax revenue performance significantly.

The strong evidence of the relationship between the tax performance and policy-related factors was also given by Fauvelle-Aymar (1999). Under theoretical reality, taxation, taxation policy and national economy are all deeply connected.

In Fauvelle-Aymar's tax effort index study of 86 developing countries, variables were divided into economic variables and political variables. In the economic variables categories, the Fauvelle-Aymar included factors from three aspects: the level of national wealth, the sectoral composition of domestic product, and the openness of the economy. The per capita GDP is used as the proxy of the level of national wealth in his study. The sectoral composition of domestic product was measured by the agricultural income share in GDP and mining income share in GDP. Lastly, the openness of the economy was measured by the share of imports in the GDP.

The main purpose of Fauvelle-Aymar's study was to detect the relationship between tax revenue performance and the government's legitimacy, efficiency and credibility. The author constructed the degree of opposition to the government, index of democracy, frequency of coups, and indicator of government credibility as the explanatory variables in the function to reflect government legitimacy, efficiency, and credibility. Where the degree of opposition to the government was measured by the sum of the average annual numbers of anti-government demonstrations, general strikes and riots; the index of democracy was measured as the Gastil index of democracy; and the index of volatility of inflation (VOLA) was used as the proxy of government credibility.

The regression result has drawn people's attention to the effect of government political capabilities.

One of the most remarkable contributions in Fauvelle-Aymar's study is that instead of using the tax ratio, which is the ratio of tax revenue to GDP, as the first dependent variable, the author also included a second measurement, which is named the current revenue ratio. The tax revenue in the tax ratio includes only tax revenues classified by the IMF, whereas the second dependent variable, the current revenue ratio, not only includes the tax revenue, but also non-tax revenues except capital revenue and grants and is thus the ratio of a broader measurement of the government revenue to GDP.

The reasons for the inclusion of two dependent variables were argued by Fauvelle-Aymar (1999) from two aspects. First, the special characteristic of industrial and/or commercial public sectors. The second, the size of the non-tax revenue in developing countries.

Fauvelle-Aymar (1999) argues that conceptually, the tax revenue and the non-tax revenue are both revenues to the government but inherently different. However, in developing countries, they might be empirically not so different from each other. This is due to the fact that the public enterprises, which yield a huge share in the non-tax revenue, were positioned prominently and have a different status in developing countries than in the developed countries. Public enterprises have had a strong presence among developing countries. Frequently, the public enterprises were the sole provider of some specific public goods and services through their monopolistic position. Hence, the non-tax revenue in developing countries is similar to the political terms of taxation (Fauvelle-Aymar, 1999).

The second consideration for constructing the current revenue ratio in the author's study is the size of the non-tax revenue. In the whole study sample of 86 developing countries, the non-tax revenue accounted for 17% of the current revenue, and in some countries, the non-tax revenue was even higher than the tax revenue. Hence, to avoid biased measurement, it should not be left untouched in the model (Fauvelle-Aymar, 1999).

The cross section data in this study are 86 developing countries' averages for the period from 1980 to 1989, and the regression result is displayed in tax ratio result and current revenue ratio result, that is, in two parts.

In the tax ratio regression result, the economic variables yield satisfied the result consistent with previous studies. The agricultural sector income share in GDP was significantly negative related to the tax ratio, and the openness level was significantly positive related to the tax ratio. Similar to some previous literature regarding the relationship between per capita income and tax ratio, Fauvelle-Aymar found that there was no significant relationship between per capita GDP and tax ratio, though the positive sign was captured in the result. Different from previous studies and as expected, Fauvelle-Aymar found the relationship between the mining income share in GDP and the tax ratio was not significant.

Satisfactorily, all four political variables that reflect the government's legitimacy, efficiency and credibility were significantly related to the tax ratio. Apparently, the inefficiency and the low level of credibility lessen the tax revenue performance. The significant and negative sign of the Gastil index of democracy indicates that autocratic governments collected more tax revenues than democratic countries. The degree of opposition was highly significant and negative related to the tax ratio when South Africa and India were excluded from the regression. The author believes that it might be because these two countries had the highest degree of opposition in the whole sample.

By contrast, the current revenue ratio regression generally yielded the same results in Fauvelle-Aymar's study. However, there are two differences compared to the tax ratio regression. Firstly, the mining share appeared positive and significantly related to the current revenue ratio, which confirms the author's argument regarding the public enterprises in developing countries; and secondly, the degree of opposition lost its significance in the function.

This study presented by Fauvelle-Aymar (1999) had extended the tax ratio literature by explaining the relationship between government's political capacity and tax revenue performance, and the result indicates that the tax revenue was also significantly influenced by government's policy capacity. More importantly, the construction of the current revenue, taking into consideration the non-tax revenue in developing countries, was very inspiring. The tax ratio regression and current revenue regression performed generally the same with some minor differences. Moreover, the traditional mining share variable, which was positively and significantly related to the tax ratio in most of previous literature, appears to be significant only in the current revenue ratio. The findings in Fauvelle-Aymar's study has raised feasible arguments regarding similarities between tax and non-tax revenues in developing countries.

Focused on the tax revenue performance in Central and Eastern European countries, Mertens (2003) structured a panel data tax effort index analysis for ten countries over the period of 1992 to 2000. In Mertens's model, only three variables were included. First was the agricultural income share in GDP, which reflected the stage of development. Second was the industrial sector income share in GDP, used as proxies of tax handles. Different from previous studies, Mertens included both mining and manufacturing sectors in the industrial sector. Finally, the degree of openness was included, which is measured as the imports sector income share in GDP. The agricultural income share in GDP was negative and statistically significant related to the tax ratio, which has proven the previous literature regarding the agricultural sector. However, the industrial sector income in GDP and the import sector income share in GDP were both negatively and statistically non-significant related to the tax ratio. The author argues that this might be caused by the widespread use of tax incentives in Central and Eastern European countries. Lastly, the author calculated the tax effort index of each country by dividing the actual tax collection by the estimated tax capacity, and reveals that most of the Central and eastern European countries experienced a decline of tax effort and hence a relatively poor tax revenue performance. Typical examples were Poland, Romania, and the Slovak Republic.

A study of a wide range of countries' tax performance and its determinants using tax effort index model was carried out by Teera and Hudson (2004). The main purpose of their study was to find and test different factors from various aspects to the tax performance based on relatively large-scale data. The study covered 116 countries around the world during the period between 1975 and 1998.

The variables in Teera and Hudson's study were mainly selected from four aspects: the stage of development, openness level, economic structure, population factor, external financial factors, and the shadow economy. Hence, eight explanatory variables were included in the study. These variables are Per capita GDP; foreign trade share in GDP reflected by the ratio of total exports to GDP; foreign aid ratio to GDP; external debt ratio to GDP; population density; agricultural sector income share in GDP; the share from manufacturing income in GDP, and the shadow economy measured by the shadow variable indicating tax evasion—the first innovation in the literature. Acknowledging the fact that countries in different stages of development may reveal a different relationship between tax performance and relevant factors, Teera and Hudson (2004) further divide the 116 countries into four groups according to their stage of economic development. The four groups were: high-income OECD group, low-income group, lower middle-income group, and upper middle-income group.

Except the negative and significant sign of agricultural share, the positive and significant sign of the openness level, and the negative and significant sign of the foreign debt, which were both consistent with previous studies, the results of the remaining variables in Teera and Hudson's study appear to suggest some different views compared to previous studies.

Foreign aid appeared as insignificant in all groups; hence, the crowding out effects of foreign aid was rejected by this study. The shadow variable, which reflects the tax evasion, was significant in both the low income group and high income group, but interestingly, with different signs: positive in the low-income

group and negative in the high-income group. Teera and Hudson (2004) argue that this might be because the shadow economy increased the tax evasion in low-income countries but also raised tax revenue somewhere else. Another similar situation appeared concerning the variable of population density. It revealed that the population density had a positive impact on the tax ratio in low-income countries, but a reverse effect on the upper-middle income group; however, the impact from the population density was revealed as positive in high-income countries. The manufacturing share of GDP shows no significance in the whole sample, whereas when repeating the regression with interactive terms between GDP and manufacturing, both of them are statistically significant. The authors argue that this is because different countries are in different stages of development, and some variables, such as the manufacturing share, are performing differently. This fact could be further simply summarized as "a one size fits all" approach, whichmay not be totally appropriate (Teera & Hudson, 2004, p. 797).

Focusing on the tax revenue performance in Latin-American countries, Bird et al. (2006) presented cross-country statistical studies on the determinants of tax revenue performance from both the traditional tax base and societal/political factors. As the authors point out, for developing countries with poor tax revenue performance, it would not be of much help to tell them to "find oil" or to "rearrange nature's bounty", but a more realistic solution would be the improvement of their governing institutions (Bird et al., 2006, p. 4).

Following the study purpose, Bird et al. (2006) divided the explanatory variables into two aspects: the supply side factors (traditional tax bases), which are widely acknowledged throughout the literature, and the demand side factors (societal institutions), which have been relatively ignored in the previous tax effort studies. On the supply side, the authors included the per capita GDP, population growth rate, and openness level, which was measured as the sum of total imports and exports divided by the GDP, and non-agriculture income share in the GDP. On the demand side, explanatory variables were categorized into seven aspects. They were:

1.The quality of governance index measured by the mean value of six governance dimensions through a hundred variables; sub-indexes included voice and account, political stability, rule of law, and control of corruption.

2. International Country Risk Guide (ICRG), which is the alternative variable to the quality of governance index; sub-indexes include rule of law, bureaucratic quality, ethnic tension, and corruption.

3. Regulation of entry, which is measured by the time and number of procedures of entry, represents the level of politicians and bureaucrats to seek and provide benefits.

4. Tax morale level, which reflects the motivation of the public to pay taxes;

5. Shadow economy, which measures the informal sector and exit option;

6. Income inequality, which represents the household income and wealth inequality in the distribution; and finally,

7. The level of fiscal decentralization.

Very importantly, Bird et al. (2006) also includes two measurements as the dependent variable: tax effort, measured as the ratio of actual tax collection and estimated tax capacity; and revenue effort, which was labelled for the first time in the literature, measured as the ratio of actual current revenue collection and the estimated current revenue capacity, where the current revenue in the study was calculated as the sum of tax revenues and non-repayable receipts excluding grants. The argument behind the revenue ratio is due to the practices and possible mistakes in revenue classification, and especially in developing and transitional countries. By including the current revenue analysis, a more robust testing of the model could be achieved.

According to the results from the study by Bird et al. (2006), even though the traditional tax handles still play a key role in the tax effort model, the per

capita GDP in both tax and current revenue models were constantly negative relative to the tax/current revenue ratio, but not always significant. The population growth rate was similar to the per capita GDP, constantly negatively related to tax/current revenue ratio but not always significant. Whereas the non-agricultural income share in GDP appeared positively and significantly related to the tax/current revenue ratio, and was also the strongest explanatory power among all supply side factors. The openness level was negatively related to both tax ratio and current revenue ratio, but seems statistically significant sometimes in the tax effort regression, but statistically non-significant in the current revenue effort regression.

From the demand side, the institutional factors appeared positively and significantly related to both tax effort regression and current revenue regression. The results identified the critical influence of the institutional factors on tax effort as well as current revenue effort. In addition, within the institutional sub-variables, it revealed that the corruption and the role of law had the most influencing power on the level of tax ratio and current revenue ratio. Through the shadow economy, tax morale and inequality variables in the regression were less statistically significant than other variables, but the authors point out that one should not take the evidence and concluded that their influence is small. As the authors stated, such institutional variables have a wide influence in the economy and society (Bird et al., 2006).

A recent study of tax revenue performance carried out by Fenochietto and Pessino (2013) was statistically advanced and inspiring. Firstly, this study adopts the stochastic frontier panel data tax ratio analysis, taking into account the special characteristic of each country. Secondly, the sample size was sufficiently large with 113 countries. Inspiringly, instead of grouping countries according to their stage of development, which is the most common way in the previous literature, the study by Fenochietto and Pessino (2013) classified the whole sample into two groups according to their special economic structure. The first group was 96 of the non-natural resource dependent countries, and the second group was 17 resource dependent economic countries. Thirdly, the construction of the explanatory variables included some critical social

factors. Following the previous studies, Fenochietto and Pessino included the per capita GDP as the indictor of the stage of development; sum of imports and exports as a percentage of GDP reflecting the openness level; and the percentage of agriculture sector income in GDP to reflect the ease of tax collection. Other than these three supply factors, the authors also included the total public expenditure in education as the indicator of the education level; GINI coefficient stands for the degree of income distribution inequality; Consumer price index (CPI) measured the inflation level, and finally the corruption perception index, which measured the inefficiencies of the government.

The results from Fenochietto and Pessino's 96 non-natural resource dependent countries is consistent with previous studies and had some relatively important contributions regarding the determinants of tax ratio. All variables except the CPI were significant in the model with a positive sign for the per capita GDP and education level, and a negative sign for the Agricultural sector. The main finding of this part of the study was that the corruption and GINI index were both significantly and negatively related to the tax ratio. This confirmed the critical influence of income inequality and institutional quality on the tax performance of non-resource dependent countries. The result from the 17 natural resource dependent countries was generally similar to the 96 non-natural resource dependent countries; however, the CPI still appeared non-significant, and corruption seems to have lost its significance.

The most recent tax capacity and effort inter-country literature in this chapter is the study of the relationship between the quality of governance and tax revenue performance by Huossain (2014). Apart from the inclusion of economic factors, Huossain (2014) focused particularly on the influence of the quality of governance on the tax capacity and effort, which from the evidence of the previous studies indicates institutional factors as one of the determinants of the revenue performance. The author used a data set of 55 developed and developing countries from the period 2002 to 2012. The quality of governance was reflected by the institutional capacity and control of

corruption in his study. Both the variables were generated from the Worldwide Governance Indicators (WGI), which is published by the World Bank.

Hence in Huossain's tax effort index model, the tax ratio is explained by 6 variables: institutional capacity, control of corruption, the percentage of government expenditure in GDP, ratio of sum imports and exports to GDP, share of broad money in percentage of GDP, and urban population rate. As argued by Houssain (1014), better institutional capacity and higher control of corruption usually reflects a more efficient government and the willingness of people to pay taxes. Hence the institutional capacity and control of corruption were expected to be positively related to the tax ratio. Huossain (2014) also argued that higher rate of government expenditure also indicates a higher need of tax collection, hence the sign was expected to be positive between the percentage of government expenditure in GDP and tax ratio. The openness level has been a widely used and tested variable, and the positive sign was expected to be the same as previous studies. The share of broad money was used to reflect the level of monetization, and theoretically has a positive influence on the indirect taxes, hence a positive sign was expected in Huossain's model. The author also argues that a higher level of urbanization often results in higher demands for public goods and services; what is more, the more people in the cities, the less agricultural activities in the rural areas (Huossain, 2014).

There was only one non-significant variable in Huossain's study, which is the broad money in percentage of GDP. All other variables were statistically significant and with the expected signs. The institutional capacity and the control of corruption were both statistically significant and positive. This main finding of this study revealed that there is a close relationship between tax revenue performance and the quality of governance in both developing and developed countries. Hence, it is revealed that improving the tax revenue performance can be achieved not only by expanding the tax base, but also by improving the institutional factors (Huossain, 2014).

Table 2-1 below summarises the typical tax ratio in international country comparison studies using tax effort index model, including the author, year, and the explanatory variables that were adopted in the model.

Table 2-1: Summary of tax effort index studies on international country comparison

Author	Independent variable
Williamson (1961)	Per capita income
Plasschaert (1962)	Per capita income
	Ratio of import to GNP
Hinrichs (1966)	Per capita income
	Openness level
Thorn (1967)	Per capita income
	Openness level
	Cultural style dummy variable
Lotz and Morss (1967)	Per capita income
	Foreign trade share in GNP
Weiss (1969)	Per capita income
	Openness level
	Urbanization level
	Literacy rate
	Percentage of employment in agriculture sector
	Index of degree of mass communications
Shin (1969)	Per capita GNP
	Foreign trade share in GNP
	Agricultural share in GNP
	Rate of change in prices
	Population growth rate
Lotz and Morss 1970	Per capita income
	Openness level
	Degree of monetization
	Degree of centralization
Bahl (1971)	Agricultural share in GNP
	Mining share in GNP
	Export share in GNP
Thuong and Gash (1979)	Per capita income
	Exports share in GNP
	Imports share in GNP
	Dummy variable of economic integration
Leuthold (1991)	Per capita income
	Agriculture share in GNP
	Import and export share in GNP
	Mining share in GNP
	Foreign grants and loans and domestic borrowing
Ghura (1998)	Per capita income
	Agriculture share in GDP
	Openness level
	Dummy variable for oil-producing
	Dummy variable for non-oil mining
	Inflation rate
	Percentage change in real effective exchange rate
	Structural reforms
	Human capital index
	Corruption index

	External grants to GDP ratio
	Change in external debt-GDP ratio
	Percentage change in terms of trade
	Dummy variable for CFA members
Fauvelle-Aymar (1999)	Per capita GDP
	Agriculture share in GDP
	Mining share in GDP
	Imports share in GDP
	Degree of opposition
	Index of democracy
	Indicator of government efficiency
	Indicator of government credibility
Mertens (2003)	Agriculture share in GDP
	Industry share in GDP
	Import sector share in GDP
Piancastelli (2001)	GNP per capita
	Trade share in GNP
	Agriculture share in GNP
	Industrial share in GNP
	Service share in GNP
Teera & Hudson (2004)	GDP per capita
	Trade share
	Foreign aid ratio to GDP
	Population density
	Agriculture share in GDP
	Manufacturing share in GDP
	External debt ratio to GDP
	Shadow economy
Bird, Martinez-Vazquez, and Torgler (2006)	Per capita GDP
	Population growth rate
	Openness level
	Agriculture share in GDP
	Income Inequality index
	Size of shadow economy
	Tax morale index
	Quality of governance index
	ICRG
	Regulation of entry index
Pession and Fenochietto (2013)	GDP per capita
	Trade share in GDP
	Agriculture share in GDP
	Education expenditure share in GDP
	GINI coefficient
	CPI index
	Corruption index
Huossain (2014)	Institutional capacity
	Control of corruption
	Percentage of government expenditure in GDP
	Openness level
	Share of broad money in percentage of GDP
	Urban population rate

2.6 Tax effort and capacity using the regression approach: previous study on intra-country analysis

The discussion of the literature above has given a brief summary of developing the tax effort model. The same model can also be applied to the inner-country analysis, however, the previous studies of single country tax revenue performance investigation using the tax effort index model are few.

Concerning the fiscal stress of local governments, a tax effort study of tri-cities in the Commonwealth of Virginia, USA was conducted by Badu and Li (1994). Badu and Li (1994) were focused on finding determinants of the level of tax capacity and effort, especially concerning the relationship between local government fiscal stress and tax revenue performance.

In Badu and Li's model, seven explanatory variables are included, namely fiscal stress index (measured by the composite stress index which was calculated and published by the Joint Legislative Audit and Review Commission (JLARC) of the Commonwealth of Virginia.), annual taxable retail sales (1000 dollars), family income (1000 dollars, median adjusted), state aid (total funds transferred from the state, 1000 dollars), unemployment rate, per capita welfare expenditure, and the combined effect of both the unemployment rate and welfare expenditure (unemployment rate multiplied by per capita welfare expenditure).

The regression result from Badu and Li's model was generally productive with most of the variables being significant. The fiscal stress index was significantly and positively related to the tax ratio, which indicates that the local government's tax revenue performance was positively influenced by higher fiscal stress. The total fund transferred from the state was significantly and negatively related to the tax ratio. This finding was similar to the finding of the relationship between foreign grain and the country's tax revenue performance in the inter-country comparisons, which revealed the same relationship as in previous studies. The unemployment rate and the per capita welfare expenditure as single variables were statistically non-significant, however, the combined variable that reflects the effects of both employment and welfare

expenditure turned out statistically positive and highly significant. This finding has two important points. Firstly, it reveals that the government expenditure activities or behaviours were also one of the determinants of the tax revenue performance. Secondly, as the author argues, to improve the tax performance in local government, extending the tax base might not be the only way. Better taxation performance could also be achieved by a lower unemployment rate and welfare expenditure (Badu & Li, 1994).

A study to exploit the local government tax revenue potential in Indonesia was carried out by Alfirman (2003). Given the fact that Indonesia had experienced a major fiscal decentralization in 2001, and local governments were having serious concerns about the lack of revenue caused by the decentralization, Alfirman's study was focused on the tax potential of provincial level government units in Indonesia before the decentralization, and he tried to add to the explanation and solution of local government's poor revenue performance soon after the decentralization.

Alfirman (2003) developed a tax frontier approach to examine the potential maximum tax capacity rather than the variation of tax effort differences. Two particular tax categories were relevant in Alfirman's study: local tax and property tax. Hence, two dependent variables were generated: the local tax ratio, and the property tax ratio. The education level (number of high school students per capita), agricultural share in GDP, level of openness (ratio of sum imports and exports and GDP), and labour force participation rate were applied as explanatory variables in the regression. A series of dummy variables were also included, including the dummy variables that indicate the geographical differences, and dummy variables regarding different levels of relatively rich and poor provinces.

The openness level was positive and significant in both local tax ratio and property tax ratio in Alfirman's tax effort index model. This had confirmed the previous inter-country literatures about the positive influence of openness level in developing countries. The agricultural share in GDP appeared as a negative sign, but statistically non-significant in relation to the local tax ratio.

The education level, however, revealed a rather puzzling result. The education level was significantly related to the local tax ratio; however, it lost its significance in the property tax ratio analysis, and also unexpectedly, the sign became negative.

The result from Alfirman's study shows that none of the Indonesian local governments had met their tax potential. The author further points out that the decentralization process would bring a much heavier local expenditure responsibility, even though theoretically this might raise the local tax effort due to the financial needs. The author further pointed out some important government inefficiency related factors that might affect the tax effort negatively, especially corruption. However, the study did not provide any empirical evidence (Alfirman, 2003).

Another fiscal reform related to provincial tax revenue performance was presented by Wang et al. (2009). The study focused not only on the tax capacity at the local government level, but also on what extent the local governments have exploited the capacity. The authors applied a panel data tax capacity and tax effort analysis at a provincial level in China for the period of 1986 to 2004. The study was mainly focused on the fiscal reforms that took place in the 1980s and early 1990s. Explanatory variables included in the research are per capita GDP, agricultural share in GDP, industry share in GDP, total foreign trade share in GDP and population density.

The significant positive relationship between the industry share and local tax capacity was captured in the tax effort index model constructed by Wang et al. (2009). This result matches the fact that China's fiscal structure was largely dependent on the revenues generated from industrial sectors (Wong, 1992). The per capita GDP showed a positive sign but was not significant. This result was consistent with the literature that the role of per capita GDP in the tax ratio function was uncertain in developing countries. The results of the agricultural sector variable and the openness level variable were consistent with previous tax ratio inter-country studies, with the agricultural sector significantly and negatively related to the tax ratio, and the openness level

being significant and positive. However, the population density was not significant in the function, though a positive sign was detected.

In terms of tax effort analysis of different provinces, Wang et al. (2009) found significant geographical disparities. The relatively richer and coastal regions showed a higher tax capacity but low tax effort; whereas those less developed provinces showed relatively lower tax capacity but higher tax effort. As the authors pointed out that the decentralization fiscal reform, which started in 1980s, had a positive impact on the tax capacity of local government, whereas the tax sharing system introduced in the 1994 fiscal reform had a significant negative impact on local tax share of GDP.

A newer local provincial tax effort study in relation with the fiscal decentralization in China was carried out by Huang et al. (2012). The study covered 31 provinces for the period of 1996 and 2006. In order to better obtain the tax effort indices, the authors adopted four different estimates as the potential tax capacity, namely, personal income (PI), Gross regional product (GRP), total taxable resources (TTR) and the representative tax system using regression analysis (RTS/R). Hence, the four different approaches of tax effort are the ratio of actual tax collection and four different estimated tax capacities. The explanatory variables included in the equation are fiscal decentralization level, interaction term of fiscal decentralization and time trend (FD*T), per capita GRP, industrial share to GRP, and total trade share to GRP.

Similar to the finding of Wang et al. (2009), the results from the study by Huang et al. (2012) showed that industrial share and trade share to GDP have significant positive impact on the local tax effort, whereas the per capita GDP, in the case of China, has a negative impact on tax effort. However, in contrast to the conclusion of Wang et al. (2009) on the impact of the 1994 tax sharing system, this newer study indicates that the tax sharing system reform had played a significant positive role in the increasing of the local governments' tax effort in all four different approaches of tax effort.

A single country framework tax revenue performance study using a tax effort index model was performed by Chaudhry and Munir (2010). The authors focused on the issue of low tax to GDP ratio in Pakistan; a time-series analysis over the period 1973 to 2009 was adopted in the study. The author preformed three steps of regression. The first regression only included economic tax handles, such as agricultural share to GDP, manufactoring share to GDP, and openness. The second regression added in the economic policy included variables such as exchange rate, monetization level, and inflation rate. The third regression included external variables like external debt and foreign remittances. The result from Chaudhry and Munir's study indicated that the agricultural share and manufacturing share to GDP were positively related to the tax ratio; however, the agricultural share is not significant, and what is more, the service sector and per capita income in the first regression equation showed a negative sign, which is not common in most of other studies. The final conclusion indicates that both economic policy variables and external variables have a significant impact on the tax ratio; however, the traditional tax handles, such as per capita GDP and GDP decomposition variables, have no significant impact on the tax ratio.

A very recent regression approach of the tax revenue study in Turkey was carried out by Karagöz (2013). In order to contribute to the study on the budget deficit problem in Turkey, the author investigated the determinants of tax revenue by a time series regression covering the period of 1970 to 2010. The result indicates that the tax revenue in Turkey is significantly determined by agricultural and industrial sector share in GDP, foreign debt, monetization rate, and urbanization level. A negative relationship was found between the agricultural sector share in GDP and tax revenue. However the openness level, which is measured by the ratio of the sum of exports and imports to GDP, has been found as having no significant relationship with the tax revenue performance in Turkey.

yao and Lin (2013) estimated the tax capacity and tax effort performance of 24 provincial level administrative units in Taiwan using the tax effort index model for the period of 2001 to 2010. Other than the traditional population

factors and the decomposition of GDP, the authors also considered the fiscal transfer, public expenditure, and interestingly the non-tax revenue factors. The result indicated large disparities in tax capacities among local governments in Taiwan, and low tax effort commonly occurred in local governments. Moreover, per capita public expenditure, non-tax revenue share as the percentage of local fiscal revenue, and the level of dependence on debt were observed having a positive and significant impact on the local tax effort. By contrast, the centrally-allocated tax revenues, central grants and election years showed a negative impact on the local tax efforts.

Table 2-2 below is the summary of tax effort index studies on intra-country studies, including the author, year, and the explanatory variables that were adopted in the model.

Table 2-2: Summary of tax effort index studies on intra-country country comparison

Author	Independent variable
Badu and Li (1994)	Fiscal stress index
	Annual taxable retail sales
	Median adjusted family income
	Unemployment rate
	Per capita welfare expenditure
Alfirman (2003)	Education level
	Shares of agricultural sector in GDP
	Labour force participation rate
	Openness level
	Dummy variables for geographic differences
	Dummy variables for rich provinces
	Linear dummy variable for firm and time effects
	Quadratic dummy variable for firm and time effects
Wang et al. (2009)	GDP per capita
	The ratio of industry to GDP
	The ratio of agriculture to GDP
	The ratio of import and export to GDP
	Population density
Chaudhry and Munir (2010)	Per capita income
	Share of agriculture in GDP
	Share of manufacturing in GDP
	Share of service sector in GDP

	Openness level
	Exchange rate
	Money supply
	Inflation rate
	External debt
	Worker's remittances
	Foreign aid
	Literacy rate
	Urban population share in total population
	Dummy variable for political stability
Huang, Lo, and She (2012)	Real per capita GDP
	Industry value of output to GDP
	Total export and import value to GDP
	Degree of fiscal decentralization
	Interaction term of fiscal decentralization and time trend
Yao and Lin (2013)	Ratio of centrally-allocated tax revenues to local fiscal revenue
	Ratio of central grants to local fiscal revenue
	Election years
	Year of different rule party
	Population density
	Per capita public spending
	Non-tax revenues
	Dependence on debt
Karagöz (2013)	Ratio of agricultural value added to GDP
	Ratio of industrial value added to GDP
	Ratio of total foreign debt to GDP
	Ratio of money supply (M2)
	Ratio of urban population to total population
	Openness level

2.7 Summary and the hypothesis in this study

2.7.1 Taxation and its capacity and effort

Taxation is recognized as the most import financial source to the governmental public expenditure; hence, it plays a key role in the national economy (Allan, 1971; James & Nobes, 2013; Lymer & Oats, 2013).

The aim of this research is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. In order to fulfil this aim, to fully understand

the concepts and measurements of tax capacity and tax effort are very important.

Tax capacity is defined as the hypothetical ability of tax authority units to raise revenue for the purpose of public finance within the existing available tax bases (Bahl, 1971, 1972; Akin, 1973; Wang et al., 2009). The tax effort is the measure of the extent to which an area or governmental unit's strength of tax collection compares with its taxable capacities (Bahl, 1972; Mertens, 2003; Wang et al., 2009).

Tax effort is calculated as the ratio between the actual tax collection and the tax capacity; hence, the estimating process of the tax capacity is vital in the study of tax revenue performance. However, the absolute tax capacity as a theoretical concept is very difficult to obtain. Empirical methods to calculate the absolute tax capacity are still being debated (Lewis, 1949; Maroun, Turner, & Sartorius, 2011). Thus, the relative tax capacity approach seems more realistic and practical.

2.7.2 Measurement of tax effort and capacity

Typical and most widely used measurements of relative tax capacity/effort are the Representative Tax System method (RTS), and the Regression-based Tax Effort Index model (TE/R) (ACIR, 1962; Bahl, 1972; Akin, 1973; ACIR, 1987; Kim, 2007). The RTS method in practice relies on the estimated tax base and is calculated using representative tax rates. By doing so, a single tax system is constructed in the whole sample. By applying this single tax system to different samples, the relative tax capacity as well as the tax effort can be calculated. In contrast, the TE/R method relies on the construction of explanatory variables. Then, through regression techniques, the relative tax capacity can be obtained by the estimation of the regression result. Both methods aim to obtain the relative tax capacity and tax effort. However, the main difference is that the TE/R method is more to do with the estimated relative tax capacity and the factors that are included in the regression function as the explanatory variables. Since the main purpose of this research

is to find the determinants of tax capacity, the TE/R method is adopted in this study.

2.7.3 Previous studies on tax effort and capacity

Through years of development, the TE/R method has been improved in many ways. The scale of choice of explanatory variables has focused on not only the economic conditions, but also on other social and political conditions (Bird et al., 2006, 2008). The choice of the explanatory variables in the tax effort index model has gradually moved from the traditional tax handles/supply side to social and political factors/demand side (Ghura & Hadjimichael, 1996; Ghura, 1998; Fauvelle-Aymar, 1999; Teera & Hudson, 2004; Le et al., 2012). Hence, a great expansion of social, political, and cultural variables, such as the cultural differences indicators, variation of government efficiencies, education levels, foreign grants, income distribution and corruption were adopted in the tax effort index models (Ghura, 1998; Piancastelli, 2001; Teera & Hudson, 2004; Bird et al., 2006; Gupta, 2007; Bird et al., 2008). In addition, not only is the right hand side of the function expanding, but the left hand side, the dependent variables, are also improving. The traditional models used the ratio of actual tax collection and GDP/GNP; some scholars have extended this variable to test the fiscal revenue determinants, along with the argument whether the tax revenue in the model represents the "true" tax revenue, since many developing countries have noticeable amounts of non-tax revenues, which might be similar to the concept of taxes in many ways (Fauvelle-Aymar, 1999; Bird et al., 2006).

The investigation of the determinants of tax revenues and tax effort were well-developed in the analysis of inter-county comparison of tax effort. The same model can be also taking in the inner-country analysis. However, relevant studies are in the minority in the literature. This is possibly because of the insufficient of data. For instance, in the inter-country tax effort index studies, the government quality factors were obtained from international statistical organizations in many studies (Fauvelle-Aymar, 1999; Bird et al., 2006; Huossain, 2014). However, relevant indicators are difficult to find at a sub-country level. Nevertheless, various attempts have been made around the

world (Badu & Li, 1994; Wang et al., 2009; Chaudhry & Munir, 2010; Huang et al., 2012; Karagöz, 2013; yao & Lin, 2013). However, when conducting the inner-country tax effort analysis, researchers revealed that different countries have their own special features. In other words, each country is unique from others in some ways. The same variables in different countries revealed a different story. The characteristic variations of countries has demonstrated that there is no such thing as the "standard components" in the construction of explanatory variables; one must work with each country's particular characteristics when applying of the tax effort index model.

The tax effort index study in the intra-country analysis are very few, and it is even rarer in China. Moreover, the existing few tax effort index studies in China have been mainly focused on the supply side factors, i.e., from the economic perspective (Wang et al., 2009). The special social and political characteristics of China has been widely ignored in the tax literature. In order to fulfil this gap, this study offers a comprehensive tax effort index analysis with a combination of both supply side factors and demand side factors.

2.7.4 The hypotheses in this study

This research aims to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. Through the literature review of tax effort and capacity using regression approach, it can be seen that there are mainly eleven economic and social aspects relating to the tax revenue performance. The eleven aspects and their related previous studies are listed in the table 2-3 below.

Table 2-3: The eleven economic and social aspects that relating to the tax revenue performance in the literature reviewed

Main aspects relating to the tax revenue performance	Related studies
Stage of development	Williamson (1961) Plasschaert (1962) Hinrichs (1966) Thorn (1967) Lotz and Morss (1967) Weiss (1969) Shin (1969) Lotz and Morss 1970 Thuong and Gash (1979) Leuthold (1991) Ghura (1998) Fauvelle-Aymar (1999) Piancastelli (2001) Teera & Hudson (2004) Bird, Martinez-Vazquez, and Torgler (2006)

	Wang et al. (2009) Chaudhry and Munir (2010) Huang, Lo, and She (2012) Pession and Fenochietto (2013)
Development of industrial sector	Bahl (1971) Leuthold (1991) Fauvelle-Aymar (1999) Mertens (2003) Piancastelli (2001) Teera & Hudson (2004) Wang et al. (2009) Chaudhry and Munir (2010) Huang, Lo, and She (2012) Karagöz (2013)
Openness level	Plasschaert (1962) Hinrichs (1966) Thorn (1967) Lotz and Morss (1967) Weiss (1969) Shin (1969) Lotz and Morss 1970 Bahl (1971) Thuong and Gash (1979) Leuthold (1991) Ghura (1998) Fauvelle-Aymar (1999) Alfirman (2003) Mertens (2003) Piancastelli (2001) Teera & Hudson (2004) Bird, Martinez-Vazquez, and Torgler (2006) Wang et al. (2009) Chaudhry and Munir (2010) Huang, Lo, and She (2012) Pession and Fenochietto (2013) Huossain (2014)
Development of service sector	Piancastelli (2001) Chaudhry and Munir (2010)
Population growth rate	Shin (1969) Bird, Martinez-Vazquez, and Torgler (2006)
Population density	Teera & Hudson (2004) Wang et al. (2009) Yao and Lin (2013)
Shrinking of agricultural sector activities	Weiss (1969) Shin (1969) Bahl (1971) Leuthold (1991) Alfirman (2003) Mertens (2003) Piancastelli (2001) Teera & Hudson (2004) Bird, Martinez-Vazquez, and Torgler (2006) Wang et al. (2009) Chaudhry and Munir (2010) Pession and Fenochietto (2013) Karagöz (2013) Huossain (2014)
Resident income inequality	Bird, Martinez-Vazquez, and Torgler (2006) Badu and Li (1994) Pession and Fenochietto (2013)
External grants	Leuthold (1991) Ghura (1998) Teera & Hudson (2004) Chaudhry and Munir (2010) Karagöz (2013) Yao and Lin (2013)
Anti-corruption effort	Ghura (1998) Bird, Martinez-Vazquez, and Torgler (2006) Pession and Fenochietto (2013) Huossain (2014)
government capacity	Lotz and Morss 1970 Fauvelle-Aymar (1999) Bird, Martinez-Vazquez, and Torgler (2006) Chaudhry and Munir (2010) Huossain (2014)

Based on the outcomes of the literature reviewed, the testable hypothesis in this study can be formulated as follows:

H1: The stage of development is positively related to the tax revenue performance at provincial level in China.

H2: Development in the industrial sector is positively related to the tax revenue performance at provincial level in China.

H3: The development of the service sector is positively related to the tax revenue performance at provincial level in China.

H4: The openness level is positively related to the tax revenue performance at provincial level in China.

H5: The population growth rate is negatively related to the tax revenue performance at provincial level in China.

H6: The population density is positively related to the tax revenue performance at provincial level in China.

H7: The shrinking of agricultural sector activities is positively related to the tax revenue performance at provincial level in China.

H8: The resident income inequality is negatively related to the tax revenue performance at provincial level in China.

H9: The external grants received by local governments are negatively related to the tax revenue performance at provincial level in China.

H10: The anti-corruption effort is positively related to the tax revenue performance at provincial level in China.

H11: The government capacity is positively related to the tax revenue performance at provincial level in China.

Further detailed rational of each hypotheses will be presented in Chapter 5:

Research design, methodology and methods.

Chapter three: The evolution and reform of China's tax system

3.1 Introduction

The aim of this research is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. Since the aim of the study involves the tax performance in China, it is important to understand the evolution and reforms of China's tax system as an essential background before studying its related topics. In this chapter, an outline of historical tax evolution and reforms of the Chinese tax system are presented.

Since the establishment of the People's Republic of China in 1949, China's tax system has experienced five main stages of evolution and reform.

Section 3.2 presents stage one, which was between 1950 and 1952, the first two years of the establishment of the new Chinese government. Section 3.3 illustrates the second stage, which is between 1953 and 1978, when China was under the planned economy, and the role of taxation was insignificant in the national economic environment. The third stage is the period between 1978 and 1993, and is discussed in section 3.4. The background of the third stage is when China put an end to the planned economy and launched the open door policy for the purpose of building a market-oriented economy. In section 3.5 stage four tax reform in 1994 is presented, when a fundamental tax reform took place. In addition, the introduction of the tax sharing system between central and local governments is also presented. Lastly, in section 3.6, stage five is presented—which is from 1995 until the present day.

3.2 Stage one: 1950-1952 establishment of the new tax system

In 1950, a year after the establishment of the new government, to restore the economy from the years of the anti-Japanese war and the civil war, and also to sustain the financial power for the new government, the Chinese Communist Government established the "Principal Rules for Implementation of the National Tax Administration", which rolled out the very first tax system structure for the PRC (Easson & Li, 1987).

Between 1950 and 1952, the new socialist government established the taxation system with eighteen taxes for the New People's Republic of China to recover the national economy and sustain the fiscal revenue of the new government. Eighteen taxes that constituted the new Chinese tax system were: agriculture tax, animal husbandry tax, commodity tax, industrial and commercial tax, stamp tax, salt tax, custom duties, transaction tax, slaughter tax, house property tax, land tax, special consumption tax, license plate tax, interest income tax, salary of remuneration tax, inheritance tax, contracts (deed) tax, and tonnage dues. Agriculture tax and animal husbandry tax was not unified and legislated at the national level, but managed and collected by local government. The salary of remuneration tax and the inheritance tax were never implemented (M.O.F., 2000).

3.3   Stage two: 1953 – 1978 simplification of the tax system

Before 1979, China was under a centrally planned economic system, which differed from a market-oriented economy in many ways (Easson & Li, 1987). For example, the government controlled production and allocation of resources; in other words, all the economic resources were in the state's hands rather than in private hands (Yueh, 2010). The economic goals and focus points of the pre 1978 period were to build a socialist economy, and the detailed steps were also pre-established by the central government (Yang, 2001).

The Chinese tax system during this period was very simple, since the central government decided almost everything regarding what people and states needed; even the local governments were forbidden the freedom of spending local revenues since the provinces' expenditures were budgeted by the central government (Yang, 2001; Shen, Jin, & Zou, 2012).

Following two major movements called "The Socialist Transformation"[2] in 1953, and the "The Great Leap Forward"[3] between 1958 and 1961, China's tax system had been through large scale reduction with many important industry and profit related taxes simplified and merged into a single tax (Liu,

2000; M.O.F. 2000). This tax system simplification process reached its peak when the movement of The Cultural Revolution[4] started in 1968. During The Cultural Revolution period, almost all private enterprises in China were eliminated, and most of the tax categories in the tax system were merged into a single industrial and commercial tax. The result was that the single industrial and commercial tax became the most important and largest tax in terms of tax revenue before 1978, and the remaining taxes became less relevant to the national economy (Wang, 1984; Easson & Li, 1987; Liu, 2000, 2008).

Table 3-1 shows the major events and main changes of tax categories of China during the tax reform period from 1950 to 1978.

Table 3-1: Major events and main changes of tax categories of China during the tax reform period from 1950 to 1978

1950	1951	1953	1958	1973	1978
*agriculture tax	*agriculture tax	*agriculture tax	agriculture tax (unified and legislated)	agriculture tax	
*animal husbandry tax	*animal husbandry tax	*animal husbandry tax	*animal husbandry tax	*animal husbandry tax	*animal husbandry tax
commodity tax	commodity tax	commodity tax	consolidated industrial and commercial tax (merged from commodity tax, industrial and commercial tax, commodity circulation tax and stamp tax)	industrial and commercial tax (merged from the parts that all state-owned enterprises and collectively-owned enterprises that used to be subjected to the consolidated industrial and commercial tax and its surtax, urban real estate tax, vehicle and vessel license plate tax, salt tax and slaughter tax in 1973)	industrial and commercial tax
industrial and commercial tax	industrial and commercial tax	industrial and commercial tax		Consolidated industrial and commercial tax	consolidated industrial and commercial tax

			industrial and commercial income tax (the income part from the industrial and commercial tax before)	industrial and commercial income tax	industrial and commercial income tax
stamp tax	stamp tax	stamp tax			
*salt tax	*salt tax	*salt tax	*salt tax		
custom duties	custom duties	custom duties	custom duties	custom duties	custom duties
transaction tax	transaction tax	*transaction tax on livestock (the remaining transaction taxes on different goods were either discontinued or merged to commodity tax and commodity circulation tax)	*transaction tax on livestock	*transaction tax on livestock	*transaction tax on livestock
slaughter tax	slaughter tax	slaughter tax	slaughter tax	**slaughter tax	**slaughter tax
house property tax land tax	combined into an urban real estate tax in 1951	urban real estate tax	urban real estate tax	**urban real estate tax	**urban real estate tax
special consumption tax	special consumption tax	reformed and renamed to cultural recreation tax	cultural recreation tax (suspended in 1966)		
license plate tax	vehicle and vessel license plate tax (name changed as the objective of this tax were only vehicles and vessels)	vehicle and vessel license plate tax	vehicle and vessel license plate tax	**vehicle and vessel license plate tax	**vehicle and vessel license plate tax

interest income tax	interest income tax	interest income tax	interest income tax (suspended in 1959)		
salary of remuneration tax (never implemented)					
inheritance tax (never implemented)					
		commodity circulation tax (the commodity tax, sales tax and its surtax, stamp tax on some main commodities was consolidated into this tax)			
*contracts (deed) tax	*contracts (deed) tax	*contracts (deed) tax	*contracts (deed) tax	*contracts (deed) tax	*contracts (deed) tax
tonnage dues	tonnage dues	tonnage dues	tonnage dues	tonnage dues	tonnage dues
				bazaar transaction tax (introduced in 1962)	bazaar transaction tax
* not yet unified and legislated in the national level, managed and collected by local government, approved by the central government.					
**only paid by individuals and foreign residents.					

Source: Adapted from Wang (1984), Easson and Li (1987), Liu (2000), Liu (2008) and M.O.F., (2000)

By the end of 1978, as the result of a series of tax reforms aimed at further simplification of tax system, the number of taxes were further reduced to 13. These were: industrial and commercial tax, consolidated industrial and commercial tax, industrial and commercial income tax, customs duty, transaction tax on livestock, bazaar transaction tax, urban real estate tax, vehicle and vessel usage license tax, tonnage dues, slaughter tax, agricultural tax, animal husbandry tax, and deed tax (Liu, 2008).

3.4 Stage three: 1979-1993: tax system reforms associated with the market oriented economy reform

Between 1978 and 1993, the major concern for the central government was the transformation from a planned economy to a market-orientated economy under the background of market-oriented economic reforms started in the late 1970s. From the taxation perspective, the taxation reform was a vital part of the market-oriented economic reforms, and the major taxation reform objectives were: constricting foreign-related taxation system; shifting the main source of fiscal revenue from SOE profits to SOE taxes; and reforming the entire industrial and commercial tax system, so that the tax became an important lever of national economy (Liu, 2000).

3.4.1 Constricting foreign-related taxation system

The mark of the official welcoming of foreign investment was the launch of the opening up policy. By encouraging foreign enterprises and individuals to come and invest in China, it is obvious that the contribution to the Chinese economy by taxes from the foreign investors was expected (Easson & Li, 1987).

Under this background, four taxes were introduced between 1980 to 1991: Joint venture income tax and individual income tax in 1980; Foreign enterprise income tax in 1981; and Income tax on enterprises with foreign investment, and foreign enterprises in 1991 (N.P.C. 1980; 2000). Until then, a basic foreign-related tax system was initially formed.

3.4.2 Reforming the entire industrial and commercial tax system

The milestone of China's economic reform was the year of 1978, but the milestones of China's tax reform were the years 1983 and 1984, when the SOEs, which were the major revenue source of government finance, were totally subjected to taxes rather than just profits being transferred to the central and local government (Otsuka, Liu, & Murakami, 1998). In 1983, China had stepped out the very first stage of the revenue reform, called the first step of Li gai shui, which means, "replacing profits with taxes" (Xu & Cui, 2011). In general, the central government allowed the SOEs to retain their profits after "payment of an agreed-upon amount of tax" (Xu & Cui, 2011). In other words, the contributing profits of the SOEs became an income tax, and a new tax,"Income tax on state owned enterprises," was introduced. This started the first step of "the reform of substituting taxation for handing in profits from the state enterprises" (Liu, 2000).

This reform was completed in 1984, when the SOEs were no longer required to hand over their profits to the government, but instead, pay various taxes (Lin, 2009). These major reforms included the industrial and commercial tax being divided into four different taxes according to different objectives of taxation. The four taxes were product tax, value added tax, salt tax, and business tax.

In the meantime, the collective and private sectors also enjoyed a rapid expansion in the economy thanks to the launching of the market oriented reform and the open door policy (N.B.S., 1950-1995). Under this situation, in order to balance the tax burden between SOEs, collective-owned enterprises and individual enterprises, income taxes were introduced to collective, and individual units, and private enterprises between 1985 to 1988 (Liu, 2000).

Aside from the tax reforms in the SOEs, collective-owned, and private enterprises, some new taxes were also introduced into the industrial and commercial tax system between 1984 and 1988, such as resource tax, city maintenance and construction tax, real estate tax, city and town land usage tax, tax on bonus of state-owned enterprises, and vehicle and vessel usage

tax. Meanwhile, the stamp tax, which was abandoned before, was also restored according to the interim provisions (Liu, 2000).

3.4.3 Adjustment/orientation taxes and special purpose taxes

In order to enhance the important role played by taxation in China's economy, other than the tax reforms mentioned in early sections, the Chinese authorities also introduced a series of adjustment/orientation taxes in various fields during the taxation reform period between 1978 and 1994 (Liu, 2000, 2008). These adjustments and orientation taxes are: Individual income adjustment tax, adjustment tax on state-owned enterprises, orientation regulation tax on fixed assets, adjustment tax on wage of state-owned enterprises, special tax on industrial fuel, and special consumption tax (M.O.F., 2000).

3.4.3.1 Individual income adjustment tax

When the individual income tax was introduced in 1980, it was mainly subjected to the growing group of foreign workers, and the purpose of this tax was mainly to collect taxes from the increasing number of foreign workers who earned income in China (N.P.C., 1980). A few years later, the authorities noticed an increasing number of Chinese citizens who were also receiving substantial incomes without paying income tax (Easson & Li, 1987). Subsequently, the individual income adjustment tax was introduced in 1986.

3.4.3.2 Adjustment tax on state-owned enterprises

The adjustment tax on state-owned enterprises was introduced under the background of the "replacing profits with taxes" reform, which transformed the SOE's profits into taxes.

3.4.3.3 Orientation regulation tax on fixed assets

The introduction of orientation regulation tax on fixed assets aimed to strengthen the leverage function of the taxation on the investment activities and to control the scale of fixed asset investment, due to the rapidly increased fixed asset investments after the launch of the market oriented reform (N.B.S., 1950-1995).

3.4.3.4 Adjustment tax on the wage of state-owned enterprises

Adjustment tax on the wage of state-owned enterprises was introduced in 1985, and the purpose of this tax was to control and adjust the increasing salary level in state-owned enterprises.

3.4.3.5 Special tax on industrial fuel

In the early 1980s, in order to balance the supply and demand of industrial fuel, reducing energy consumption in industry, and encouraging effective use of energy resources, industrial units burning crude oil or heavy oil as fuel for industry boiler or industrial furnace became subject to the newly introduced special tax on industrial fuel.

3.4.3.6 Special consumption tax

The special consumption tax was introduced in 1987 and aimed to balance the market and strengthen market regulatory power on some supply-demand imbalance of goods (Liu, 2008).

3.4.4 Agriculture related taxes and other taxes

Apart from the tax reforms mentioned before, the agriculture related taxes and other taxes were also reformed, or introduced.

3.4.4.1 Farmland occupation tax

Along with the fast pace of economic development, the other significant development during this period is the rapid growth of urbanization (Zhou & Cao, 1999). Fast expanding cities and townships have resulted in an inevitable farmland loss. In order to balance the increase of urbanization and the decrease in arable land, the farmland occupation tax was introduced in 1987.

3.4.4.2 Banquet tax

The banquet tax was introduced on 22nd September 1988, for the purpose of providing guidance on reasonable consumption, to encourage thrift in society as well as being an anti-corruption measure to some degree.

3.4.4.3 Agriculture tax and animal husbandry tax

On 31st October 1978, the Ministry of Finance submitted the report from the Ministry of Finance on "Reducing the Tax Burden in Rural Areas" to the State Council. According to the report, a tax deduction and exemption principle in the agriculture tax and animal husbandry tax was confirmed. Since then, the effort on tax deduction and exemption was carried on throughout the later agriculture tax and animal husbandry tax administration work. (Easson & Li, 1987).

3.4.4.4 Transaction tax on livestock

After the opening up policy and economic reforms, the authorities soon noticed the fast increase in business activities in livestock transactions in the rural and township areas. In order to strengthen the legitimate trade and income equality, the transaction tax on livestock was finally unified and legislated at the national level in 1982 (Liu, 2000).

3.4.4.5 Custom duties

Custom duties were introduced in the early 1950s. However, given the background that China was a very self-reliant, planned economy and with very little external trade, the custom duties were treated as being relatively unimportant (Easson & Li, 1987).

After the opening up policy and the construction of the market-oriented economy, reform of the customs system was required for the new environment. Under this background, a new central department the General Administration of Customs of the People's Republic of China was established in 1980, and a national level legally formalized custom system finally established.

3.4.5 Summary of taxation reform between 1978 and 1993

The tax reform between 1979 and 1993 was associated with the main background of China's economic reforms, and the reforms in taxation ran parallel with the economic reforms, and played an important role during the transformation of China's economy from a planned economy to a market

oriented economy (Gao, 2008). Through all the changes and reforms, China's taxation had become more formalized, but also a rather complicated tax system by the end of 1993 with 37 taxes in total. Listed in Table 3-2 below is the timetable of the major taxation reforms and related main laws and regulations.

Table 3-2: Major tax reforms between 1979 and 1993

Major Tax Reforms between 1979 and 1993: Year and Relative Laws and Regulations	
Income Tax on Enterprises with Foreign Investment and Foreign Enterprises	1980: "Income Tax Law of the People's Republic of China on Chinese-foreign Equity Joint Ventures"
	1981: "Income Tax Law of the People's Republic of China for Foreign Enterprises"
	1991: "The Income Tax Law of the People's Republic of China for Enterprises with Foreign Investment and Foreign Enterprises". A new tax was introduced: income tax on enterprises with foreign investment and foreign enterprises (replaced the previous "joint ventures income tax" and "foreign enterprise income tax")
Individual income tax	1980: "Individual Income Tax Law of the People's Republic of China"
Individual Income Adjustment Tax	1986: "Provisional Rules of the People's Republic of China on Individual Income Adjustment Tax" started to collect "individual income adjustment tax"
Consolidated industrial and commercial tax	1981: "Suggestions Regarding the Reform of Industrial and Commercial Tax", the new "product tax" partly emerged from this tax. The original "consolidated industrial and commercial tax" was not abolished, but only subject to foreign enterprises and individuals
Product Tax	1984: "The Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"
	1984: "Regulations of the People's Republic of China on Product tax (Draft)" started to collect "product tax"
Value-added tax	1984: "the Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"
	1984: "Regulations of the People's Republic of China on Value Added Tax (Draft)" started to collect VAT
Business tax	1984: "The Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"
	1984: "Regulations of the People's Republic of China on Business tax (Draft)" started to collect business tax
Salt Tax	1984: "the Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"

	1984: "Regulations of the People's Republic of China on Salt tax (Draft)" started to collect "salt tax" from all units including SOEs
Income Tax on State-owned Enterprises	1983: "the Report of the Working Conference Regarding the National Reform of Substituting Taxation for Handing in Profits", "the Tentative Regulations of Replacing Profits with Taxes in the State Enterprises", and "the Interim Provisions of the Ministry of Finance of PRC for Collection of Income Tax from State Enterprises"
	1984: "Detailed Rules for the Implementation of the Regulations of the People's Republic of China on State-Owned Enterprises Income Tax (Draft)"
Adjustment tax on state-owned enterprises	1983: "the Tentative Regulations of Replacing Profits with Taxes in the State Enterprises"; the adjustment tax on state-owned enterprises was introduced in this tentative regulation as one of the four ways of handing the after-tax-profit to the government
	1984: "the Regulations of Collecting the Adjustment Tax on State-owned Enterprises"
Resource Tax	1984: "the Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"
	1984: "Regulations of the People's Republic of China on Resource Tax (Draft)" started to collect "resource tax"
City Maintenance and Construction Tax	1984: "the Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"
	1985: "Provisional Regulations of the People's Republic of China on City Maintenance and Construction Tax" started to collect "city maintenance and construction tax"
Urban real estate tax	1981: "Suggestions Regarding the Reform of Industrial and Commercial Tax". According to the "suggestions", few years later, the urban real estate tax was divided into two taxes: real estate tax (1986) and cities and towns land usage tax (1988). The original urban real estate tax was not abolished, but only subject to foreign enterprises and individuals
Real Estate Tax	1984: "the Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"
	1986: "Provisional Regulations of the People's Republic of China on Real Estate Tax" started to collect "real estate tax"
Cities and Towns Land Usage Tax	1984: "The Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"
	1988: "Provisional Regulations of the People's Republic of China Governing Land Use Tax in Cities and Towns" started to collect "cities and towns land usage tax"
Vehicle and vessel license plate tax	1981: "Suggestions Regarding the Reform of Industrial and Commercial Tax". According to the "suggestions", a few years later, the new "vehicle and vessel usage tax" (1986) emerged from this tax, whereas the original "vehicle and vessel license plate tax" was not abolished, but only subject to foreign enterprises and individuals
Vehicle and Vessel Usage Tax	1984: "The Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"

	1986: "Provisional Regulations of the People's Republic of China on Vehicle and Vessel Usage Tax" started to collect "vehicle and vessel usage tax"
Stamp tax	1984: "the Interim Provisions on the Second Step to Substituting Taxation for Handing in Profits in State Enterprises"
	1988: "Provisional Rules of the People's Republic of China on Stamp Duty" restored "stamp tax"
Income Tax on Collective Enterprises	1985: "The Provisional Regulations of the People's Republic of China on collective enterprises income Tax" started to collect "income tax on collective enterprises"
Income tax on individual unit of industry and commerce in cities	1986: "the Provisional Regulations of the People's Republic of China on individual unit of industry and commerce in cities income Tax" started to collect "income tax on individual unit of industry and commerce in cities"
Private enterprise income tax	1988: "the Provisional Regulations of the People's Republic of China on private enterprise income Tax" started to collect "private enterprise income tax"
Orientation Regulation Tax on Fixed Assets Investment	1983: "The Interim Procedures on Construction tax" started to collect "construction tax"
	1987: "The Provisional Rules of the People's Republic of China on Construction Tax"
	1991: "the Provisional Regulations of the People's Republic of China of Fixed Assets Investment Orientation Regulation Tax" started to collect "orientation regulation tax on fixed assets investment", replacing the previous construction tax
Tax on Bonus of State-owned Enterprises	1984: "The Provisional Regulations on the Tax on Bonus of State-owned Enterprises" started to collect "tax on bonus of state-owned enterprises"
	1985: "Detailed Implementation Rules for the Tax on Bonus of State-owned Enterprises"
Adjustment Tax on Wage of State-owned Enterprises	1985: "The Provisional Regulations on the Adjustment Tax on Wage of State-owned Enterprises" started to collect "adjustment tax on the wages of state-owned enterprises"
Tax on Bonus of Collective Enterprises	1985: "The Provisional Regulations on the Tax on Bonus of collective Enterprises" started to collect "tax on bonus of collective enterprises"
Tax on Bonus of Public Institutions	1985: "The Provisional Regulations on the Tax on Bonus of public institutions" started to collect tax on bonus of public institutions!
Farmland Occupation Tax	1987: "Interim Regulation of the People's Republic of China on Farmland Occupation Tax" started to collect "farmland occupation tax"
Banquet tax	1988: "Provisional Regulations of the People's Republic of China on Banquet tax" started to collect "banquet tax"
Special Tax on Industrial fuel	1982: "Circular of the State Council Concerning the Pilot Provisions of Collecting Special Tax on Industrial fuel"

Special Consumption Tax	1987: "Notice on Issues Concerning Collecting Special Consumption Tax from Colour Television"; 1987, "Provisions on Issues Concerning the Collection of Special Consumption Tax from Saloon Car" started to collect special consumption tax on Televisions and saloon cars.
Agriculture Tax	1978: "Report of the Ministry of Finance on Reducing the Tax Burden in the Rural Areas"
	1979: "Opinions on Strengthening the Administration of Fiscal Affairs of the Agricultural Sector", further reducing the tax burden in less developed areas
	1983: "Notice on Ceasing the Implementation of Threshold Measurement of the Agriculture Tax"; 1983, "Several Provisions of the State Council on Collecting Agriculture Tax from Agricultural and Forestry Specialties' Income"
Transaction Tax on Livestock	1983: "Provisional Regulations of the Transaction Tax on Livestock" issued in 1982, started to collect from 1983.
Animal Husbandry Tax	1978: "Report of the Ministry of Finance on Reducing the Tax Burden in the Rural Areas"
	1979: "Opinions on Strengthening the Administration of Fiscal Affairs of the Agricultural Sector", further reducing the tax burden in less developed areas
Custom duties	1980: "Decision of the State Council on Reforming the Customs Administrative System"; reform of the custom system and adjustment of the tariff
	1982: "The General Customs Administration's notice on starting to levy Export Customs Duties", further reforming the custom system and adjustment in the tariff. Introduced export customs duties
	1987: "Customs Law of the People's Republic of China"; "Regulations on Import and Export Duties of the People's Republic of China"
Contracts tax	Continued from the past
Slaughter tax	Continued from the past
Bazaar transaction tax	Continued from the past
Tonnage dues	Continued from the past

Source: Adapted from The Law and Regulations Database (2015), lawinfochina.com.

There is no doubt that the 1978 to 1993 period is extremely important in China's economic history. Not only the rapid economic growth, but also the opening-up policy, is still the most fundamental and influential element in the economy even today (Sedki, Chao, & Chen, 2014). It was during the opening-up period that the fiscal revenue system changed from a SOE profit based to a taxation based revenue system. The role of taxation in the economy has been largely developed and improved. The successful transformation from the enterprise profit based fiscal revenue system to the taxation based fiscal

revenue system had paved the way for the future tax reforms (Liu, 2000; Gao, 2008).

3.5   Stage four: 1994 tax reforms and the establishment of the tax sharing system

On 25th December 1993, the State Council issued the "Circular of the State Council on the Approval and Transmission of the Application Program for Industrial and Commercial Tax System Reform of State Administration of Taxation". This regulatory document points out the major problems and imperfections of the then industrial and commercial tax system. The problems include the unbalanced tax burden between enterprises, non-uniform distributive relations between the State and enterprises, problems in demarcation in jurisdiction between the central and local authorities in tax revenue and administration, rather weak adjustment and control of taxation in the prevalent economic environment, contradictions due to the two different sets of tax system to enterprises with domestic or foreign investment, relaxed regulations on tax administration and collection, and an incomplete taxation legal system.

Among all negative issues, the central government was mostly concerned about the decline of both ratios of budgetary revenue as a share of GDP, and the budgetary revenue of central government as a share in the total national budgetary revenue. This fact was well acknowledged as the term of "the decline of the two ratios" (Wong & Bird, 2008).

In 1978, the total percentage share of the budgetary revenue in GDP accounted for 31%. However, this figure dropped to 22% in 1985, and 11% in 1994 (M.O.F., 2000). In the meantime, the percentage share of the central government budgetary revenue in the total national budgetary revenue also experienced a dramatic decline since the mid-1980s. The central government budgetary revenue accounted for 15% of the total national budgetary revenue in 1978; since then, the figure grew steadily to 40% in 1984. However, after the total reform of the industrial and commercial taxes, this figure fell subsequently to 22% in 1993 (M.O.F., 2000). Given the fact that the fiscal

revenue plays a key role in the government functions in the market-oriented economy, and especially the revenue of the central government in China, which is a one-party government country, the decline of the central government revenue brings threat to the political stability and political power of the central government (Wong & Bird, 2008).

Against the background of the great achievement of economic development and the need to fit the newer economic environment, as well as facing the serious problem of the decline of the two ratios, Chinese authorities launched another major tax reform starting in the early 1990s. These reforms aimed to increase the budgetary revenue by adopting various tax reforms, and strengthen the central government revenue through the rebuilding of central-local revenue relationships (Lin, 2009).

3.5.1 Income tax reform

3.5.1.1 Enterprise income tax reform

The major reform in the enterprise income tax was the unification of enterprises with domestic investment. Income tax on enterprises with domestic or foreign investment was to be unified in the next step.

On 13th of December 1993, the State Council issued the administrative regulation named the "Provisional Regulations of the People's Republic of China on Enterprise Income Tax"; since then, the new unified income tax on enterprises with domestic investment was introduced. According to the regulation, the taxpayers are all enterprises within the PRC, other than foreign investment enterprises and foreign enterprises, including state-owned enterprises, collective enterprises, private enterprises, joint venture enterprises, joint stock enterprises, and any other types of organizations gaining income from production and business. Since then, all domestic investment enterprises' tax, the income tax on state-owned enterprises, income tax on collective enterprises, income tax on private enterprises and the adjustment tax on state-owned enterprises, were all unified into a single enterprise income tax according to the new regulations.

3.5.1.2 Individual income tax reform

On 31st October 1993, the "Decision of the Standing Committee of the National People's Congress on Amending the Individual Income Tax Law of the People's Republic of China" was issued by the Standing Committee of the National People's Congress. The new individual income tax law was to enter into force from 1st January 1994.

The new amended individual income tax law indicates that taxpayers are individuals who have resided in the country for one year or more, with or without domiciles in the PRC, and gain income within or outside China; individuals who have no domiciles and do not reside in China, or who have no domiciles but have resided in China for less than one year, shall pay the individual income tax on gains within China (M.O.F. 2000). Compared to the previous individual income tax adopted in 1980, the taxable income categories had increased from 6 to 11, and some changes on the tax rates were also made to cover a wider tax base (Liu, 2000).

3.5.2 Turnover tax reform

To address the problem of the decline of the budgetary revenue in the GDP, it was a rational choice to focus on the turnover tax reform. Since the Li Gai Shui reform from the early 1980s until 1993, the turnover taxes played a key role in the tax revenue system. Three iconic turnover taxes in China during the 1978 to 1993, are product tax, value-added tax, and business tax. In 1993, these three represented nearly 70% of the total tax revenue (M.O.F., 2000).

Therefore, the second major tax reform took place in the turnover tax category, and mainly focused on three important taxes: Value-added tax, consumption tax, business tax.

3.5.2.1 The merging of value-added tax and product tax

On 13th December 1993, the "Provisional Regulations of the People's Republic of China on Value-added Tax" was issued. A flat tax rate of 17% was applied to the taxpayers and a flat rate of 13% was applied to taxpayers who were selling or importing particular goods that were listed in the regulation.

Hence, the old value added tax and the product tax were merged into a single value added tax (M.O.F., 2000).

3.5.2.2 The extension of consumption tax

When the consumption tax was introduced in 1980s, it was listed in one of the "special tax" categories, and it was only applied to colour televisions and saloon cars. The new consumption tax law was introduced in the "Provisional Regulations of the People's Republic of China on Consumption Tax", which increased the taxable consumer goods to 11 categories, including tobacco, alcoholic drinks and alcohol, cosmetics, skin-care and hair-care products, precious jewellery precious jade and stones, firecrackers and fireworks, gasoline, diesel oil, motor vehicle tyres, motorcycles and motor cars. Tax rates are from to 3% to 35% according to different goods listed in the regulation (M.O.F., 2000).

3.5.2.3 The improved business tax

The new business tax regulation was introduced in the "Provisional Regulations of the People's Republic of China on Business Tax"; tax payers are all units and individuals engaged in the provision of services listed in the regulation. There are nine taxable categories, namely, transportation and communication, construction, finance and insurance, post and telecommunications, culture and sports, entertainment, servicing, transfer in intangible, and sales of immovable. The tax rate is a flat rate from 3% to 5%, except for entertainment, which is from 5% to 20% (M.O.F., 2000).

3.5.2.4 The introduction of land value-added taxes

During the 1994 tax reform, a new tax, land value-added tax, was introduced in the "Provisional Regulations of the People's Republic of China on Land Value-added taxes" issued by the State Council. The taxpayers are all units and individuals who gain income from the transference of use rights of State-owned land and property rights of buildings and attached installations therein. The tax rate is a four-level progressive rate from 30% to 60 (M.O.F., 2000).

3.5.3 Other tax adjustments

Other than the major reforms regarding taxes that contributed to the majority share in the total tax revenue, adjustments and amendments were also applied on other small taxes.

The resource tax was introduced in the "Regulations of the People's Republic of China on Resource Tax (draft)" issued in 1984, and the taxpayers were all units and individuals engaged in the exploitation of natural resources listed in the regulation. This tax was further reformed and amended in 1994. On 25th December 1993, the State council had issued the "Provisional Regulations of the People's Republic of China on Resource Tax". The new regulation increased the taxable natural resource item number from 5 to 7, including crude oil, natural gas, coal, other non-metal ores, ferrous metal ores, nonferrous metal ores, and also salt. Since then, the resource tax and the salt tax has merged into a single resource tax.

The "Notice of the State Council on Matters Concerning to Abolish Bazaar Transaction tax, transaction tax on livestock, the special tax on industrial fuel, tax on the bonus of enterprises and adjustment tax on wages, and Delegate the authority of Administration of Slaughter Tax and Banquets Tax to local Governments" was issued on 23rd January 1994 by the State Council. According to the notice, all taxes mentioned above, except slaughter tax and banquet tax, were all abolished on 1st January 1994.

On 29th December 1993, the "Decision on the Use of Interim Regulation Concerning Value-added taxes, Consumption Taxes and Business Taxes on Foreign-funded Enterprises and Foreign Enterprises" was issued, and came into force on 1st January 1994. According to the decision, the consolidated industrial and commercial tax, which was only levied on Foreign-funded enterprises (FFEs) and foreign enterprises, was abolished. Instead, the FFEs and foreign enterprises became subjected to value-added tax, consumption tax and business tax. A more detailed and standardized document was issued the following year: the "Circular on Questions Related to Provisional Regulations Concerning Taxations Including Value-added Tax, Consumption

Tax and Business Tax Applicable to Enterprises with Foreign Investment and Foreign Enterprises", which was issued by the State Council on 22nd February 1994. According to this document, the FFEs and foreign enterprises are subject to a total of 11 taxes, including value-added tax, consumption tax, business tax, income tax on enterprises with foreign investment and foreign enterprises, land value-added tax, resources tax, stamp tax, slaughter tax, urban real estate tax, vehicle and vessel license plate tax, and contract tax.

3.5.4 The tax sharing system in 1994

Decentralization is the process of the assignment of fiscal, political, and administrative responsibilities to lower levels of government in a variety of forms and dimensions (Litvack, Ahmad, & Bird, 1998, p. 4). Fiscal decentralization is an important process in many reforms of former socialist countries, especially in the case of China, which made a great effort to break down the previous highly centralized fiscal system to establish a more decentralized fiscal system to suit the needs of the market economy (Shen et al., 2014).

The most important component in the fiscal decentralization process, from the aspect of revenue system reforms, is the division and restructuring of tax revenues. The tax revenue decentralization process in China began in the 1980s. On 5th September 1981, the State Council issued the "Suggestions Regarding the Reform of Industrial and Commercial Tax", and in the "suggestions" the initial concept of a tax revenue sharing system; hence, many revenue sharing system reforms were applied (Shen et al., 2014).

Before 1994, the tax revenue sharing scheme between central and local governments was mainly based on case-by-case negotiations. Local governments started to share some parts of the tax revenues, and acquired more powers for financing their needs (Zuo, 2008; Huang, Lo, & She, 2012).

Even though many sharing schemes were tried, the uneven balance in the distribution of revenue percentage, an improper tax sharing structure, and the rather complex application of the negotiated contract method of tax sharing

between central and local government led the fiscal performance of China to a situation of waning fiscal position of the overall government, rather weak macroeconomic adjustment power as well as the problem of the "two declines"[5]. (Zuo, 2008; Shen et al., 2014). Against this background and to deal with the problem of the "two declines", the fundamental fiscal reform, named the Tax Sharing System (TSS), was introduced in 1994.

On 15th December 1993, the State Council issued the "decision on the implementation of the tax sharing system in the fiscal administration system"; hence, a detailed and standardized rule of sharing the tax revenue between central and local government was formally introduced.

After the decision, the tax administrations were divided into national tax services and local tax services. Tax revenues were also divided into three parts with clear formula: central taxes, local taxes, and central-local shared taxes (Chou, 2009). Central taxes are classified as taxes that are essential for maintaining national objectives; local taxes are those taxes that are more suitable to be managed and collected by local governments; taxes that could be interpreted as more relevant to economic development were classified as central-local shared taxes (Shen *et al*., 2014).

According to the "decision", the detailed division of taxes are listed in the table 3-3.

Table 3-3: The classification of central, local, and central-local shared taxes according to the tax sharing system

	Customs duty
Central government taxes	Import related VAT and consumption tax
	Consumption tax
	Enterprise income tax from central government owned enterprises
	Enterprise income tax from local banks, foreign banks and other financial institutions
	Business tax, enterprise income tax, profits and city maintenance and construction tax from railroads, bank and insurance company headquarters
	Profits from central government-owned enterprises.

Local government taxes	Business tax excluding the central tax share Enterprise income tax from local enterprises excluding the central tax share City maintenance and construction tax excluding the central tax share Local enterprise profit Individual income tax Cities and towns land usage tax Orientation regulation tax on fixed assets investment Real estate tax Urban real estate tax Vehicle and vessel usage tax Vehicle and vessel usage tax license plate tax Stamp tax Slaughter tax Agriculture tax Animal husbandry tax Farmland occupation tax Contracts tax Land value-added tax
Central-local government shared taxes	Value added tax excluding central tax share (central 75% - local 25%) Resource tax (resource tax from marine oil exploitation belongs to the central government, all the rest belongs to the local government) Stamp tax from stock transactions (central 50% - local 50%)

Source: the State Council (1993) decision on the implementation of the tax sharing system in the fiscal administration system.

Since then, a complete tax sharing system was established, and this financial structure between central and local governments has become the fundamental tax revenue system in China today (Sun & Zhou, 2013).

3.5.5 Summary of the 1994 tax reform

By the end of 1994, the Chinese tax reform was almost completed. After the reform, there were a total of 23 taxes, which are: income tax on enterprises with foreign investment and foreign enterprises, individual income tax, enterprise income tax, resource tax, value added tax, business tax, consumption tax, city maintenance and construction tax, urban real estate tax, real estate tax, cities and towns land usage tax, vehicle and vessel license plate tax, vehicle and vessel usage tax, stamp tax, orientation regulation tax on fixed assets investment, farmland occupation tax, land value-added tax, banquet tax, contract tax, slaughter tax, agriculture tax, animal husbandry tax, customs duties, and tonnage dues (Liu, 2008).

The 1994 tax reforms, especially the establishment of the tax sharing system, has been a great influence on the China taxation system even until now

(Xiulin & Feizhou, 2013). The enterprises and individual income taxes were unified, the tax bases of the turnover taxes were extended to capture even more revenues, and other specific excise taxes were also further adjusted (Ahmad, Gao & Tanzi, 1995). Among the various reforms, the most influential one was the establishment of the tax sharing system. Since the tax sharing system, government tax revenues have been divided into central, local, and central-local shared taxes according to their function-based roles. (Litvack *et al*., 1998; Liu, 2000, 2008)

Some major reforms and related laws and regulations on taxes in 1994 are listed in the table 3-4.

Table 3-4: Major tax reforms and related laws and regulations in 1994

Taxes	Laws and regulations	Actions
Bazaar transaction tax	"Notice of the State Council on matters concerning the abolition of bazaar transaction tax, transaction tax on livestock, special tax on burning oil, tax on bonus of enterprises and adjustment tax on wages, and delegate the authority of administration of slaughter tax and banquet tax to local governments"	abolished
Transaction tax on livestock		
Special tax on burning oil		
Tax on bonus of state-owned enterprises		
Tax on bonus of collective enterprises		
Tax on bonus of public institutions		
Adjustment tax on wages of state-owned enterprises		
Consolidated industrial and commercial tax	"Decision on the Use of Interim Regulation Concerning Value-added taxes, Consumption Taxes and Business Taxes on Foreign-funded Enterprises and Foreign Enterprises"	
Value added tax		

Product tax	"Provisional Regulations of the People's Republic of China on Value-added Tax" (1993)	Merged into value added tax
Individual income tax	"Decision of the Standing Committee of the National People's Congress on Amending the Individual Income Tax Law of the People's Republic of China" (1993)	Merged into individual income tax
Individual income adjustment tax		
Income tax on individual unit of industry and commerce in cities		
Income tax on state-owned enterprises	"Provisional Regulations of the People's Republic of China on Enterprises Income Tax" (1993)	Merged into enterprise income tax
Income tax on collective enterprises		
Private enterprise income tax		
Adjustment tax on state-owned enterprises		
Resource tax	"Provisional Regulations of the People's Republic of China on Resource Tax" (1993)	Merged into resource tax
Salt tax		
Land value-added tax	"Provisional Regulations of the People's Republic of China on Land Value-added Taxes" (1994)	New tax introduced: Land value-added tax

Source: Adapted from The Law and Regulations Database (2015), lawinfochina.com.

3.6 Stage five: The simplification process of the China tax system after 1994

The 1994 tax reform shaped the main tax structure that has lasted until the present day. Since 1994, the main taxation system has not changed in its basic scale, but further adjustments and simplifications were made after 1994. Further tax reforms between 1995 and present day are listed in the table 3-5 below.

Table 3-5: Major tax reforms and related laws and regulations after 1995

Taxes	Laws and regulations	Actions
Vehicle Purchase tax	"Interim Regulation of the People's Republic of China on Vehicle Purchase Taxes" (2000)	Newly introduced
Agriculture specialty related taxes	"Notice of the Ministry of Finance and State Administration of Taxation on Abolishing Agriculture Specialty Tax Issues Excluding Tobacco Leaf" (2004)	The agriculture specialty tax was only collected on tobacco leaves
Agriculture tax	"the Decision of the Standing Committee of the National People's Congress on Abolishing the Regulation of the People's Republic of China on Agriculture Tax" (2005)	Abolished
Animal husbandry tax		
Agriculture tax on agricultural and forestry specialties	"Order No. 459 [2006] of the State Council—Abolishing the Provisions of the State Council Concerning Imposition of Agricultural Tax on Agricultural Specialty Income and the Provisional Regulations on Animal Slaughter Tax" (2006)	All agriculture related taxes were abolished except on tobacco leaves
Slaughter tax		
Tobacco leaf tax	"Notice of the Ministry of Finance and State Administration of Taxation on Abolishing Agriculture Specialty Tax Issues Excluding Tobacco Leaf" (2004) "Interim Regulation of the People's Republic of China on Tobacco Leaf Tax" (2006)	Left from the abolishment agriculture related taxes, and formally named as the "tobacco leaf tax"
Enterprise income tax	"Enterprise Income tax Law of the People's Republic of China" (2007)	Unified the enterprise income tax on both enterprises with domestic investment and enterprises with foreign investment. The income tax on enterprises with foreign investment and foreign enterprises, and the enterprise income tax has merged into a single unified enterprise income tax
House property tax	"Order No. 546 of the State Council of the People's Republic of China on abolishing the Interim Regulation on Urban Real Estate Tax" (2009)	Merged the real estate tax and the urban real estate tax.
Banquet tax	"Decision of the State Council on Abolishing Some Administrative Regulations" (2008)	Abolished
Vessel tonnage tax	"Interim Regulation of the People's Republic of China on Vessel Tonnage Tax" (2011)	Replaced the old tonnage due regulations issued in 1952 with more formalized and standardized regulations, also higher tax rates.
Orientation regulation tax on fixed assets investment	"Decision of the State Council on Amending and Repealing Some Administrative Regulations" (2013)	Abolished

3.6.1 Summary of the post 1994 tax adjustments

Until 2014, the current Chinese tax system was complete with 18 taxes by 2013. According to the State Administration of Taxation of The People's Republic of China, China now has 18 tax categories: (1) Value Added Tax, (2) Consumption Tax, (3) Business Tax, (4) Enterprise Income Tax, (5) Individual Income Tax, (6) Resource Tax, (7) Urban and Township Land Use Tax, (8) House Property Tax, (9) City Maintenance and Construction Tax, (10) Tax on the Use of Arable Land, (11) Land Appreciation Tax, (12) Vehicle Purchase Tax, (13) Vehicle and Vessel Tax, (14) Stamp Tax, (15) Deed Tax, (16) Tobacco Leaf Tax, (17) Customs Duty, and (18) Tonnage Dues. The first 16 tax categories are collected by tax authorities. Customs duty, Tonnage Dues, along with the import VAT and import consumption tax are collected by customs (M.O.F., 2014).

The post 1994 tax reforms were mostly adjustments and amendments to the taxation details; the basic structure has not changed until today. The turnover taxes continue to play a dominant role in the taxation revenue system, and the tax sharing system is still the fundamental structure between the central and local tax revenue relationship (Shen et al., 2012; Shen et al., 2014).

Chapter four: China's central and local fiscal revenue performance and its main characteristics

4.1 Introduction

The market-oriented economic system reform, which was launched in the late 1970s, was a milestone in China's economic development (Brean, 2013). Accompanied by fast paced GDP growth, China's central and local fiscal revenue performance also experienced many changes; in particular the establishment of the Tax Sharing System in 1994, which reshaped the revenue relationship between the central and local governments (Chou, 2009; Sun & Zhou, 2013).

In this Chapter, the main purpose is to evaluate the main characteristics of China's fiscal revenue and its performance, especially the relationship between central and local governments. A detailed fiscal revenue classification in China is discussed in section 4.2, particularly focused on the concepts and the scale of tax revenue, non-tax revenue, non-tax sourced revenue, budgetary revenue, off-budgetary revenue and extra-budgetary revenue. The development of the central transfer system from central government to local governments are presented in Section 4.3 due to the fact that the government transfer system is a key component in the country's fiscal system, and also a key link between the central and local government revenues. Section 4.4 provides a brief outline of the budgetary revenue performance and its main characteristics before the market oriented reforms. Section 4.5 is mainly focused on the decline of the two ratios during the period between 1978 and 1993. The two ratios stand for the ratio of total budgetary revenue to the GDP, and the ratio of central government budgetary revenue to the total government budgetary revenue. In section 4.6, the budgetary revenue performance after the establishment of the tax sharing system in 1994 is discussed. Section 4.7 is focused on the non-tax sourced revenue performance and characteristics in China. Both the extra-budgetary revenue and off-budgetary revenue are discussed at both central and local government levels. Finally, a summary of this chapter is presented in section 4.8.

4.2 China's fiscal revenue categories

According to the Government Finance Statistics Manual (GFSM) published by the International Monetary Fund (IMF), by the classification of the source of revenue, the fiscal revenue is mainly composed of two main sources, namely, the tax revenue, with revenues from tax collections, and non-tax revenues such as grants, property income, sale of goods and services, and social contributions (IMF, 2001, pp. 47-48).

However, in China, the term "non-tax revenue" had never been clearly defined in terms of its concepts and measurements until the early 21st century (Gao, 2010). Before the official definition of "non-tax revenue", the definition and calculation of non-tax sourced revenues were rather blurry in official statistical documents. This is due to the reality that in the statistical yearbook, instead of using the term of tax revenue and non-tax revenue, fiscal revenue in China's official documents was more often represented by budgetary revenue and extra-budgetary revenue before 2010.

Thus, when studying the Chinese fiscal revenue performance, distinguishing between the budgetary revenue and the extra-budgetary revenue is the essential early step.

It is clear that by the classification of the revenue sources, government revenue can be divided into tax revenue and non-tax revenue parts (IMF, 2001). However, in contrast, according to the different style and level of administrations in China, government revenues can also be classified into budgetary revenues and extra-budgetary revenues, where budgetary revenues are government organs, agencies, institutions and social group organizations (in general terms: public units), lawfully gained revenues that are under the national budgetary management, whereas extra-budgetary revenues are defined as the lawfully gained revenues that are collected and managed by individual public units (The State Council, 1996).

The definition of budgetary revenue and extra budgetary revenue reveals that the main difference between the budgetary revenue and the extra-budgetary

revenue is their level of administration. The budgetary revenue is the fiscal revenue that is under the central budgetary administration and management, whereas the authority for collecting, spending and re-allocating extra budgetary revenue remain in the individual units that receive extra budgetary revenue (Tong *et al*., 2013). The extra budgetary revenues include, for example, various fees and fines, revenue from public service institutions, villages and towns self-raised funds or pooled funds (Lin, 2000). Tax revenue, therefore, is classified as a component of budgetary revenue, because taxes, including central, local and central-local shared taxes, are all pre-settled by the central government and under strict budgetary administration.

Hence, it is clear that there are four components in the Chinese fiscal system, namely, the tax revenue and non-tax revenue according to their sources; budgetary revenue and non-budgetary revenue according to their administration style and level. However, the scale of these four revenues is not clearly separate from each other, especially the concepts and scale between the non-tax revenue and extra-budgetary revenue.

Due to the uniqueness of the extra-budgetary revenue in China's fiscal system, the definition of non-tax revenue could be a little confusing. As a broad definition, the non-tax revenue is all government lawful revenue from sources other than taxes (IMF, 2001). In the case of China, there are two types of IMF defined non-tax revenue: budgetary non-tax revenue, which is the non-tax sourced revenue under budgetary managed, often called off budgetary revenue; and non-budgetary non-tax revenue, which is outside the budgetary management, namely the extra budgetary revenue. In other words, the extra budgetary revenue is equivalent to the non-budgetary non-tax revenue.

In reality, the term of "non-tax revenue" appeared in the official documents without a clear definition and it was not until early 21st century that the definition and scope were finally given by the Ministry of Finance (M.O.F., 2002, 2004).

According to the official document, the non-tax revenue is the non-tax sourced, lawfully gained fiscal funds by central, local governments, government institutions, institutional organizations, government agencies and other public organizations, for the purpose of satisfying quasi or general public needs (M.O.F., 2002, 2004). The scope of non-tax revenue includes all the off-budgetary revenue. However, it does not include some of the extra-budgetary revenue, such as the social security fund and legal reserves of housing acquisition (M.O.F., 2002, 2004).

Figure 4-1 shows the fiscal revenue decomposed by the different categories according to their revenue sources, and different administration styles and levels.

Figure 4-1: Structure of China's fiscal revenues
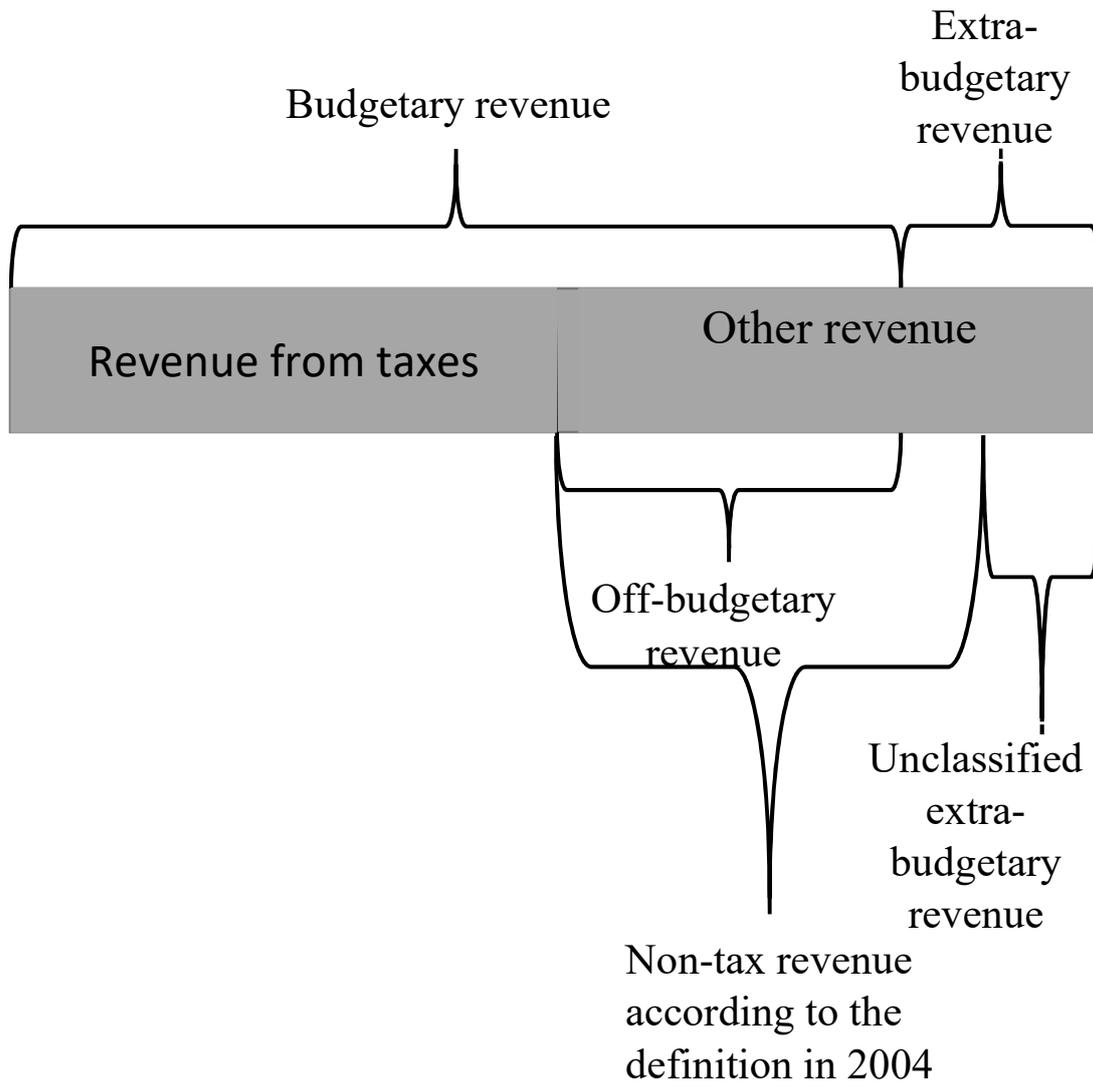
The lack of clear definition in the early years and the complex structure of the non-tax revenue have resulted in an understanding where non-tax revenue in different studies indicates different meanings. Hence, in this study, all government fiscal revenue apart from taxes is defined as the non-tax sourced revenue. Revenue from taxes is defined as the tax revenue. The portion of non-tax sourced revenue under the central budget control and administration is classified as the off-budgetary revenue. Other non-tax sourced revenue outside the central budget control and administration are defined as the extra-budgetary revenue. The budgetary non-tax revenue and the off-budgetary

revenue are interchangeable in the following sections. Figure 4-2 is the re-classified fiscal revenue categories for the convenience of this study.

Figure 4-2: Re-categorized fiscal revenue structure

Fiscal revenue

| Tax revenue | Non-tax sourced revenue |

Off-budgetary revenue

Budgetary revenue

Extra-budgetary revenue
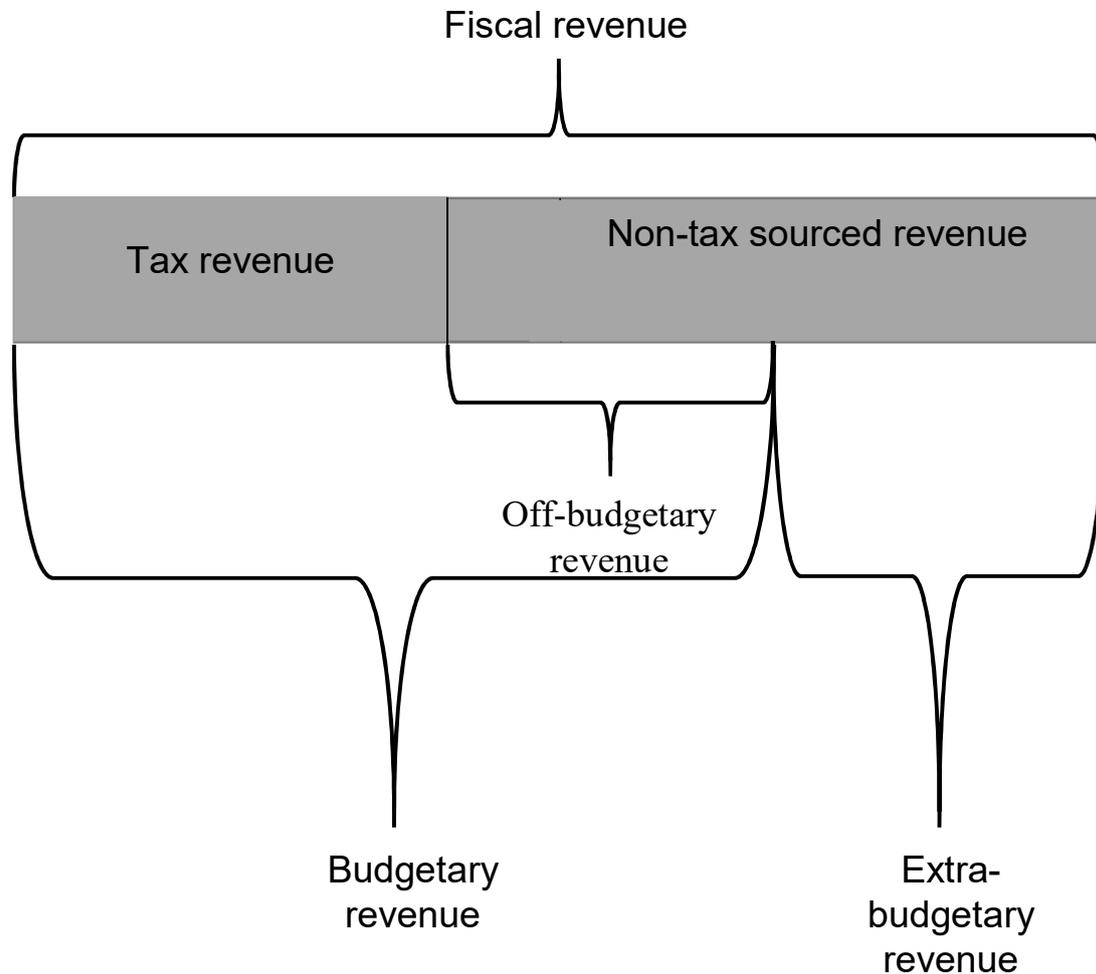
4.3 The transfer system from central to local governments

It is widely acknowledged that the government transfer system is a key component in the country's fiscal system and has an important impact on the central-local government fiscal relationship. In order to better understand the central and local fiscal revenue relationship, the development of the central transfer system in China is examined in this section.

Central government's macroscopic readjustment and control is highly reliant on the central transfer system, and the transfer system is essential in terms of balancing fiscal power between local governments, resource redistribution, narrowing inequality, as well as for the purpose of the long lasting political stability of the country (Bergvall, Charbit, Kraan, & Merk, 2006; Boadway & Shah, 2007; Egger, Koethenbuerger, & Smart, 2010; Ma, 1995; Oates, 1999).

The transfer system in China has experienced numerous reforms and adjustments in the last thirty years. According to the different characteristics, the intergovernmental transfers can be classified into three categories: general transfer, special transfer, and tax rebates (Jin, 2007).

The main purpose of the central transfer payments is to relieve financial stress and to balance the fiscal disparities of local governments, whereas the purpose of special transfer payments is to serve the central political agenda and to rectify local expenditure preference (Dong, 2013). The tax rebates however, were newly introduced after the tax sharing system. The main purpose of the tax rebates was to maintain the incentives of relatively better developed areas.

4.3.1 The transfer system before the tax sharing system (pre 1994)

Before the 1878 open door reform, the central transfer system from central to local governments was simple and direct. The fiscal principle in the pre-reform period was Tongshou Tongzhi, which means "uniform collection and uniform spending". Under this driving principle, all local revenues and expenditures were budgeted by the central government, and the central transfer was simple and straight, and quite efficient under the planned economy.

However, this kind of transfer system sacrificed entirely the local incentives of raising fiscal revenues because the fiscal revenue was handed totally to the central government and any budget deficit was automatically filled by the central transfer (Lin, 2009; Shen, 2011; Wong, 2000).

After the open door reform in the late 1970s, China's economy was experiencing tremendous changes; the mechanism of the planned economy broke down, along with a huge fiscal system reform. During the reform period, the main purpose of the central transfer was still, as it was before, filling the fiscal gaps, with some other mixed adjustment functions under the newly introduced contract responsibility system between central and local governments (Shen, 2011).

Under the newly introduced contract responsibility system, there were mainly six different types of intergovernmental transfers according to its functions and calculation method. These were the income share transfer, fixed amount grants, fixed amount submit, and special founding introduced in 1980, the fixed ratio submit introduced in 1985, and the progressive increase rates submit which was introduced in 1988 (Jin, 2007).

The Table below 4-1 displays the main characteristics of six main transfers.

Table 4-1: Types of intergovernmental transfers between 1980 and 1993

Types of intergovernmental transfers between 1980 and 1993	
Income share transfer	(1980 – 1993) General transfers from central to local, amount was based on the revenue sharing method/ratio between central and local. Ratio was vary in different provinces and in different years.
Fixed amount grants	(1980-1993) General transfers from central to local, unconditional central transfer for the purpose of balancing fiscal of particular among local governments.
Fixed amount submit	(1980 – 1993) General transfers from relatively richer local governments to the central government, a specific amount of revenue is required to submit to the central government.
Fixed ratio submit	(1985 – 1993) General transfers from relatively richer local governments to the central government, a specific ratio of revenue is required to submit to the central government.
Progressive increase rates submit	(1988 – 1993) General transfers from relatively richer local governments to the central government, a specific amount of revenue, which calculated based in the revenue increase rate in vary years, was required to submit to the central government.
Special funding	(1980 – 1993) Special transfers from central to local, unconditional central transfer for the purpose of financing fiscal deficient/special difficulties of particular local governments

4.3.2 The transfer system after the tax sharing system (1994 – present)

During the 1994 reform, on the basis of the restructured revenue system, the transfer system between central and local governments was also reformed in terms of the amount and form. It was after the tax sharing reform, the intergovernmental transfers were turned into a formula-based system. In order to avoid huge shocks to the transfer system, the central government decided to maintain the majority of the general transfer methods and process the reform step by step (M.O.F., 2000).

In order to structure a transfer system which matched the new tax sharing system, in 1995, the Ministry of Finance issued the "Interim implementation regarding the intergovernmental transfers", which marked the first step of the general transfer reforms. Since then until 2011, the Ministry of Finance issued the same interim implementations each year with a more formulized and standardized transfer adjustments. During the reform period, there were mainly four types central transfer mechanisms, namely the tax rebates, fixed subsidies, special transfers, and equalization transfers (M.O.F., 2000)

4.3.2.1 The introduction of tax rebates

In order to smooth the impact of the tax sharing reforms to the local governments, and also maintain the incentive of local governments, a new central transfer was introduced in 1994, namely the tax rebates. The basic concept of tax rebates is that the central government would return part of the tax revenue to the local governments. The tax rebates first involved VAT and consumption tax. Later in 2002, the personal income tax and enterprise income tax were also bought under the tax rebate program (M.O.F., 2000).

It is worth commenting that the tax rebates are calculated according to the base year, which results in a relatively poorer adjustment power on the issue of fiscal disparities. Since the richer provinces have larger tax revenues compared to less developed provinces, a larger share of tax rebates are also retained in richer provinces. This has potentially created a problem: the rich provinces have more tax rebates, hence they have more fiscal power to

finance their development; whereas the poorer provinces, with a relatively small tax rebate base, receive a much smaller share of the tax rebate, thus, the tax rebates are working as a function of creating fiscal disparities (Martinez, Qian, Wang, & Zou, 2006; Wong, 2000).

4.3.2.2 Fixed subsidies

In order to replace the old annually negotiated transfer mechanism by a more formula based mechanism, the central government introduced the "fixed subsidies" transfer. The fixed subsidies replaced the majority of the old negotiated transfer methods. The number of transfers was calculated by a formula which set the base year as 1993. One of the important properties of this calculation is that local governments were guaranteed to receive a size of transfer which was not less than the level in 1993. However the purpose of this transfer was to reduce the remaining revenue held by local governments, and it was expected to be replaced by an equalization transfer by shrinking its size from time to time (Ahmad, Li, & Richardson; 2002; Ma & Norregaard, 1998).

4.3.2.3 Special transfers

The special transfer was partly continued from the old transfer system, but increased the scale and extended into more details. A special transfer was a conditional transfer, which was directly financed and administered by the central government. Different from other transfers however, it was based on an ad hoc negotiated basis. This is due to the fact that a special transfer was delivered to different areas in various periods, to serve purposes as varied as disaster relief, environmental projects, price subsidies, education projects, for example, in specific regions or areas. Ad hoc negotiation was the practical choice for the special transfer (M.O.F., 2000).

4.3.2.4 Equalization transfers

The new equalization transfer was also partly continued from the old general transfer system, but categorised separately according to its equalization function. The main function of the equalization transfer is to balance the rapid

increase of local fiscal gaps and regional disparities. It is worth mentioning that the equalization transfer is the most formulized transfer in the early stage of the reforms. the variables in the calculation of local expenditure needs includes all kinds of objective factors such as the number of civil servants, regional wage disparities, population factors, and GDP; later in 1997, factors such as local fiscal capacities were also taken into the calculation (Ahmad et al., 2000; Ma & Norregaard, 1998; Wang, 2002).

4.3.3 The development of central transfers

Even though the official terms of general transfer have changed name a few times since 2002, the different names are only to indicate the political preferences of central government; the characteristics and nature of the general transfer has not changed, but categorized under different names according to their functions (Han, 2014).

Under the new revenue sharing system, the number of central transfers has been increasing steadily. Figure 4-3 below is the percentage share of central transfers in the total central expenditure between 1990 and 2013.

Figure 4-3: Percentage of central transfers in the total central expenditures 1990 - 2013
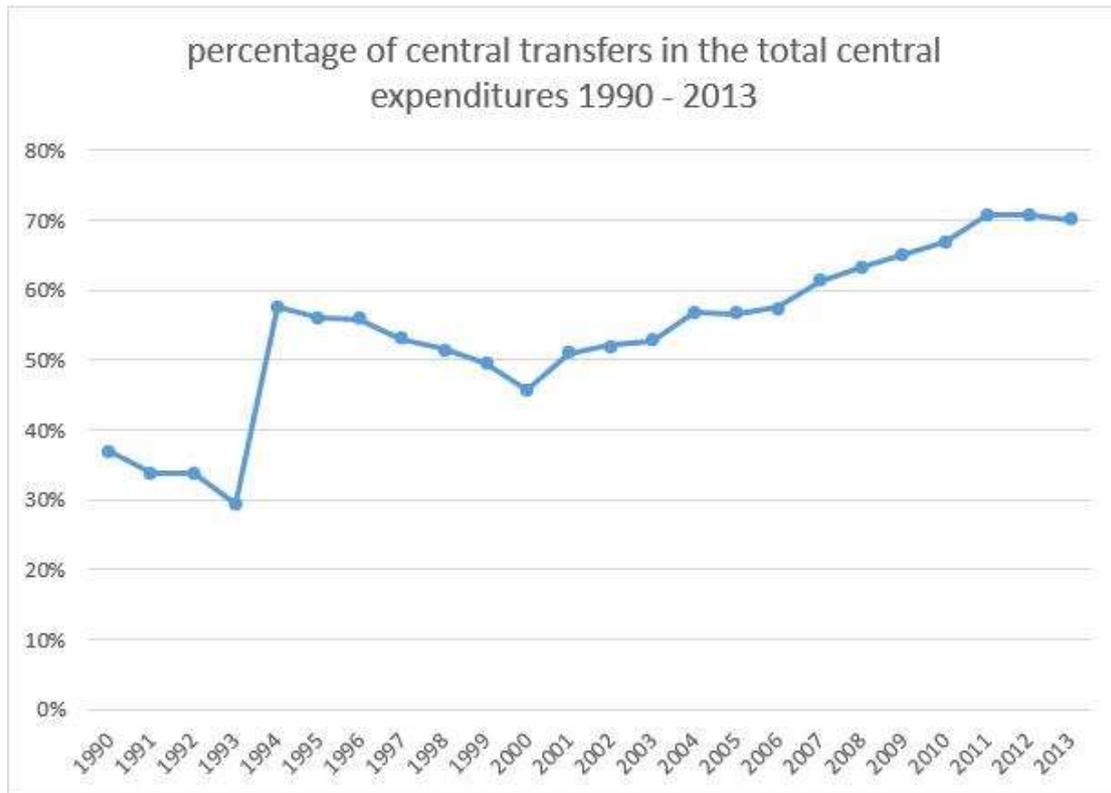
Data source: M.O.F. (1995-2015)

It is clear that to see that before the 1994 tax sharing reform, the share of the total central transfer was maintained below 40%, however this figure had jumped to 58% in 1994. Until the present day, over 70% of total central government expenditure is taken by the central transfers.

In contrast, from the local governments' aspect, in 2011, for example, 44% of the total local fiscal revenue was dependent on the central transfer. Particularly in the western areas, the central transfers contributed over 60% of western governments' total fiscal revenues (Dong, 2013).

4.4   The budgetary revenue before 1978

The major sources of government revenue during the pre-1978 period came from profits and taxes from State Owned Enterprises (SOEs), and the state required SOEs to hand in all their profits (Lin, 2009). The budgetary principle was called Tongshou Tongzhi, which means "uniform collection and uniform spending" (Lin, 2009). "Uniform collection" can be explained in the way that all

the profits are subjected to the central government; and "uniform spending" means that almost everything, even including the prices of the production, the total amount of the output and total number of sale, were all decided and budgeted by the central government (Yang, 2001; Shen et al., 2012).

As the central government treated the revenue from SOEs as its main revenue, other budgetary revenue, mainly taxes, were regarded as something that mainly related to private economies (Xu & Cui, 2011). According to the National Bureau of Statistics of PRC (2014) and the China Financial Year Book: Compilation of 50 Years (1949-1999), in the year of 1978, the total tax revenue was only 45.86% of the total government revenue, whereas the total revenue from the SOEs accounted for 50.52% of the total public government revenue (N.B.S., 2014; M.O.F., 2000).

It may be noted that within the budgetary revenue, the tax structure in the pre-1978 period was very unbalanced. The industrial and commercial tax, which was mainly from the SOEs, was contributing on average over 80% to the total government tax revenues compared to other tax revenues between 1950 and 1978 (Wang, 1984).

The figure 4-4 is an illustration of the industrial and commercial tax revenues as percentage of total government tax revenue.

Figure 4-4: Industrial and commercial tax revenues as percentage of total government tax revenue: 1950 – 1978

Data source: N.B.S. (2000)

The Milestone in China's economic development was the market-oriented economic reforms started in the late 1970s. After the launching of the reforms, the state had put more effort on changing the economic system from a planned economy to a market-oriented economic system (Jia & Zhao, 2008). The purpose of this reform was to improve production efficiency through economic decentralization, and the budgetary revenue reform was considered as the vital part in the new market-oriented economic reforms (Lin, 2000).

4.5 The Decrease of two ratios between 1978 and 1993

In December 1978, during the Third Plenary session of the eleventh central committee of the Chinese communist party, the authorities decided to adjust the policy focus of the nation from cultural and political revolution to economic and technological progress by setting the goal of "four modernizations", making economic development as the top priority for the country (Yueh, 2010). The aspects of the four modernizations are agriculture, industry, science and technology, and the military establishment (Mackerras, McMillen, & Watson, 2003, p. 95). Many "open door" policies were applied afterwards,

and the role of taxation was considered to be very important in achieving the "four modernizations" (Liu, 2000).

Through 15 years of reform since 1978, China's economy experienced rapid growth. The real GDP (base year = 1978) in 1978 was 365.02 billion yuan. Only eight years later in 1986, the real GDP reached 766.28 billion yuan, double the figure in 1978. By the end of 1994, the real GSP level in China had reached 1660.63 billion yuan, which was already over 4.5 times larger than the level in 1978 (N.B.S., 1978-2015).

Accompanied with the remarkable economic growth, China's tax revenues also experienced a great increase. The total tax income in 1978 was 51.93 billion yuan, which contributed only 46% of the total budgetary revenue; whereas in 1993, this figure increased to 97% of the total budgetary revenue with the amount of 425.53 billion yuan; the importance of taxation had begun to attain top priority in the total fiscal revenue. (M.O.F., 2000)

Even though China had achieved great economic success through the opening up policy and reforms, it was not without problems. Along with the great achievement, there were problems which existed that diminished the success of the rapid growth of GDP, especially regarding the central and local budgetary revenue performance.

4.5.1 The decrease of budgetary revenue share in GDP

Taking advantage of the open door policy between 1978 and 1993, China's GDP had experienced rapid growth. The total budgetary revenue increased alongside the GDP, but at a much slower pace compared to the GDP. In 1978, the total budgetary revenue was 113.23 billion yuan, the share of total budgetary revenue in the GDP was 31%, whereas this figure had dropped to 22% in 1985, 16% in 1990 and 11% in 1994 (M.O.F., 2000).

Figure 4-5 below shows the percentage of budgetary revenue in GDP changes over the period of 1978 to 1994.

Figure 4-5: The total public budgetary revenue share in GDP: 1978 – 1994

The total public budgetary revenue as percentage of GDP
1978-1994
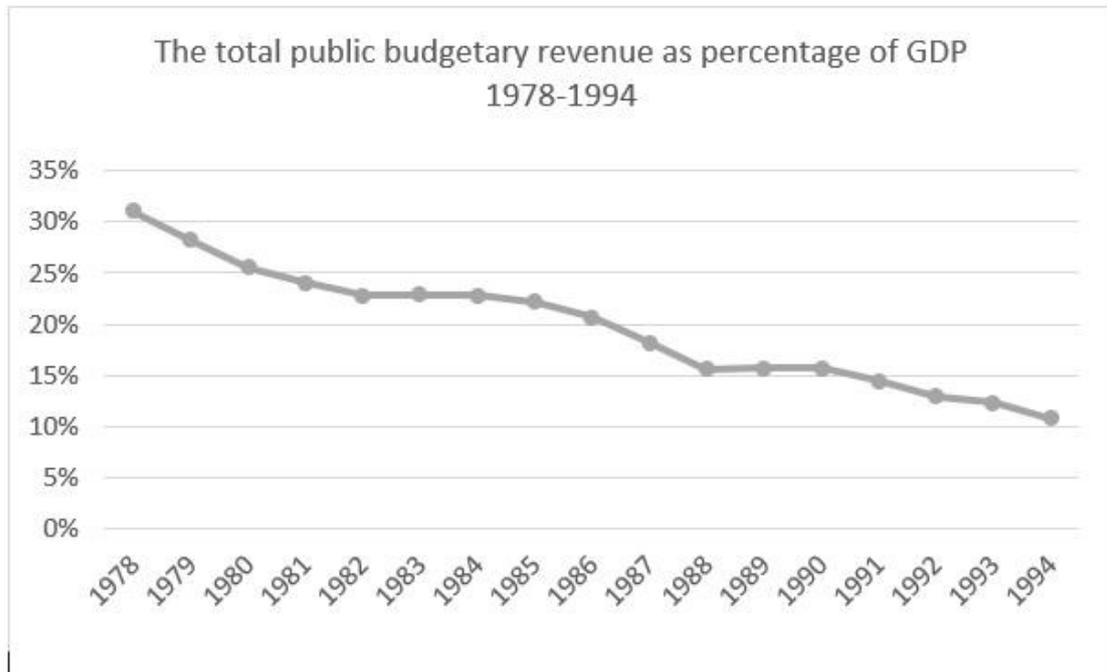
Data source: N.B.S. (2000) China financial yearbook, compilation of 50 years: 1949-1999.

As noted earlier at the beginning of this section, the share of tax revenue in the total budgetary revenue had increased from 46% in 1978 to 97% in 1993. However, due to the poor performance of the budgetary revenue share in GDP, tax revenue was in fact decreasing as a percentage share of GDP during the period 1978 to 1994. The ratio of tax revenue and the GDP in 1978 was 14%; during the first six years after the open door policy, it remained at 13%. In 1985, caused by the first and second steps of "Li Gai Shui", which led to a huge amount of SOEs' profits becoming industrial and commercial related taxes, the ratio of tax revenue and the GDP jumped to 23%; however, since 1986, this figure has experienced a sharp and steady downward trend. In 1993, the tax revenue only accounted for 12% of the GDP, which was even lower than the figure in 1978 (M.O.F., 2000).

4.5.2 The decrease of Central government budgetary revenue among the total government budgetary revenue

With the downward trend in the budgetary revenue share in the GDP, the share of the central government budgetary revenue in China's total fiscal

revenue has also declined since the mid-1980s. The shifting of the budgetary revenue share between central and local governments can be explained by various fiscal responsibility systems that were introduced during the period between early 1980 and 1994.

During the period of 1980 and 1994, in order to boost the incentive of local government to collect revenues, the process of fiscal administrative decentralization was initialized by the introduction of a series of uniform-sharing formulae, named "the Contract Responsibility system" (Ahmad *et al.*, 2002; Shiyi & Jun, 2009). According to the contract responsibility system, the fiscal revenue was divided into three main parts, namely central-fixed revenues, local-fixed revenues, and shared revenues. The sharing rules were determined and settled by the central government (Wang *et al.*, 2009).

During the period of 1980 to 1984, under the newly introduced uniform sharing system, a large fiscal disparity was created due to the fact that the uniform sharing system had boosted the surpluses in the wealthy provinces, and led to the poor provinces suffering more heavily from fiscal deficits (Shen *et al.*, 2012). In order to solve the problem caused by the uniform sharing system, two adjustments regarding the central-local revenue sharing system were introduced between 1985 and 1993. One is the redesigned revenue-sharing arrangement responsibility system, which was introduced in 1985, and the other is the fiscal contracting system, introduced in 1988 (Jia & Zhao, 2008).

Under the new arrangements introduced in 1985, the revenue-sharing ratio between central and local governments was adjusted according to the budget balances in the previous years (Jia & Zhao, 2008). Hence, the wealthy provinces shared less revenue with the local government, and poorer provinces were allowed to retain more shared revenue. Provinces were required to set up the revenue and expenditure targets, and local expenditure was required to be financed by the local government's own self-generated revenues and retained shared revenues (Wang et al., 2009; Shen *et al.*, 2012).

The introduction of the shared revenue system between central and local government led to an increase of central government revenue share in the total fiscal revenue in the early 1980s; however, the later revenue system adjustments caused a steady decrease in the central government revenue after 1984 (M.O.F., 2000). The central government revenue relied heavily on tax revenues from local governments, however, local provinces were less willing to raise budgetary revenue due to the existence of the floating rate of shared revenues (Ma, 2005). In contrast, as a result of the 1988 fiscal contracting system, the local governments were responsible for their own fiscal expenditure, hence, a great effort was put into the raising of off-budgetary revenues, which was much less regulated by the revenue sharing system (Ma, 2005; Shen *et al.*, 2012).

Figure 4-6 illustrates the declining trend of the percentage of central government budgetary revenues in total national budgetary revenue between 1978 and 1993, with a comparison with the local government budgetary revenue.

Figure 4-6: The decline of the central government budgetary revenue:
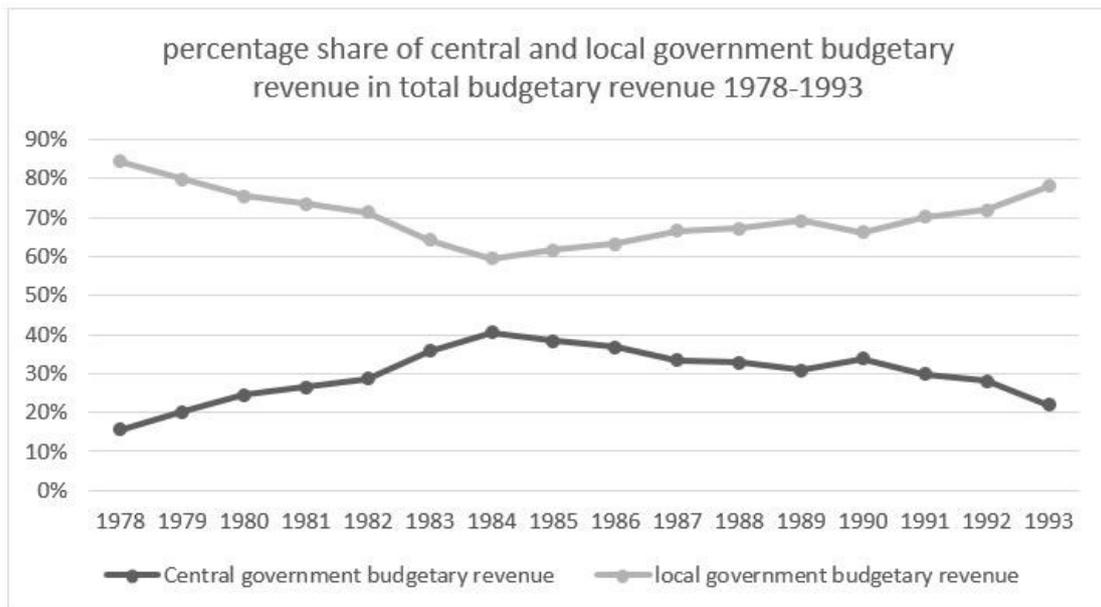
Data source: M.O.F. (2000)
[Note: a] the central and local revenue in this table represents the income from central and local level governments themselves.
[Note: b] The figure here excludes debt revenues.

It can be seen from figure 4-6 that since the launch of the opening up policy in 1978, the proportion of the central government budgetary revenue in the total government budgetary revenue mounted steadily, from nearly 15% to 40% in 1984. In contrast, after the reform of the industrial and commercial taxes in 1984, the proportion of central government budgetary revenue dropped steadily alongside the introduction of various contract responsibility systems between 1985 and 1993. By 1993, the central government budgetary revenue only accounted for 22% of the total government revenue. The steady decline in the central government revenue seriously weakened the power of bridging income inequality, and affected the important public services that were sustained by the central government (Shen *et al.*, 2012).

4.6   Budgetary revenue performance and its main characteristics following the tax sharing system

The decline of the two ratios, namely, the ratio of budgetary revenue in GDP and the ratio of central government budgetary revenue in total government budgetary revenue, led the central government into great fiscal stress, and the term "the problem of the two ratios" was soon widely recognized in China, especially by the central government (Wong & Bird, 2008).

Against this background, the key turning point of the fiscal relationship between the central and local government, a tax sharing system was introduced, and it fundamentally re-shaped the fiscal structure and central-local fiscal relationship in China (Jia & Zhao, 2008). The tax sharing system completely changed the tax revenue division method between central and local governments from the arrangement based on a uniform formula based method (Chou, 2009).

The newly designed revenue sharing system had replaced the previous case-by-case negotiation contract system, the largest component in the tax revenue, the turn over taxes, was reformed into the Value Added Tax, and the central government is taking the majority share (Liu, 2008).

The newly established "National Tax Bureau" controls the central tax and central-local shared tax collections, and the "Local Tax Bureau is only responsible for the local taxes. The separate central and local tax bureaus have restrained the local authorities' tax exemption policies, and all the provincial level turn over tax reductions and exemptions have been abolished by the National Tax Services (Wong, 2000). Furthermore, any tax reductions or exemptions in the future must be approved by the National Tax Bureau and reported in a separate schedule of tax return (Shen, 2011). Through a tightened fiscal control, the 1994 fiscal reform recentralized the fiscal system (Wong, 2000; Wang *et al*., 2009; Shen, 2011).

4.6.1 Increased budgetary revenue share in GDP

One of the great achievements of the 1994 fiscal reform and tax sharing system was the increase in the government revenue share in the GDP. Figure 4-7 below indicates the upward trend of the budgetary revenue as a percentage of the GDP.

Figure 4-7: Total government budgetary share in GDP: 1978 – 2013
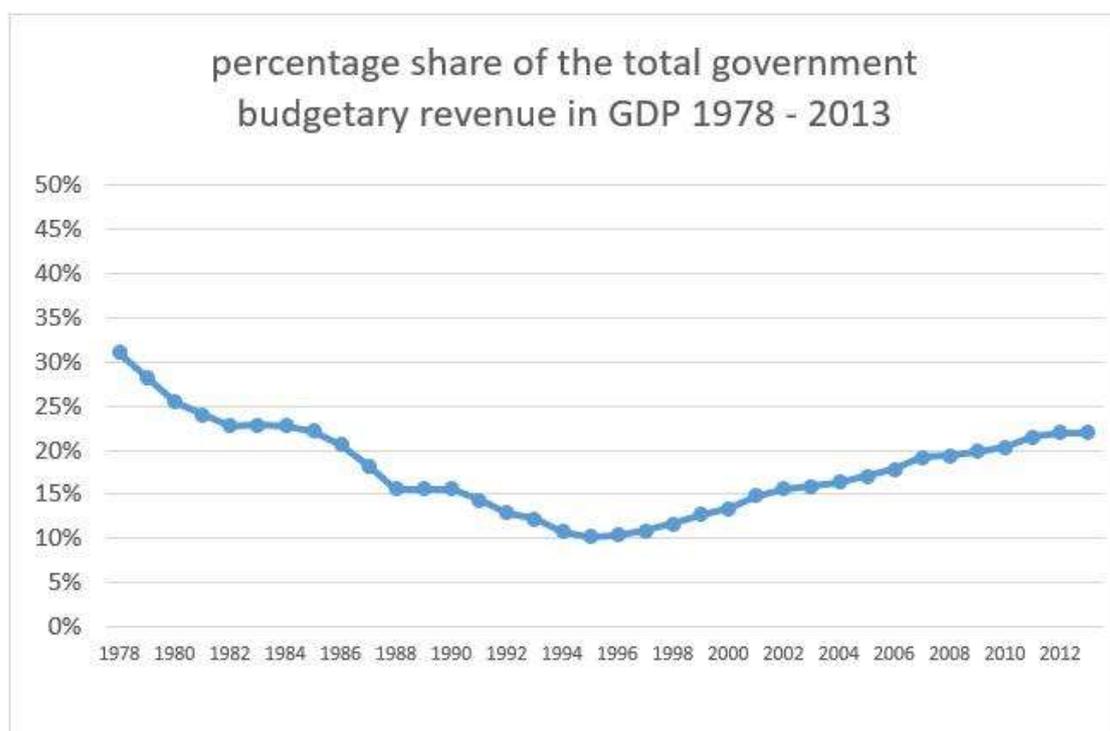
Data source: N.B.S. (1978-2015)

From Figure 4-7 above, it is evident that since the open door policy in 1978, the government budgetary revenue share in GDP decreased steadily. However, the situation fundamentally changed after the 1994 reform. Since then, a clear and steady increase has been observed, lasting until 2013.

4.6.2 Increase in the central government budgetary revenue share in the total budgetary revenue

The 1994 reform turned the tide in the decrease in fiscal revenue share; however, the greatest achievement of the 1994 reform was the sharp jump of the central government's fiscal revenue in the share of total government revenue. Figure 4-8 below shows the trend of central government budgetary revenue as a percentage of the total government budgetary revenue.

Figure 4-8: Central government budgetary revenue share in total government budgetary revenue: 1978 – 2012
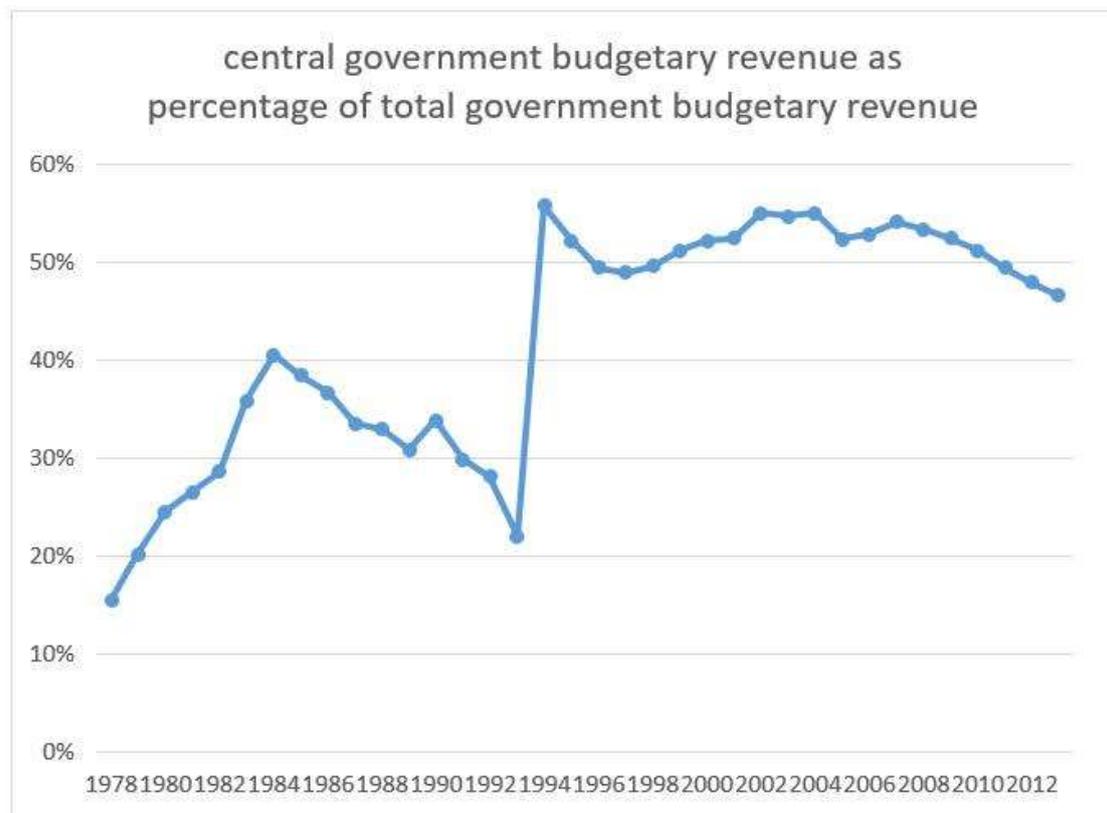
Data source: M.O.F. (1995-2015, 2000)

According to figure 4-8, the central government budgetary revenue share in 1993 accounted only for 22% of the total government revenue; however, this

figure had jumped to more than 55% in 1994, a one-off increase in the central revenues in just one year.

4.6.3 Unbalanced tax burden distribution between different taxes

Even though by 1993, China had as many as 38 taxes, the distribution of taxes in total tax revenue was very unbalanced. Tax revenue from value-added tax was 108.15 billion Yuan in 1993, and business tax collected 96.61 billion Yuan in the same year. The share of these two taxes in the total tax revenue in 1993 reached almost 50% of the total tax revenue. In the 425.53 billion total tax revenue in 1993, the total revenue from the value-added tax, business tax, product tax, state-owned enterprises income tax, and custom duties reached 370.84 billion Yuan, which accounted for over 87% of the total tax revenue. Other than these five taxes, the remaining 33 taxes contributed less than 13% to the total tax revenue. (M.O.F., 2000) Figure 4-9 depicts the unbalanced tax contribution by various taxes in 1993.

Figure 4-9: Unbalanced tax contribution to the overall tax revenue: 1993
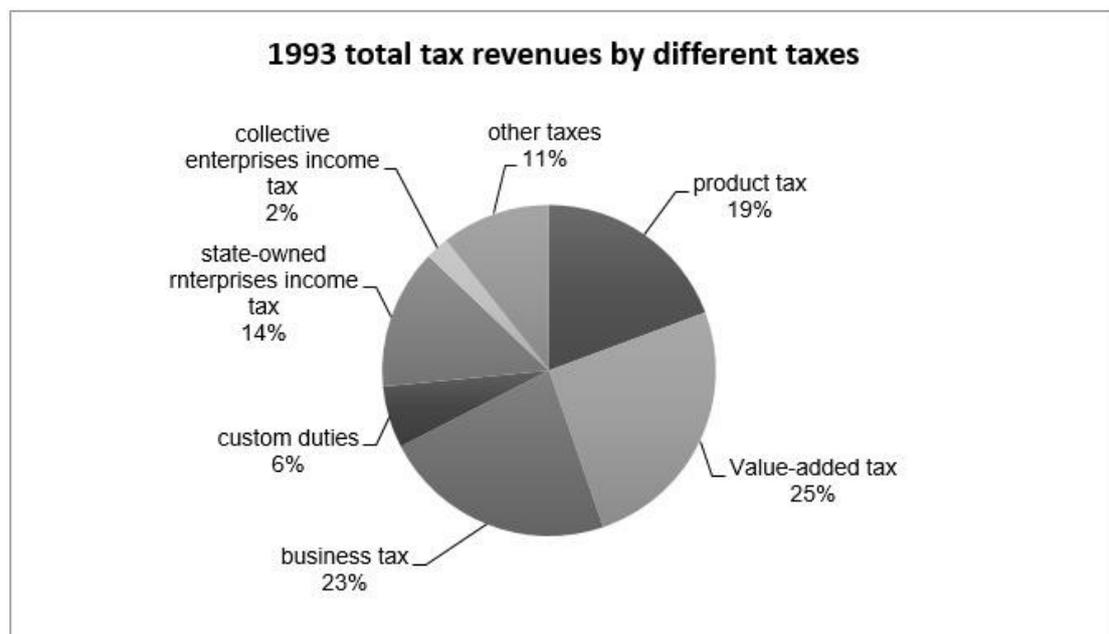
Data source: M.O.F. (2000)

After the tax sharing reform, value added tax, consumption tax, business tax and enterprise income tax were still the dominant tax sources.

Figure 4-10 depicts the average tax contribution by various taxes between 1994 and 2013.

Figure 4-10: Unbalanced tax contribution to the overall tax revenue: 1994 – 2013
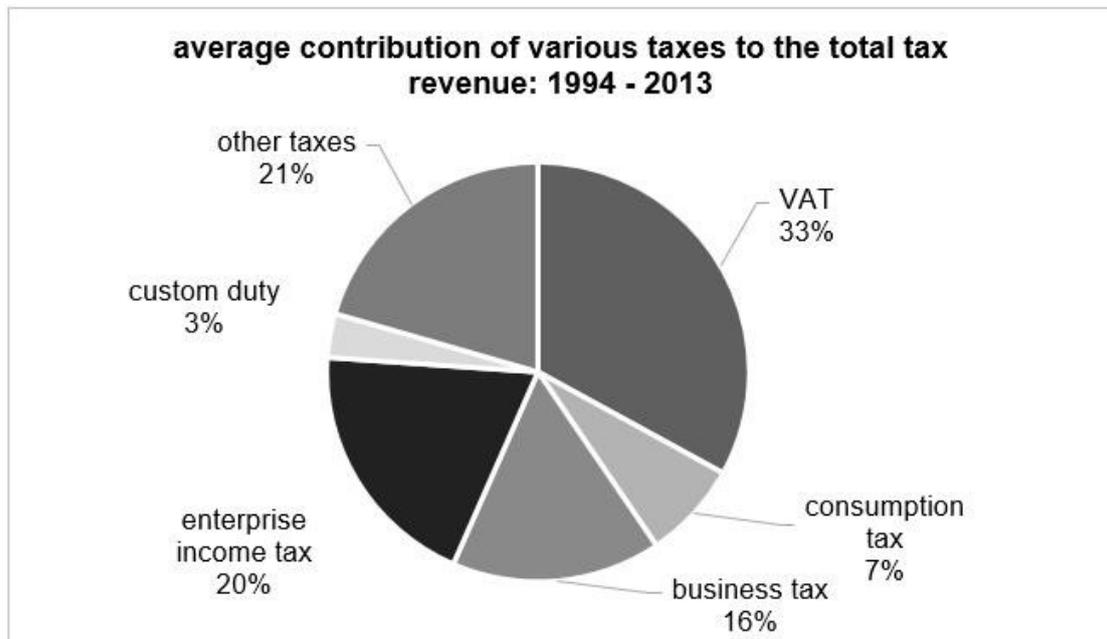
Data source: M.O.F. (1995-2015)

The picture is very clear; during the period 1994 to 2013, the average contribution of VAT, business tax, and enterprise income tax accounted for almost 70% of the total tax revenue. This fact sealed the dominant position of the turn-over taxes in China's tax revenue system.

4.6.4 Unbalanced tax revenue contribution compares to the GDP level

In addition to the regional income and fiscal disparity, there is also an unbalanced tax revenue—GDP ratio which commonly exists at local level.

Figure 4-11 below is an example for year 2005; all 31 provinces are ranked by their GDP level in the first column, and the ratio of tax revenue to GDP is presented in the second column.

Figure 4-11: Regional disparity of tax revenue contribution to the GDP

Year 2005	GDP (100 million yuan)	Tax revenue as percentage of GDP (%)
Guangdong	22557.37	6.77%
Jiangsu	18598.69	5.95%
Shandong	18366.87	4.50%
Zhejiang	13417.68	7.27%
Henan	10587.42	3.45%
Hebei	10012.11	3.93%
Shanghai	9247.66	14.63%
Liaoning	8047.26	6.57%
Sichuan	7385.1	4.90%
Beijing	6969.52	12.71%
Hunan	6596.1	4.06%
Hubei	6590.19	4.31%
Fujian	6554.69	5.45%
Heilongjiang	5513.7	4.48%
Anhui	5350.17	4.57%
Shanxi	4230.53	6.45%
Jiangxi	4056.76	4.21%
Guangxi	3984.1	4.79%
Shaanxi	3933.72	5.25%
Tianjin	3905.64	6.93%
Inner-mongolia	3905.03	5.30%
Jilin	3620.27	4.15%
Chongqing	3467.72	5.10%
Yunnan	3461.73	7.11%
Xinjiang	2604.19	5.48%
Guizhou	2005.42	6.85%
Gansu	1933.98	4.76%
Hainan	897.99	6.07%
Ningxia	612.61	6.01%
Qinghai	543.32	5.04%
Xinjiang	248.8	3.27%

Data source: N.B.S. (1978-2015)

According to Figure 4-11, the average tax revenue ratio to GDP in the year 2005 was 5.82%; however, the richest five provinces in terms of GDP only contributed the average tax revenue ratio at 5.59%, which was even lower than the country average level. In contrast, in the poorest six provinces, the tax revenue ratio to GDP is higher than the country average level. It is quite clear that the contribution of tax revenue to the GDP is widely unbalanced in terms of their GDP level.

4.6.5 Local government fiscal deficient

At the pre-reform period, the local government fiscal deficit was automatically filled by the central transfer (Liu, 2008). This was introduced during a series of fiscal reforms in the 1980s and early 1990s when the expenditure responsibility was decentralized to local governments (Wong, 2000). Moreover, because the shared revenue system was based on a case by case

negotiation between central and local government, richer provinces tended to have more advantages during the negotiation and maintain a larger share of their revenue. Less developed provinces, however, did not receive enough fiscal support by the central transfer due to the weakened transfer power caused by the decline of the two ratios. Adding up the 1994 central fiscal revenue recentralization, local governments are under great fiscal deficit (Shen, 2011; Shen et al., 2012).

Under the expenditure assignment between central and local government during the reform period, the exclusive central expenditure are on national defence, foreign affairs, public debt and geological prospecting expenses; however, urban maintenance and construction, environmental protection, water supply and community services do not come out of central expenditure. The rest of the expenditure, such as on education, health care, social welfare, government administration, capital construction, research and development, and culture development are shared expenditure responsibilities by both central and local governments (M.O.F. 2010). It is clear that the shared expenditure items are day-to-day public administration and social services. Figure 4-12 shows the expenditure of both central and local government and their percentage share in the total national expenditure for different expenditure items in year 2007, 2008, and 2009.

Figure 4-12: The expenditure items in central and local governments:2007-2008-2009

Unit: 100 Million Yuan	2007					2008					2009				
item	National	Central	Central %	Local	Local%	National	Central	Central %	Local	Local%	National	Central	Central %	Local	Local%
General Public Services	8514.24	2160.17	25.37%	6354.07	74.63%	9795.92	2344.55	23.93%	7451.37	76.07%	9164.21	1084.21	11.83%	8080	88.17%
Diplomacy	215.28	213.78	99.30%	1.5	0.70%	240.72	239.15	99.35%	1.57	0.65%	250.94	249.71	99.51%	1.23	0.49%
Aid to Foreign Countries	111.54	111.54	100.00%			125.59	125.59	100.00%			132.96	132.96	100.00%		
National Defense	3554.91	3482.32	97.96%	72.59	2.04%	4178.76	4098.95	98.09%	79.81	1.91%	4951.1	4825.01	97.45%	126.09	2.55%
Public Security	3486.16	607.83	17.44%	2878.33	82.56%	4059.76	648.63	15.98%	3411.13	84.02%	4744.09	845.79	17.83%	3898.3	82.17%
Armed Police	585.17	462.16	78.98%	123.01	21.02%	664.13	502.26	75.63%	161.87	24.37%	866.29	679.11	78.39%	187.18	21.61%
Public Security	1757.48	62.42	3.55%	1695.06	96.45%	2057.67	51.44	2.50%	2006.23	97.50%	2354.89	62.25	2.64%	2292.64	97.36%
Education	7122.32	395.26	5.55%	6727.06	94.45%	9010.21	491.63	5.46%	8518.58	94.54%	10437.54	567.62	5.44%	9869.92	94.56%
Science and Technology	1783.04	924.6	51.86%	858.44	48.14%	2129.21	1077.35	50.60%	1051.86	49.40%	2744.52	1433.82	52.24%	1310.7	47.76%
Culture, Physical Education	898.64	127.21	14.16%	771.43	85.84%	1095.74	140.61	12.83%	955.13	87.17%	1393.07	154.75	11.11%	1238.32	88.89%
Social Security and	5447.16	342.63	6.29%	5104.53	93.71%	6804.29	344.28	5.06%	6460.01	94.94%	7606.68	454.37	5.97%	7152.31	94.03%
Housing for Social Security											725.97	26.43		699.54	
Medical and Health Care	1989.96	34.21	1.72%	1955.75	98.28%	2757.04	46.78	1.70%	2710.26	98.30%	3994.19	63.5	1.59%	3930.69	98.41%
Environment Protection	995.82	34.59	3.47%	961.23	96.53%	1451.36	66.21	4.56%	1385.15	95.44%	1934.04	37.91	1.96%	1896.13	98.04%
Urban and Rural Community	3244.69	6.2	0.19%	3238.49	99.81%	4206.14	14.33	0.34%	4191.81	99.66%	5107.66	3.91	0.08%	5103.75	99.92%
Agriculture Forestry and	3404.7	313.7	9.21%	3091	90.79%	4544.01	308.38	6.79%	4235.63	93.21%	6720.41	318.7	4.74%	6401.71	95.26%
Transportation	1915.38	782.25	40.84%	1133.13	59.16%	2354	913.2	38.79%	1440.8	61.21%	4647.59	1069.22	23.01%	3578.37	76.99%
Expenditure for Purchasing	849.13	487.68	57.43%	361.45	42.57%	1002.74	659.19	65.74%	343.55	34.26%	1085.08	648.81	59.79%	436.27	40.21%
Mining power and											2879.12	508.23	17.65%	2370.89	82.35%
Cereals Oil and Reserve											2218.63	781.44	35.22%	1437.19	64.78%
Banking											911.19	778.04	85.39%	133.15	14.61%
Earthquake Rebuilding						798.34	62.47	7.82%	735.87	92.18%	1174.45	130.6	11.12%	1043.85	88.88%
Interest Payment for Domestic and Foreign Debts											1491.28	1320.7	88.56%	170.58	11.44%
Other Expenditure	7209.05	2017.31	27.98%	5191.74	72.02%	9167.16	2547.65	27.79%	6619.51	72.21%	3203.25	601.83	18.79%	2601.42	81.21%
Total	49781.35	11442.06	22.98%	38339.29	77.02%	62592.66	13344.17	21.32%	49248.49	78.68%	76299.93	15255.79	19.99%	61044.14	80.01%

Data source: M.O.F. (1995-2015)

It is clear that the majority of the shared expenditure responsibility is highly reliant on local governments. Categories include medical and health care, urban and rural development, public services, education. Figure 4-13 gives a clear illustration of the historical divergence of central-local expenditure since early 1981 to 2013.

Figure 4-13: Percentage of central and local expenditures in total national expenditure: 1981 – 2013
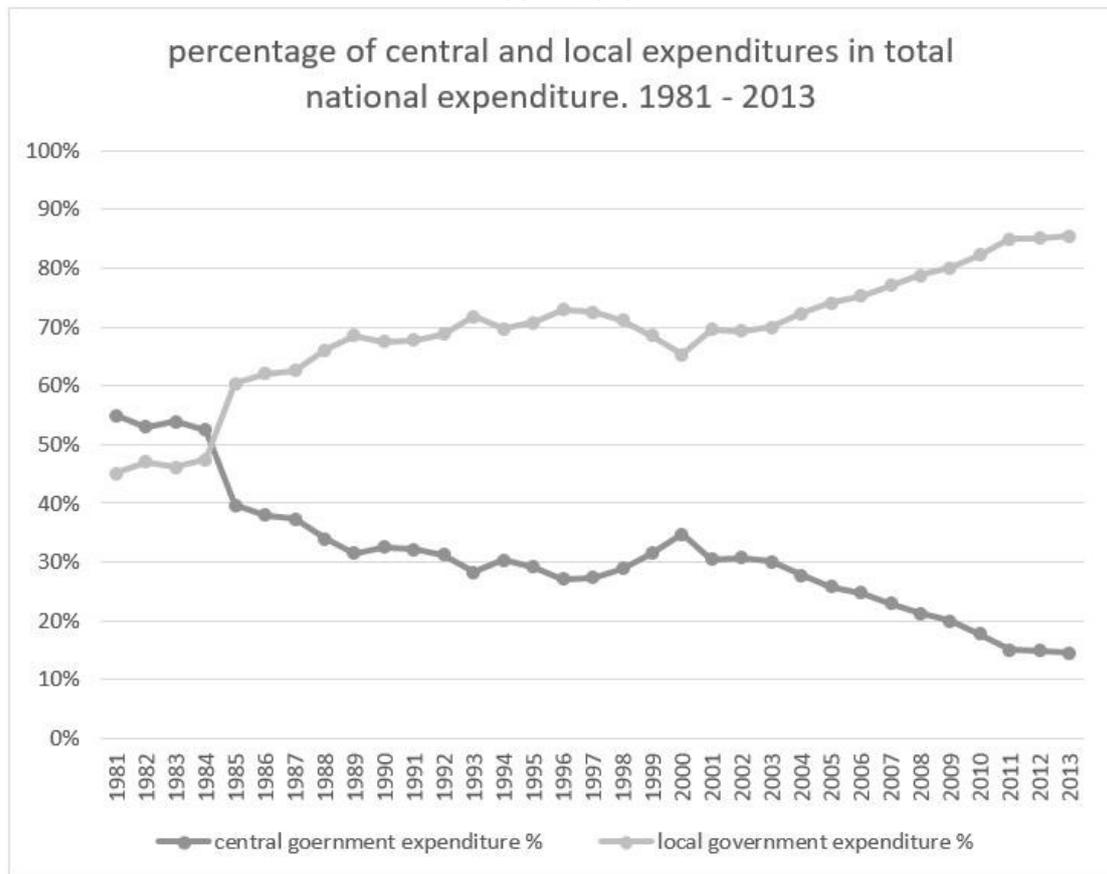
The responsibility for expenditure decentralization can be clearly seen from Figure 4-13. The central government shares less and less expenditure during the period between 1981 and 2013, whereas the local governments' expenditure has experienced a steady increase, especially after 2000.

4.7   The non-tax sourced revenue and its characteristics in China

Tax revenue is only one of the components in China's fiscal system. Moreover, it is not necessarily vital in every stage of fiscal development

(Wong & Bird, 2008). This is mainly caused by the existence of non-tax sourced revenue. The existence of non-tax sourced revenue has a long history in China's fiscal system, and is very important in China's fiscal revenue system. The following sections focus on the history and characteristics of both extra-budgetary revenue and off-budgetary revenue.

4.7.1 Extra-budgetary revenue in the pre-1994 period

Before the 1978 reform, under the "unified collection and unified spending" principle, the major components of government revenue were the tax revenue, and enterprise profits. However, there were other revenues, named the "extra-budgetary revenues". The extra-budgetary revenue had drawn little attention in the pre-reform period due to its relatively small size and its insignificance in public finance (Ma, 2005; Guifen, 2007). It was after the 1978 reforms that the rapid growth rate of the extra-budgetary revenue became one of the main concerns.

During the pre-reform period, the share of extra-budgetary revenue was maintained at a level lower than 20%; however, the situation changed dramatically after the 1978 reform (M.O.F., 2000). The increase in the rate of the extra-budgetary revenue in 1991, 1992 and 1993 was 19.7%, 18.9% and 46.7%, respectively. In contrast, the increased rate of the tax revenue in these three years was only 5.96%, 10.26% and 29.07% respectively (M.O.F., 2000). The increase in the rate of the extra budgetary revenue was much faster than the increase in the rate of tax revenue.

Figure 4-14 is the amount of budgetary and extra-budgetary revenues in China during the period 1952 to 1992.

Figure 4-14: Budgetary and extra-budgetary revenues: 1952 – 1992
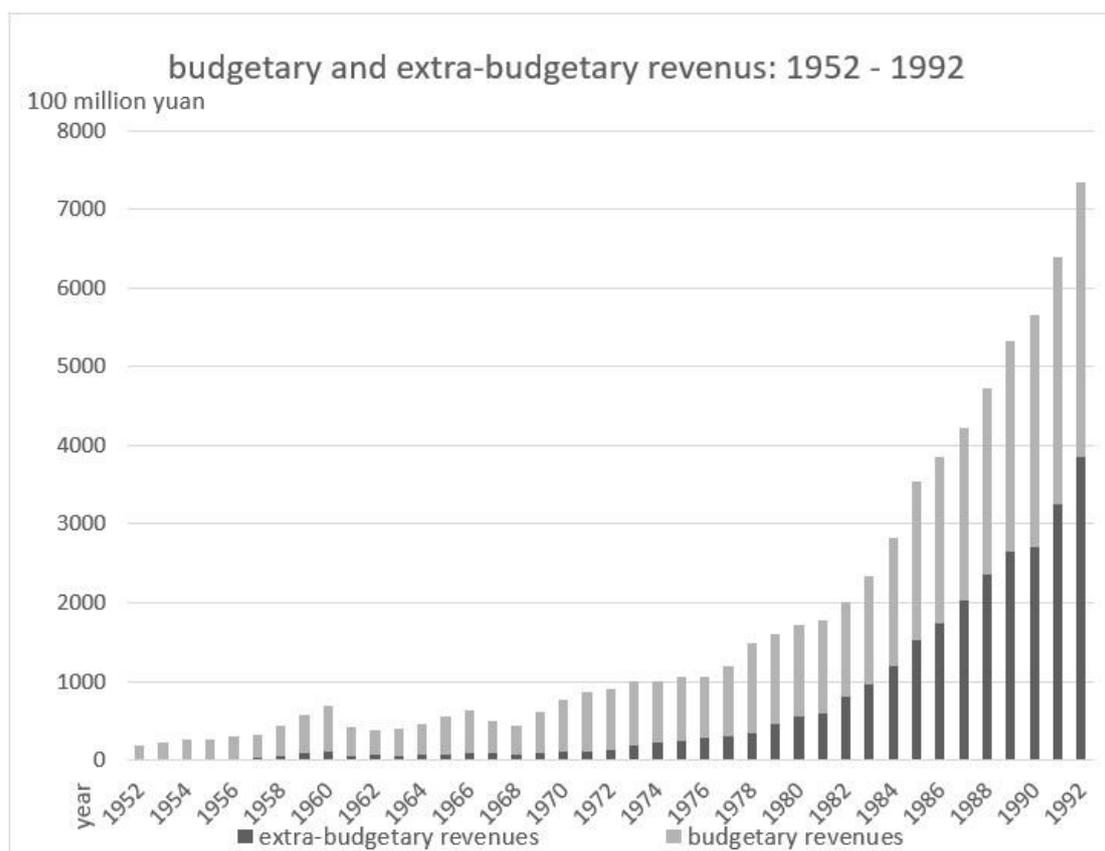
Data source: M.O.F. (2000)

According to Figure 4-14, the rapid increase in the extra-budgetary revenue reached its peak after the Li Gai Shui reform in the middle 1980s. The amount of extra-budgetary revenue was almost equal to the budgetary revenue. In the years 1991 and 1992, the extra-budgetary revenue was even more than the total budgetary revenue in the total government fiscal revenue; the ratios between the extra-budgetary and budgetary revenues were 50.73% and 52.53% respectively in 1991 and 1992. The contribution of extra-budgetary to the total fiscal revenue was so huge that it was named "the second budget" or "half the mountain" during the 1980s and 1990s (Jia & Liu, 2005, p. 24; Guifen, 2007, p. 64).

4.7.2 Causes of the rise in extra-budgetary revenue before 1994

The rapid growth of extra-budgetary revenues was caused by many factors, but the most important one, argued by many scholars, is that the inappropriate design of various reforms during the pre-1994 period, which encouraged local

governments to raise revenues other than taxes (Heady, Wong, & Woo, 1995; Ahmad et al., 2002; Shen, 2011; Shen et al., 2012).

Rapid reforms and adjustments of fiscal central-local relationships had bred distrust between central and local governments. When the central government was struggling with the decreased central revenues, part of the reason was traced to the excessive local revenues. Numerous revenue sharing methods were introduced throughout the whole period. On several occasions in the 1980s, the central government even "borrowed" revenues from local governments. Rapid adjustments of the fiscal system had left an impression that the surplus revenue is unsafe under the central government's fickle revenue sharing system. As a result, it had led to a rapid increase in local non-tax source revenues for the purpose of secure local revenues (Heady et al., 1995; Ahmad et al., 2002; Shen, 2011; Shen et al., 2012).

Under the contract responsibility system, local governments would purposely hide the budgetary revenues because this information had a direct influence on the amount of retained surplus. This is because the revenue sharing method under the contract responsibility system was mainly through the negotiations between central and local governments. However, a larger share of tax revenues would lead to a higher portion of income payable to the central government (Ahmad et al., 2002).

In the meantime, the decline of central fiscal revenue had caused a cut in central transfers and the expansion of local expenditure responsibility. Hence, the highly decentralized expenditure assignment, along with the inapposite negotiation based contract responsibility system, had led to a phenomenon whereby the local governments were purposely hiding the budgetary revenue by less intensive tax collection, and raising revenue through the setting up and raising of fees, self-raising funds, and fines (Lin, 2000).

4.7.3 The main characteristics of the Budget Law in 1994

The issue of the growth in extra-budgetary revenue had not been better since the early 1990s reform. The expenditure assignment between the central and

local governments had not changed significantly after the tax sharing system had been introduced, and in addition, local governments had no right, at least not on a formal basis, to change the rates or bases of any taxes, nor could they introduce new taxes. Hence the incentive of raising extra-budgetary revenue had passed onto the new system (Wong, 2000).

Taking into consideration f the rapid shrinking of the budgetary revenue, the State Council had published "the Regulations on the Management of the State Budget" in 1991. However, the extra-budgetary revenues were left almost untouched. Throughout the "Regulations", the extra-budgetary revenues were only mentioned in two articles:

First, in article 71, transferring budgetary revenue into extra-budgetary revenue, or transferring extra-budgetary expenditure into the budgetary expenditure, was considered to be committing a crime against budget law.

Second, in article 76, government institutions, agencies and units were required to strengthen the administration on the extra-budgetary revenues.

It is clear that the "regulations" did not touch the scale of the extra-budgetary revenue, nor r any detailed rules of how to manage the extra budgetary revenue.

What changed the tide was "the Budget Law of the People's Republic of China" issued by the NPC in 1994, and "the Regulation for the Implementation of the Budget Law of the People's Republic of China" issued by the State Council in 1995. After the budget law, the classification and administration of the off-budgetary revenue was changed significantly according to the budget law and the regulation.

The budgetary law re-categorized the scope of budgetary and off-budgetary revenues. The budgetary revenue after the budget law consisted of four main parts, namely, tax receipts, receipts from State-owned assets, receipts from special items, and other receipts. Tax receipts mean the tax revenue, receipts

from the state-owned assets refers to "the part of the proceeds that are derived from the departments and entities from possessing, using, and disposing of, according to law, the domestic and overseas state-owned assets" (Article 19, chapter 3 of the Budget Law in 1995). The special items refer to the "revenue that is, according to special needs, established, collected, included in the budget management, and used for special purposes upon approval of the State Council or of the Ministry of Finance, which is authorized by the State Council" (Article 9, chapter 9 of the Regulation for the Implementation of the Budget Law in 1995).

The budget law and the matched regulations centralized budgetary control. The extra-budgetary revenue is not under the national budget management. Hence, local units treated the extra-budgetary revenues as "private savings", which was not owed in any way to the central government (Wong, 2000, 2008). By re-scaling the budgetary revenue, central government now has a tighter control over both budgetary and extra-budgetary revenues. Evidence can be found in the Budget Law in 1995:

Article 12, Chapter 2 of the Budget Law: "The National People's Congress examines the central and local draft budgets and the reports on the implementation of the central and local budgets……the Standing Committee of the National People's Congress supervises the implementation of the central and local budgets…"

Article 14, Chapter 2 of the Budget Law: "The State Council…organized the implementation of the central and local budgets…supervises the implementation of the budgets of the departments of the central government and of the local governments, alters or annuls inappropriate decisions and orders made by the departments of the Central Government or by the local governments on budgets or final accounts…"

Article 16, chapter 2 of the Budget Law: "The financial department of a local government at any level…regularly reports to the government at the

corresponding level and the financial department of the government at the next higher level on the implementation of the general budget…"

Article 18, Chapter 2 of the budget law: "The various units compile the drafts of their own budgets and final accounts, turn over budgetary revenues as prescribed by the state, manage the budgetary expenditure, and accept supervision of the relevant departments of the State."

Article 76, chapter 11 of the Budget Law: "The people's government at various levels, all departments and units shall strengthen the management of non-budgetary funds. Measures for the management of non-budgetary funds shall be formulated separately by the State Council…"

4.7.4 Non-tax sourced revenue after the 1994 Budget Law

After the establishment of "the Budget Law of the People's Republic of China" in 1994, and "the Regulation for the Implementation of the Budget Law of the People's Republic of China" in 1995, the central government had stronger control over budgetary and extra-budgetary revenues. However, this did not stop the raising of non-tax sourced revenues, especially the off-budgetary revenue. The following sub-sections focus on the non-tax sourced revenue performance after the 1994 budget law; especially, the other form of non-tax sourced revenues in China's fiscal revenue system: the off-budgetary revenue.

4.7.4.1 The increased size of off-budgetary revenue

After the 1994 tax sharing reform, along with the fast increase in tax revenue, the off-budgetary revenue also experienced rapid growth. Figure 4-15 is the tax revenue and off-budgetary revenue as a percentage of total budgetary revenue.

Figure 4-15: Decomposition of local government budgetary revenue by tax and non-tax sourced revenues
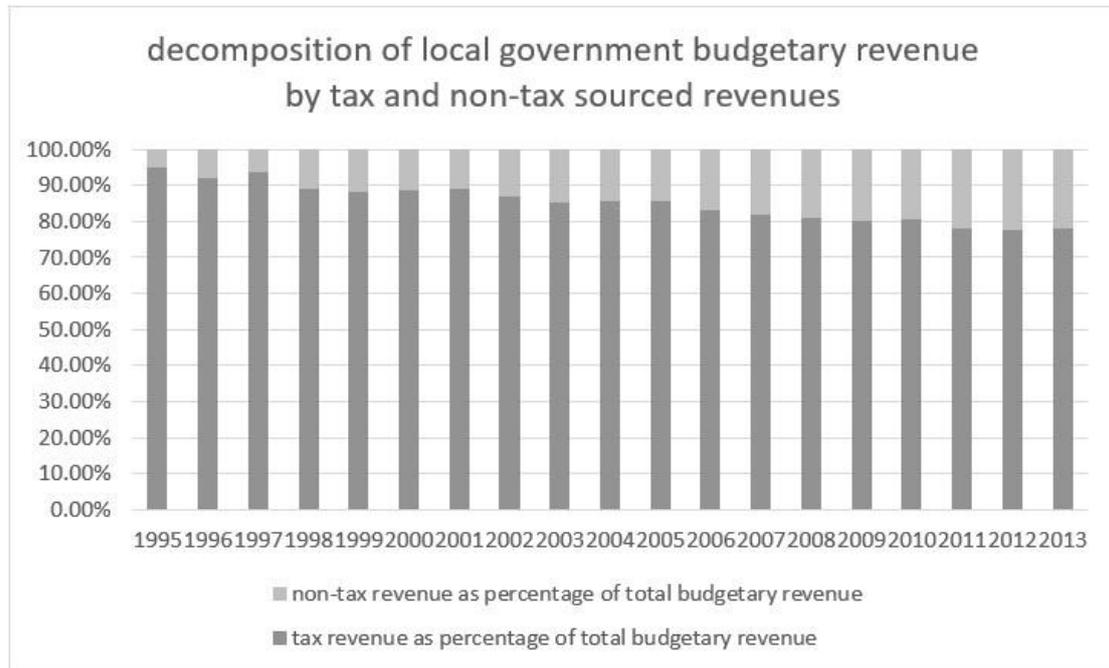
Data source:M.O.F. (1995-2015)

It is clear that the tax revenue share decreases overall throughout the whole period, whereas the off-budgetary revenue increases steadily over time. The size of the off-budgetary revenue has almost doubled form the early stage of post-reform period to the 21st century. The off-budgetary revenue share before 2000 was on average less than 10% in the total budgetary revenue. However, this figure reached over 20% after 2010.

The off-budgetary revenue in the figure and discussion above only includes the non-tax sourced revenue that was under budget management. However, the existence of extra-budgetary revenue is not included. In fact, the extra-budgetary revenue was a huge revenue source compared to the tax revenue and off-budgetary revenue, especially in the early period after the 1994 reform.

Figure 4-16 gives a brief investigation regarding the comparison of the size of tax revenue, budgetary non-tax revenue (off budgetary revenue), and extra-budgetary revenue.

Figure 4-16: Size comparison between tax revenue, budgetary non-tax revenue, and extra-budgetary revenue in local governments: 1995 – 2010

size comparison of tax revenue, off budgetary revenue, and extra-budgetary revenue in local government 1995 - 2010

■ tax revenue ■ budgetary non-tax revenue ■ extra-budgetary revenue
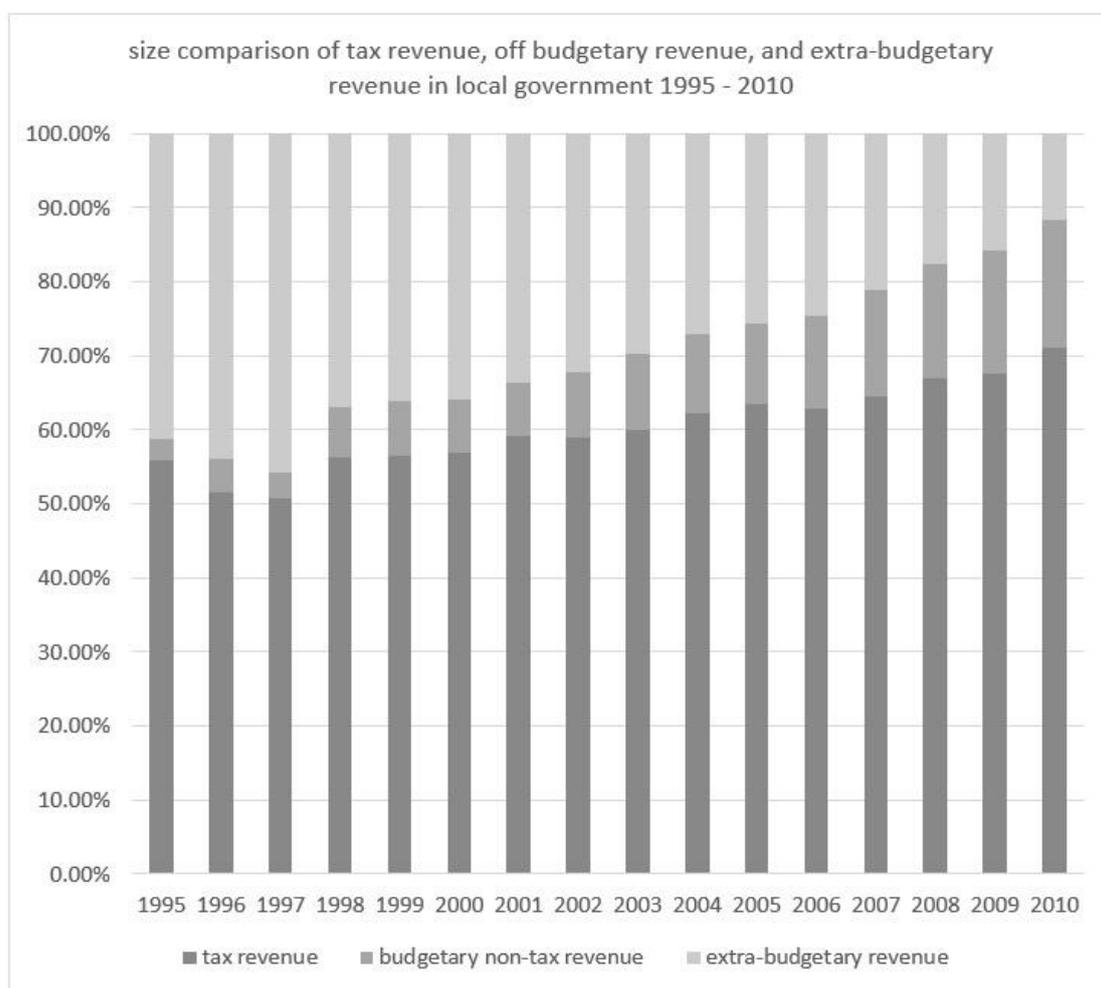
Data source: M.O.F. (1995-2015)
Note: the total revenue is calculated as the sum of budgetary revenue and extra-budgetary revenue.

By taking into consideration extra-budgetary revenue, it is clear that tax revenue only contributed, on average, less than 60% of the total government fiscal income during the period between 1995 and 2010. One point to be noted is the upward trend of budgetary non-tax revenue and the declining trend of budgetary revenue. The trend of decreasing extra-budgetary revenue in the total revenue does not necessarily indicate the cutting down of extra budgetary revenue. This is because through many years, the central government has been trying to readjust the scale and definition of various extra-budgetary revenues to categorize them into budgetary revenues, i.e.,

turning them into off-budgetary revenue instead, and bringing them under the central government budget control. Taking a serious note of the tremendous size of the extra-budgetary revenue, the central government has made a great effort to control its administration and management by taking the sub-categories of the extra-budgetary revenue into budget control. In other words, transforming the extra-budgetary revenue into off-budgetary revenue (Tong *et al*., 2013; Zheng & Wang, 2013).

For example in 1996, the State Council had issued the "Decision of the State Council on Strengthening the Administration of Extra Budgetary Funds". Hence, 13 major funds and fees in the extra-budgetary revenues, including road toll, electric power construction funds, were bought into the budgetary revenue scale. One year later in1997, further 13 categories of extra-budgetary revenues were also bought into the budget control (Zheng & Wang, 2013). The effort continued until 2011, the term of "extra-budgetary revenue" had vanished from China's statistical year book, when the central government decided that all extra-budgetary revenues are taken into the budgetary revenue and under the budget control (Tong, *et al.,* 2013).

4.7.4.2 The component of off-budgetary revenue
When investigating further into the different components of the off-budgetary revenue, the scale of off-budgetary revenue, and its special characteristics are revealed.

The off-budgetary revenue category can be categorized into 7 different types, namely special program fees, administrative and institutional fees, penalty receipts, governmental funds, income of state-owned assets and resources (SOA/R), planned subsidies to loss-suffering state-owned enterprises (PSL), and other non-tax receipts (M.O.F., 2000; Guifen, 2007). This section mainly focuses on the special characteristics of some off-budgetary categories.

   a. **The planned subsidies to loss-suffering state-owned enterprises (PSL)**

Among the eight non-tax categories, PSL is rather special compared to others. Acceding to the Ministry of Finance, the PSL is government arranged funds with the purpose of covering state owned enterprise deficits caused by self-operation or government policies (M.O.F., 2009). According to the property of the PSL, it is a subsidy of fiscal expenditure, hence in principle, and also according to the "Classification of the Functions of Government" published by the United Nations in 2000, a subsidized fiscal expenditure to the public enterprise. Including the PSL in the budgetary revenue side is mainly due to political reasons. Thus, inclusion of the PSL in the budgetary revenue has resulted in the size of off-budgetary revenue being underrated.

The inclusion of the PSL expenditure into the off-budgetary revenue also created an un-common data bias at the provincial level. For example, in Shanghai in 2000, the total tax revenue was 50.14 billion yuan, whereas, the total budgetary revenue only accounted for 48.54 billion yuan, even lower than the tax revenue. The reason behind this is that the amount of PSL was 3.72 billion yuan, and all other non-tax revenue accounted for 2.12 billion yuan. This resulted in the non-tax revenue appearing as a negative number of 1.60 billion yuan (M.O.F., 2001).

b. Government fees, charges and funds

The other property of the off-budgetary revenue is the huge share of government fees, charges and funds. These types of off-budgetary revenue are mainly judicial administration revenues, mainly contributed by special program fees, administrative and institutional fees, penalty receipts, and government I funds. Even though the government fees, charges and funds are classified as non-tax sourced revenue in the statistical yearbook, it is difficult to say that it is entirely different from tax revenue in China.

The non-tax sourced revenue and tax revenue are conceptually different, yet under some circumstances, difficult to clearly distinguish. Tax is defined as the compulsory monetary contribution to the state's revenue; and fiscal revenue is defined as the revenue collected by the State to finance the activities of the public sector. Theoretically, non-tax revenue is recognized as

the revenue, which is gained from other sources than taxes, but a question is raised when asking how we deal with a non-tax sourced revenue which has tax properties, or if any revenue is classified as non-tax revenue but is actually almost conformable to the concept of "tax"?

Fauvelle-Aymar (1999) argues that in developed countries, the tax revenue and the non-tax revenue are inherently different, whereas in developing countries, many non-tax revenues, such as the revenue from the public sector, are similar to taxes in political terms. Bird *et al.* (2006) also points out that the practices and possible mistakes in revenue classification in developing and transitional countries have blurred the differences between tax revenue and non-tax revenue.

According to the definition of taxes from the OECD, compulsory, non-repayable and exclusive of tax offence fines and compulsory loans, are the main characteristics that distinguish taxes from fees (OECD, 1996). If a payment is compulsory and non-repayable but is clearly related to the cost of the service provided, then it is not considered as tax. Whereas, if such payment is qualified under each of these four conditions:

1. The amount of charges greatly exceeds the total cost of the service provided.
2. Payers of the charges do not directly benefit from the service provided.
3. No specific service is provided by the government according to the amount of charges or fees received from the payer.
4. Benefits received only by the charges or fees' payer, but the service received by each payer does not vary according to the amount of each individual's payment.

Then it would be considered as unrequited, i.e., taxes (OECD, 1996).

The non-repayable feature is the critical quality that distinguishes the tax from fees; but in the case of China, this question becomes extremely complex. When the investigation considers the non-tax revenue of local government in

China, it touches an area which is intricate and complex—local governments'
fees, charges and funds.

According to the 1994 budget law, local government fees and charges are
under a two level management system. Local provincial governments have
the right to approve the titles and scales of fees and charges, but these must
be reported and recorded by the central government. However, the standard
procedure seriously lacks any legal basis and control (Ma, 2005).

In 1997, the total amount of fees and charges had almost reached half of the
total budgetary revenue. Until 1998, there were more than 300 items of the
administrative institution fees from central government. At the local level,
some provinces had even more than 400 fees and charges; in the more than
200 categories of government funds and special charges, fewer than 50
categories were authorized by the Central State Council or the Ministry of
Finance; over 70% were established by local governments (Zhang, 2006; Jia
& Zhao, 2008, pp. 118-120).

When the investigation delves deeper into the sub-provincial governments
and their related departments, the items of fees and charges are in their
thousands (Gao, 2010). At the provincial or lower level of government, the
various departments have their own authorities to establish and collect various
fees and charges. The regulations seriously lack supervision and control, and
some of the categories of fees or charges do not even have a basic standard
to specify how much to collect (Jia & Liu, 2005). Those departments included,
but are not limited to, the transport departments, land resource management
departments, industry and commerce departments, health inspection and
supervision departments, public security departments, supervisory
departments, urban development departments, environmental protection
departments, and education departments (Jia & Liu, 2005).

It is worth noticing that the scale of revenues from these categories in China's
local governments is relatively large. Taking the most recent data, according
to the China Statistical Yearbook (2013), in year 2012, the total off-budgetary

revenue was counted as 23% of the total public budgetary revenue, with over half of the off-budgetary revenue funded by special program fees, and administrative and institutional fees, which counted as 12% of total local budgetary revenue. Figure 4-17 shows details of the structure of local budgetary revenue and decomposition of the off-budgetary revenue.

Figure 4-17: Structure of local budgetary revenue and decomposition of local government's off-budgetary revenue in 2012
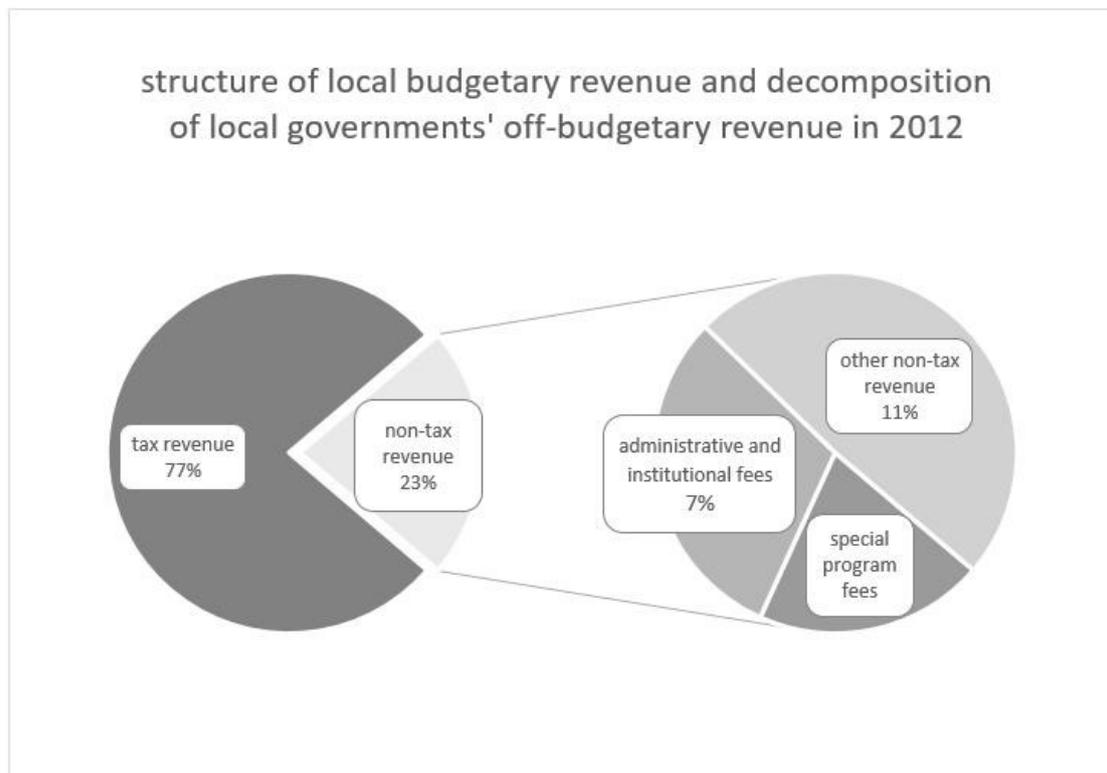
Data source: M.O.F. (2013)

Moreover, the performance of the off-budgetary revenue varies greatly across regions. The off-budgetary revenue share of the total budgetary revenue in Beijing and Zhejiang was only 6%, whereas in some provinces, such as Tianjin, Hunan, Chongqing, this figure has exceeded almost one third of the total budgetary revenue. Figure 4-18 gives an illustration of the odd-budgetary revenue size in the public budgetary revenue across provinces in 2012.

Figure 4-18: Off-budgetary revenue share in local governments' public budgetary revenue in 2012
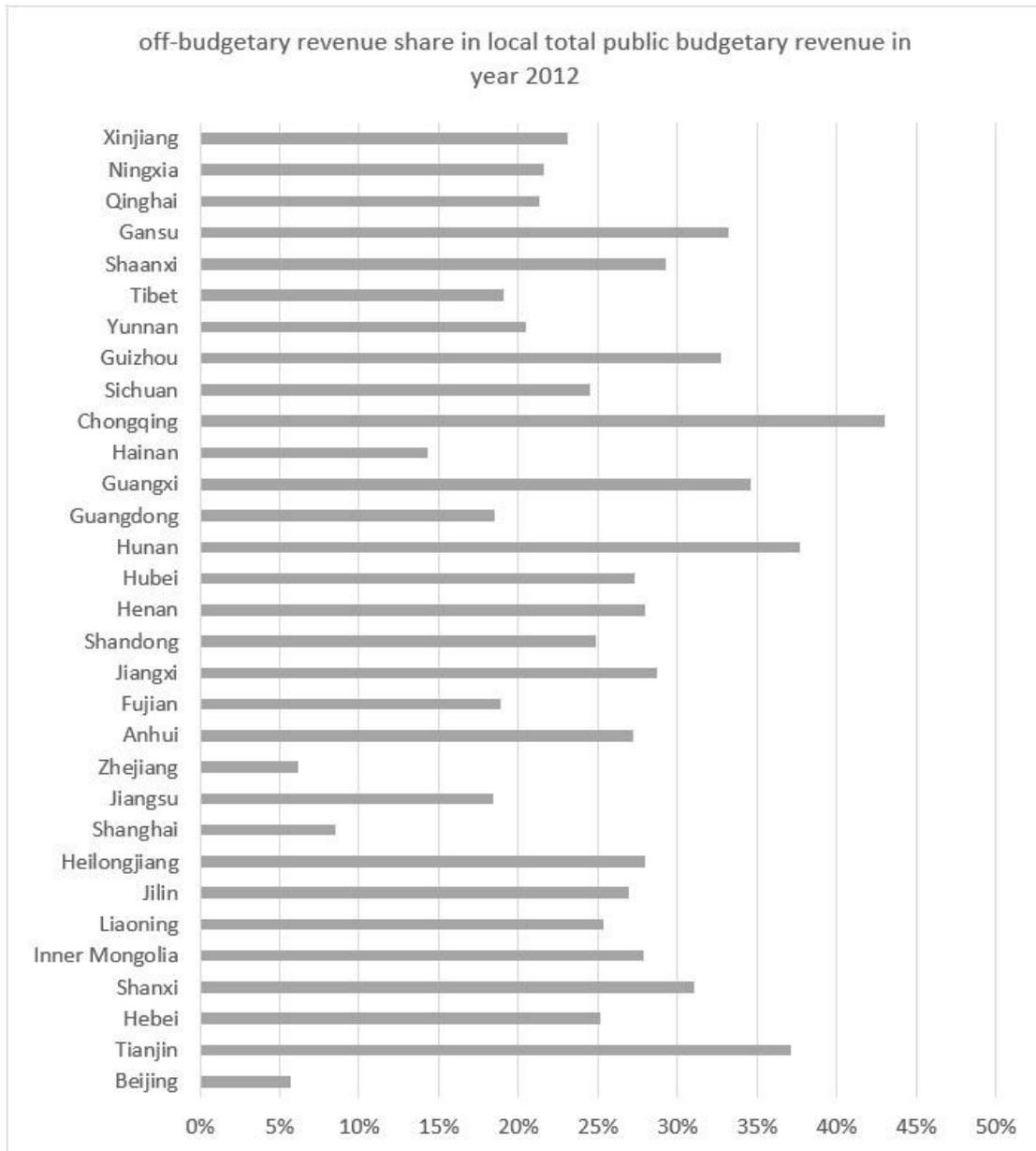
Data source: M.O.F. (2013)

Non-tax sourced revenues, including local government fees, charges and funds, are part of local government revenue, but in the case of China, these fees and charges in a large scale, match the requisites of a tax in concept. Moreover, the administration of this part of revenue is loose and complex, and causes serious problems such as boosting income inequality, breeding corruption, and eroding the tax base (Lin, 2002; Wu, 2002; Jia & Liu, 2005; Lin, 2005). One typical example is the Educational Surcharges which are one example of government fees, and according to the "Interim Provisions on the

Collection of Educational Surcharges" published by the State Council in 2005, an educational surcharge is applied to all entities and individuals who are obliged to pay product tax, value-added tax and business tax. Education surcharges exclude those who are already paying the rural education charges. The amount of the educational surcharges one needs to pay is 3% of the total payable amount of the sum of product tax, value-added tax, and business tax (M.O.F. 2006).

4.7.4.3 Previous studies regarding the off-budgetary and extra-budgetary revenues

The rapid increase in non-tax revenue has also drawn the sharp attention of researchers. In addition, it is worth mentioning that considering the complex classification and various adjustments of the categories of non-tax revenue, many scholars have adopted different methods of measurement of the non-tax revenue by re-categorizing the non-tax revenue.

Qiao and Wang (2009) present an empirical study on the relationship between non-tax revenue and economic growth during the period of 1994 and 2007. The authors define and calculate the non-tax revenue as the sum of non-tax sourced budgetary revenue and extra-budgetary revenue. The results indicate that in the 14 years after the tax sharing reform, the rate of the average annual increase in the non-tax revenue was even higher than the GDP average annual increase rate. In addition, local government contributed the majority of the total non-tax revenue. Over the data set period (1994 – 2007), on average, over 80% of non-tax revenue was contributed by local government. Qiao and Wang (2009) further point out that the non-tax revenue and GDP were positively causally interrelated, and the relationship was even stronger at local level than central level (Qiao & Wang, 2009).

Gao (2010) has investigated the size of non-tax revenue after the 1994 tax sharing reform until 2006. Gao (2010) defines the non-tax revenue as the sum of budgetary non-tax revenue and extra-budgetary revenue, and an investigation of the size of tax revenue and non-tax revenue was performed. However, the PSL has not been excluded in the budgetary non-tax revenue.

Different from Qiao and Wang's study (2009), Gao (2000) inspected the extent of the normalization administration of the non-tax revenue by introducing the ratio of budgetary non-tax revenue and total non-tax revenue. The results show that the ratio increased throughout the time line both at the central and local government levels. This supports the early arguments that the central government is making a great effort to manage the extra-budgetary revenue by taking them into the budgetary revenue and under budget control. When the investigation considers the total non-tax revenue size in central and local governments by introducing the ratio of non-tax revenue and tax revenue, clear evidence of a huge divergence between central and local government non-tax revenues was revealed. The central government non-tax revenue ratio increased from 4.8% in 1998 to 7.24% in 2007, whereas the local government non-tax ratio decreased from 78.03% in 1998 to 55 and 11% in 2007. Regardless of the different trends, central government non-tax revenue was never higher than 10% throughout the time line. However, the figure at the local level was never lower than 50% (Gao, 2000).

Bai, Wang, and Zhang (2013) adopt the same scale and definition of non-tax revenue as Gao (2000), based on data from 1994 to 2010. They investigated the relationship among non-tax revenue, GDP and tax revenue by applying a regression analysis from the perspective of cycle analysis. A causal relationship between non-tax revenue and GDP was also detected, and local non-tax revenue showed an unusual correlation to the economic growth, which added support to the previous Qiao and Wang's study (2009). Interestingly, a causal relationship between tax and non-tax revenue was also found. As Bai *et al.* (2003) conclude, the increase in tax revenue had a clear crowding-out effect on the non-tax revenue, whereas the expanding of non-tax revenue does not necessarily crowd-out the tax revenue (Bai, *et al.* 2013).

Meng and Su (2015) in their study on the relation of tax competition, fiscal stress and the size of non-tax revenue of local governments is based on the data period from 2007 to 2011, define and calculate the non-tax revenue as the sum of five categories: special program fees, administrative and institutional fees, penalty receipts, income of state-owned assets and

resources, and other non-tax receipts. The authors conclude that the average annual increase rate of non-tax revenue during 2007 and 2011 had almost reached 26% per year. The authors point out that fiscal needs are not necessarily the only explanation of the expansion of non-tax revenue, other factors, like local government competition, the needs of economic development, fiscal expenditure, the size of the central transfer, all share a significant impact on the size of non-tax revenue (Meng & Su, 2015).

Tong, Li, and Wang (2014) based on a data set from 2000 to 2010, analysed separately the budgetary non-tax revenue, government fund income and non-fiscal revenue; however, Tong *et al*. (2014) did not include any SOEs related to non-tax revenue, that is to say, the PSL. By comparing the three different types of non-tax sourced revenues, the budgetary non-tax revenue shows the largest t growth. The share of budgetary non-tax revenue in GDP in 1993 was only 0.12%. However, this figure had increased over 14 times in 2010. The result indicates that the strategic interaction regarding the non-tax sourced revenues between the local governments, are widely prevalent. In addition, strong statistical evidence of local governments' reliance on the non-tax sourced revenue was also detected. Based on the findings, Tong *et al.* (2014) conclude that one of the driving powers behind the expansion of non-tax sourced revenue is the financial deficiency due to the lack of fiscal autonomy of local governments

4.8   Summary

The main purpose of this chapter is to evaluate the main characteristics of China's fiscal revenue and its performance, as well as the revenue relationship between central and local government.

It is revealed in the early parts of this chapter that the fiscal system in China is rather complex. The fiscal revenue is classified into budgetary and extra-budgetary revenues in China's official documents. The budgetary revenue is the government fiscal revenue under the central budget control, whereas the extra-budgetary budgetary revenue is not (Tong *et al.,* 2013). Within the budgetary revenue, there are tax revenues and off-budgetary revenues. The

concept and scale of the non-tax revenue in China was never clearly defined until early the 21st century (Gao, 2000).

As a key element in the central-local government fiscal relationship, the central transfer system in China has also experienced numerous reforms and adjustments in the last thirty years. After the open door reform in the late 1970s, the central transfer system had also reformed from Uniform collection and uniform spending to contract based responsibility system. However, on the basis of the restructured revenue system in early 1990s, especially the tax sharing system between central and local governments, the intergovernmental transfers were turned into a more formula-based system. However, regardless the many reforms of the central transfer system, its characteristics and nature has never changed.

Before 1978, all profits were under the control of the central government, and almost everything, even including the prices of the production, total number of the output and total amount of sale, were all decided and budgeted by the central government (Lin, 2009; Yang, 2001; Shen *et al.,* 2012). The main fiscal revenue was the profit from DOEs, hence the tax revenue was considered as not important in the fiscal revenue system.

The main characteristic of fiscal revenue performance after the market oriented reforms in 1978 was the decline of two ratios, namely the decline of the ratio of total budgetary revenue to the GDP, and the ratio of central government budgetary revenue to the total government budgetary revenue (Jia & Zhao, 2008). At the same time, the extra-budgetary revenue experienced rapid growth (M.O.F., 1995-2015).

After the 1994 reform, the share of budgetary revenue in the GDP had increased steadily, and the most important reform was the fiscal recentralized 1994 reform that resulted in a sharp increase in the central government's budgetary revenue, and left the local governments in great fiscal stress (Shen, 2011; Shen *et al.,* 2012). In the meantime, even though the rising tide of the extra-budgetary revenue was controlled to some degree, the large share of

non-tax sourced revenue in the local government fiscal revenue system did not disappear (Jia & Liu, 2005; Guifen, 2007).

Consideration of the different components of the non-tax sourced revenue reveals that the planned subsidies to loss-suffering state-owned enterprise is a fiscal expenditure item according to its property and international standard. Classifying the PSL as off-budgetary revenue was mainly due to political reasons; however, this has resulted in an underrated off-budgetary revenue size, as well as some off normal statistical data in some regions (M.O.F., 1995-2015).

Within the off-budgetary revenue, the government fees, charges, and funds take a large portion of the total off-budgetary revenue (Jia & Liu, 2005). These fees, charges and funds are largely loose, complex, and lack supervision and control. Almost all government departments at all levels of government have their own fees and charges. In addition, according to many scholars, these fees, charges and funds arguably match the concept of taxes (Lin, 2002; Wu, 2002; Jia & Liu, 2005; Lin, 2005).

The aim of this research is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. It is clear to see from this chapter that tax revenue performance is just one part of the total fiscal revenue performance in China. In addition, the prevalent non–tax sourced revenue has played a crucial role throughout the history of China's fiscal revenue development.

Chapter Five: Research design, methodology and Methods

5.1 Introduction

In this chapter, the methodology and methods used in this study are discussed.

Section 5.2 contains the research paradigm for this research. In this section, the paradigm of this research is explained. Section 5.3 presents the model structuring, which explains the different steps used to approach the results. Section 5.4 lists the models and variables used in this study. The main purpose of Section 5.5 is to determine the dependent variables, namely the tax ratio and the current revenue ratio. In Section 5.6, a detailed discussion of each variable in determining both the tax ratio and current revenue ratio, the proxies of tax performance, is presented. The discussions include a brief summary of empirical results from previous studies and their relevance to the current study. Finally, a brief summary is presented in section 5.7.

5.2 Research paradigm

In this section, the theoretical perspectives of this research is explained. This includes ontology, epistemology, methodology, the paradigm for this research, method, and finally, data source and collation approaches.

As a researcher, it is essential to understand the area and direction of the study. It is also important to understand the key philosophical position of the researcher as researchers are guided by a set of beliefs or worldview: the paradigm of the research (Hatch and Cunliffe (2012).

The research paradigm is the set of common beliefs and agreements about how problems should be understood and addressed, based on the researcher's ontological, epistemological and methodological assumptions (Kuhn, 1962; Guba and Lincoln, 1994; Sarantakos, 2012). In brief, ontology refers to what actually exists as reality, epistemology refers to how we can gain knowledge of what exists, and methodology deals with which way to obtain knowledge (Maxwell, 2012; Killam, 2013). The relationship between

ontology, epistemology, methodology, paradigm, method, and data collection are tightly bound together. As Howell (2012) states, "Paradigms of inquiry incorporate clear indications of how ontology and epistemology are intrinsic to each methodological approach and consequent plan for data collection" (Howell; 2012. pp. viiii). The chart 5-1 below illustrates the relationship between all the important terms within the paradigm.

Chart 5-1: The relationship between ontology, epistemology, methodology, paradigm, method, and data collection

ontology	epistemology	methodology	methods	data collection
• what actually exists • the nature of reality	• how we gain knowledge of what exists	• how to obtain knowledge	• what kind of tools or instruments can we use to obtain knowledge	• what data should be collected
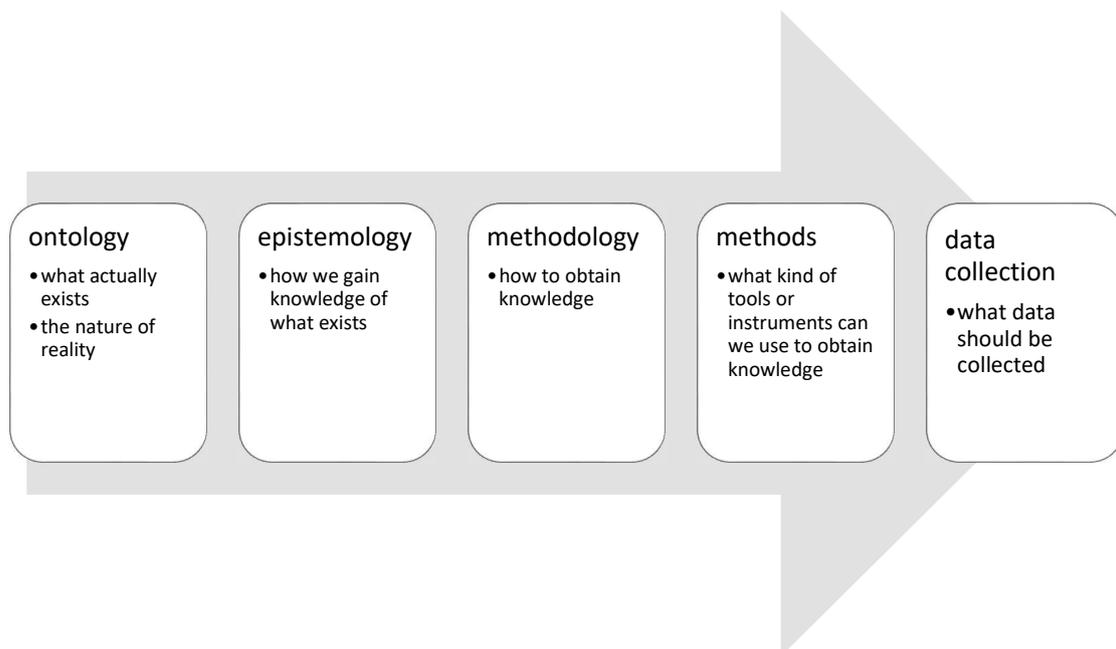
In real world social research, there could be many paradigms according to different sets of beliefs. However, there are three paradigms, namely positivism, interpretive paradigm, and critical paradigm, which are the most dominant paradigms and provide theoretical foundations for the diversity of methodologies (Sarantakos, 2012). Hence in this section, these three dominant paradigms are used as guidelines to understand different theoretical perspectives.

5.2.1 Ontology

Ontology is about the beliefs about reality, the nature and structure of being (Rawnsley, 1998; Scotland, 2012; De Kock, 2015). In other words, ontology

answers the questions of what is reality, and what is true? Different beliefs about the nature and structure of reality are the fundamental building bricks of all kinds of different research. One typical belief about the nature and structure of reality will lead to a typical research approach (Killam, 2013).

It is obvious that there could be many ontological positions depending on the researcher's beliefs about reality. However, there are three main ontological positions, which can be used as guide examples for discussion: realism, as believed in positivism paradigms; relativism, as believed in interpretive paradigms; and historical realism, which is adopted in critical paradigms.

The ontological position of realism means that the existence of reality is independent from the researcher (Cohen, Manion, and Morrison; 2013). In simple words, one truth exists and does not change within the context of what is being studied (Killam, 2013).

In contrast, relativism believes that reality is totally subjective from person to person (Guba & Lincoln, 1994). Reality is from people's consciousness, reality without consciousness is meaningless (Crotty, 1989). In other words, relativism believes in multiple versions of reality subject to different persons perceptions. In addition, reality evolves and changes according to people's consciousness (Killam, 2013).

Different from realism and relativism, historical realism believes that reality is defined by history and crystallised over time; in other words, reality is constantly forming by social, political, cultural, economic, ethnic, and gender values (Guba & Lincon, 1994; Howell, 2012; Scotland, 2012). In simple words, reality is being made to be "real" overtime under the context of social structures and policies (Killam, 2013).

5.2.2 Epistemology
Epistemological beliefs answer questions about how we learn knowledge and new discoveries. Researchers' different beliefs regarding the nature of reality and truth fundamentally shapes researchers' beliefs of the relationship

between the researcher and their studies. In another words, Different ontological beliefs will dictate different epistemological beliefs (De Kock, 2015). Epistemology explains the nature of knowledge and the relationship between the researcher and the knowledge (Killam, 2013).

From the realism aspect, since reality truly exists externally and objectively from human behaviour, in order to get an objective measurement, it is believed that researchers should totally separate from what they are researching. In other words, knowledge is only gained from the observation and analysis of the external reality (Blaikie, 2007).This approach is known as objectivism in ontological position (Heron & Reason, 1997; Killam, 2013).

On the other hand, researchers who believe that the truth of reality exists subjectively and is influenced by human behaviour, such as relativism and historical realism, will adopt an different kind of approach which the interaction from the researcher to the research is needed to discover meaning (Killam, 2013). The epistemological position of such beliefs is called subjectivism (Scotland, 2012).

From a relativism ontological position, researchers believe that social phenomena are based on individuals' actions, motivated by their own feelings, thinking, and will. In other words, the basic element is people's actions, and hence, it is more important to consider an individual's feelings and thinking ((Denzin & Lincoln, 2011). Similarly, from a historical realism ontological position, a subjective approach to reality is also adopted. Different from the relativism position however, researchers are more accepting the influence from historical values than an individual's feelings, thinking, and will (Howell, 2012).

5.2.3 Methodology

Based on a set of ontological and epistemological positions, how should knowledge be discovered and analysed in a systematic way? This brings the discussion to methodology. Methodology deals with the question of the way of obtaining the knowledge, given the sets of ontological and epistemological beliefs (Guba & Lincoln, 1994). In simple words, methodology refers to

philosophies that guide how knowledge should be gathered (Killam, 2013). Understanding of the methodology is vitally important because methodology translates the principles of a paradigm into a research language. In addition, it also provides guidelines on how the research should be carried out according to the particular research paradigm (Sarantakos, 2012).

Positivists believe that knowledge should be gained through scientific experiments based on a hypothesis since the reality exists externally and is separate from human behaviour (Howell, 2012). Studies that are based on this methodological approach are often referred to as quantitative methodology studies. The existing theory works by testing the social phenomena, and the use of theoretical models is recommended (Blaikie, 2007).

Relativism and historical realism philosophies believe that researchers in the research methodology should be inside the subjective reality, and methodologies should be built through interactions between and among the researcher and participants, since the social world does not subjectively exist, but is a human creation (Sarantakos, 2012). This methodology approach is referred to as qualitative methodology.

5.2.4 Paradigm for this research

Based on the researcher's ontological, epistemological and methodological assumptions discussed above, different philosophical positions, i.e. paradigms, are formed. Every paradigm is based on different assumptions of what reality and truth are, and the relationship between them and the researcher. This set of beliefs will underpin the particular research methodology, which works as the strategy of actions that guide the use of certain methods and data (Scotland, 2012). Table 5-1 below illustrated a summary of all three paradigms that discussed before, and their ontological, epistemological, and methodological positions.

Table 5-1: Ontological, epistemological and methodological positions behind three main paradigms

Paradigms	Positivism	Interpretive paradigms	Critical paradigms
Ontology	Realism: One truth about reality exists objectively, does not change, and is separate from human behaviours.	Relativism: Multiple truths exist, subjectively, mentally constructed, changes according to people's consciousness	Historical realism: Reality is made to be "real" through social constructions through history, and constantly influenced by social values.
Epistemology	Objectivism: researcher and what is being researched is totally separate.	Subjectivism of individuals: consider individuals' feelings.	Subjectivism of historical values: accepting the influence from historical values.
Methodology	Quantitative methodology: scientific experiments based on hypothesis	Qualitative methodology: interactions between researcher and the subject of research are needed.	

Source: Adapted from Kuhn (1962, 1996), Crotty (1989), Howell (2012) and Killam (2013)

It is worth noting that as the debate over philosophical concepts has been going for centuries, basic concepts of existing paradigms are challenged and changed over time (Kuhn, 1962; 1996). New paradigms are emerging and evolving; some are sudden, and some are gradually changed (Kuhn, 1996). Hence, even though in the above discussion three dominant paradigms have been presented, none of them is a solid approach but a system providing guidance for understanding, as there are many diversities that share some similarities but are different to a certain extent. In addition, there is no empirical way to prove or disprove whether one paradigm is better than another, since all assumptions are conjecture (Scotland, 2012).

How to pick the right paradigm for a particular research topic depends on the beliefs of the researcher and the questions that the researcher wants to answer, the aims of the research, and the objective of the research (Killam, 2013).

The main aim of this study is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue

performance at provincial level. The primary purpose of this study is to seek answers to questions regarding the following:

1. What are the key determinants affecting the tax capacity in China at provincial level?
2. How did the tax revenue perform in China at provincial level?
3. Is there any regional variation of tax performance at the provincial level?
4. What policies may be suggested to improve the tax revenue performance in China?

To achieve this aim, the following objectives are set out:

1. To explore the relationship between the tax capacity and certain economic and social factors.
2. To evaluate the tax revenue performance at provincial level in China
3. To examine the variation of regional tax revenue performance in China.
4. To make suggestions for policy makers to improve the tax performance in China.

The nature of this research is to prove certain causal relationships, and the researcher believes one reality exists objectively and independent from the researcher, and knowledge is only gained from observation and analysis of the external reality through scientific experiments based on a hypothesis. Therefore, positivism is the underpinning paradigm of this research. Since the research is required to be objective, and the variables needed for this research are measurable and therefore quantifiable, the quantitative methodology is adopted in this research. To achieve the research aim, the statistical analysis methods should be compatible and essential for this study.

5.2.5 Data source and collection approaches

The nature of the research topic, the research objectives and the paradigm of this research lends itself to the research methods of statistical analysis and the use of statistical data. Both primary and secondary data may serve the purpose of this research. Since primary data are collected from the researcher specially for the purpose of one particular study, it may be more controllable over the

quality of the data and even more appropriate to generate a more accurate result than secondary data (Denscombe, 2014). However, the realistic demands of this study requires to use secondary data published by statistical bureaus. The data needed for this research are massive in size and very difficult to obtain by the author, especially where the regional comparison between provinces are vital for this study, hence the criteria of the data need to be unified at a very high level.

In order to ensure the quality of the data, the data used in this study are only collected from statistics yearbooks and reports published by the Chinese government authorised organizations. The table 5-2 below lists the sources of all raw data used in this study.

Table 5-2: The sources of all raw data used in this study

Title	Published year	Publisher	Administrator	Cover years
China Statistical Yearbook	Each year from 1978 to 2015	China Statistics Press	National Bureau of Statistics of China	1978 – 2015
China Compendium of Statistics: 1949-2008	2010	China Statistics Press	National Bureau of Statistics of China	1949-2008
China Financial Statistical Yearbook	Each year from 1995 to 2015	Chinese Finance Periodical Office	Ministry of Finance of the People's Republic of China	1995-2015
China Financial Statistical Yearbook: Compilation of 50Years	2000	Chinese Finance Periodical Office	Ministry of Finance of the People's Republic of China	1949-1999
China Population and Employment Statistical Yearbook	Each year from 1994 to 2015	China Statistics Press	Department of Population and Employment Statistics of the National Bureau of Statistics of China	1994-2015
Procuratorial Yearbook of China	Each year from 1994 to 2015	China Procurator Press	China's Supreme People's Procurator	1994-2015
Financial Statistic Yearbook of each province	Various years	Statistics Press of each province	Statistics Bureau of each province	1994-2015
Statistical Yearbook of each province	Various years	Statistics Press of each province	Statistics Bureau of each province	1994-2015

As discussed in chapter one, due to the availability of the data, level one of administrative units in mainland China are used for this thesis. This is due to the fact that in most of the national statistical yearbooks there are only national

level and provincial level statistics included; data from lower administrative units are either missing in some regions or incomplete during the period of this study.

The 31 level one administrative regions include 22 provinces, 5 autonomous regions, and 4 municipalities that are directly under the Central Government. All 31 regions are listed in the table 5-3 below.

Table 5-3: All 31 level one administrative regions included in this study

Provinces	Anhui, Fujian, Gansu, Guangdong, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, and Zhejiang
Autonomous regions	Guangxi, Inner Mongolia, Ningxia, Tibet, and Xinjiang
municipalities	Beijing, Chongqing, Shanghai, and Tianjin

Chongqing is one of the cities which belonged to Sichuan province until 1997, when it became a level one administrative municipality under the central government. Since the data series in this research started from 1995, the administrative level transformation of Chongqing leads the research to either merge Chongqing back to Sichuan province or make adjustments and estimation of data in 1995, 1996. In this research, the author decided to adjust and estimate the data in 1995 and 1996 rather than merging Chongqing back to Sichuan due to two main reasons: firstly, the huge size of economic activities of Chongqing might create a super-sized unit by merging Chongqing and Sichuan; second, the importance of Chongqing city in China - many important data regarding Chongqing city, for instance the tax revenue, non-tax revenue, GDP level, foreign trade, urban and rural incomes, central transfers, local government expenditures, are separately presented in most of China's statistical year books, even before 1997. A similar approach was also accepted by previous studies that involved the same problem (Xie, 2011). Hence in this study, Chongqing is treated as one of the level one administrative regions throughout the study period between 1995 and 2013.

For the convenience of the reader, all 31 level one administrative regions are collectively referred to as "provinces". The detailed data collection approaches

for each variable needed are further discussed in section 5.5 and 5.6.

5.3   Model structuring

Linking the research objectives with the literature review, the following observations can be made:

1. Several economic factors are affecting China's tax performance, proxied by the tax/current revenue ratio.
2. Several social factors are affecting China's tax performance, proxied by both tax revenue and current revenue ratios.
3. The tax ratio alone cannot truly represent the true tax revenue performance in China because of some salient features of China's tax system.
4. China's tax revenue performance at the provincial level has been limited by the existence of non-tax-sourced revenue.

Adopting the well-established popular regression approach and following the previous tax effort study by Williamson (1961); Plasschaert (1962); Hinrichs (1965); Lotz and Morss (1967); Thorn (1967); Shin (1969); Weiss (1969); Lotz and Morss (1970); Bahl (1971); Truong and Gash (1979); Leuthold (1991); Badu and Li (1994); (Ghura, 1998); Fauvelle-Aymar (1999); Piancastelli (2001); Alfirman (2003); Mertens (2003); Teera and Hudson (2004); Bird *et al*. (2006); Wang *et al*. (2009); Pessino and Fenochietto (2010); Huang *et al*. (2012); Karagöz (2013); yao and Lin (2013), the method adopted in this research involves several steps:

Step one: Building the tax effort index models for both tax ratio and current revenue ratio.

In order to generate accurate results, building a proper regression model is crucial. The two models and their variables used in this study are listed in Section 5.4.

Step two: Constructing the actual tax ratio and current revenue ratio at provincial level in China.

Linking the salient feature of China's tax performance, these are the two dependent variables used in the regression model, namely the tax ratio and the current revenue ratio.

Tax ratio is measured as the ratio of actual tax collection to the GDP level. Current revenue ratio is measured as the ratio of actual collection of current revenue to the GDP. To obtain the current revenue ratio, the current revenue must be identified and calculated. As revealed in chapter 4, the fiscal revenue values presented in the Chinese Statistical Yearbook do not stand for the true government fiscal revenue due to the existence of extra-budgetary revenue outside the budget before 2010 and the constant changes of the scale of budgetary, off-budgetary and extra-budgetary revenues during the period 1995 to 2010. The detailed description and calculation of the two dependent variables is presented in Section 5.5.

Step three: Obtaining and calculating the relevant independent variables that serve the purpose of the research objectives and hypothesis.

To structure the appropriate explanatory variables, further investigation of the relevant data is required. The independent variables included in this research are selected economic and social factors based on the hypotheses generated from the literature reviewed, which are supposed to be the determinants of tax and non-tax-sourced revenues. A detailed discussion of each explanatory variable is presented in Section 5.6.

Step four: Interpreting results.

With a proper regression model design, an appropriate regression result will be generated and presented. Specifically, the hypotheses testing and regression results, the determinants of the tax and non-tax-sourced revenues of each provincial government, the tax revenue performance of each provincial government, will be presented and discussed in Chapter six.

5.4   The models and variables

It is revealed in chapter 4 that the existence of the non-tax sourced revenue is the salient feature of China's fiscal revenue system. Hence, in addition to the traditional tax ratio, this study has also constructed the current revenue ratio as the second dependent variable. Both tax ratio and current revenue ratio are the proxies of tax performance. Further details on how to identify and calculate the actual tax ratio and current revenue ratio can be found in section 5.5.

Based on the 11 hypotheses that have been generated from the literature reviewed, there are in total 11 independent variables included in this search, namely per capita GDP, industrial sector income share in GDP, service sector income share in GDP, trade share in GDP, population growth rate, population density, non-agricultural population rate, urban-rural income disparity, per capita central transfer, anti-corruption effort, and government expenditure in percentage of GDP. Detailed discussions of these 11 independent variables are presented in section 5.6.1 to 5.6.6.

Hence, the mathematical expression of the tax ratio models is as follows:

$$TY = f(rpcgdp, ind, ser, trade, grpop, dnpop, napop, income, transpc, fexp, corup)$$

Equation 5-1

Where:

$TY = the\ ratio\ of\ actual\ tax\ revenue\ and\ GDP$

$rpcgdp = real\ per\ capita\ GDP$

$ind = industrial\ sector\ income\ as\ percentage\ in\ GDP$

$ser = service\ sector\ income\ as\ percentage\ in\ GDP$

$trade = sum\ of\ imports\ and\ exports\ as\ percentage\ in\ GDP$

$grpop = natural\ population\ growth\ rate$

$dnpop = population\ density$

$napop = non-agriculrual\ population\ rate$

$income = income\ inequality$

$trans\ \ \ = per\ capita\ central\ transfer$

$fexp = government\ fiscal\ expenditure\ in\ GDP$

$corup = anti - corruption\ effort$

And the mathematical expression of the current revenue ratio model is:

$$RY = f(rpcgdp, ind, ser\ trade, grpop, dnpop, napop, income, transpc, fexp, corup)$$

Equation 5-2

Where:

$RY = the\ ratio\ of\ actual\ current\ revenue\ and\ GDP$

$rpcgdp = real\ per\ capita\ GDP$

$ind = industrial\ sector\ income\ as\ percentage\ in\ GDP$

$ser = service\ sect\quad income\ as\ percentage\ in\ GDP$

$trade = sum\ of\ imports\ and\ exports\ as\ percentage\ in\ GDP$

$grpop = natural\ population\ growth\ rate$

$dnpop = population\ densi$

$napop = non - agriculrual\ population\ rate$

$income = income\ inequality$

$transpc = per\ capita\ central\ transfer$

$fexp = government\ fiscal\ expenditure\ in\ GDP$

$corup = anti - corruption\ effort$

5.5 Determination of the dependent variables

5.5.1 Calculation of the actual tax ratio

According to the literature, actual tax ratio is calculated by the ratio of actual tax collection and GDP.

In a mathematical format,

$$ty_{it} = \frac{tr_{it}}{GDP_{it}}$$

Equation 5-3

Where:

$ty = tax\ ratio$

$tr = actual\ tax\ revenue\ collection$

$GDP = gross\ domestic\ product\ level$

$i = province$

$t = year$

The tax revenue data is collected from the China Financial Statistical yearbook, and the GDP data is collected from the China Statistical Yearbook.

5.5.2 Calculation of the actual current revenue ratio

Traditionally, the dependent variable in the tax effort index regression analysis is the ratio of the actual tax collection and GDP. Starting around the 1990s, some researchers began to use a wider indicator to capture the government's true tax-like income or the wider range of fiscal revenue performance.

For example, Fauvelle-Aymar (1999) argues that even though tax revenue and non-tax revenue are inherently different based on their respective definitions, given the important position of the public enterprises in developing countries, they are generating a noticeable amount of non-tax revenues, which is similar to the tax revenue in political terms. Hence, in Fauvelle-Aymar's study, two dependent variables were used, the ratio of tax revenue to GDP and the current revenue ratio to GDP, which included some tax-like non-tax revenues. Bird *et al.* (2006) pointed out that the consideration of current revenue, which is the sum of tax revenue and non-tax revenue other than grants, is an important indicator of tax performance in developing and transitional economies to avoid the misclassification of states' revenues. Tuan Minh, Blanca, and Jeep (2008) followed the study by Bird *et al.* (2006) and argue that the measurement of fiscal revenue effort can be accomplished by the extension of tax effort regression. Le *et al.* (2012) also follows the previous studies regarding the separation of dependent variables into the tax and revenue ratio and separately investigates the tax ratio for the tax effort and fiscal revenue, which is equal to tax plus non-tax collection, and defines this as the fiscal effort.

The researcher of this study believes that the consideration of the current revenue in the tax effort index model is necessary in the case of China. As

argued in Chapter four, the existence of a huge size of non-tax-sourced revenue is the special characteristic of China's fiscal system. Especially at the local provincial level, the significant size of off-budgetary revenue and extra-budgetary revenues are generated from government fees and charges. Tax revenue and its usage are well organized and controlled by the government; however, the government fees and charges are rather complex and lack transparency. Relevant roles and administration regarding the fees and charges collection lack relevant lawful doctrines. Local governments are granted most of the power regarding the establishment, adjustment, and collection of fees and charges. Highly decentralized expenditure responsibility and lack of central administrative control of non-tax-sourced revenue, such as local fees, charges, and funds, has resulted in local government collecting a noticeable amount of revenues as a major component of the local fiscal revenue system (Lin, 2000; Ma, 2005; Wong & Bird, 2008; Shen, 2011; Shen *et al*., 2012; Tong *et al*., 2013; Zheng & Wang, 2013).

As mentioned in Chapter four, the distinction between tax revenue and non-tax revenue is rather blurred in China. Local governments have the minimum autonomous administrative power over tax because taxes, including both central and local taxes, are pre-determined by central government. It can be argued that the non-tax-sourced revenues are acting as a function, which is similar to tax revenues in the local fiscal system. A noticeable amount of off-budgetary and extra-budgetary revenues arguably match the concept of tax revenue (Lin, 2002; Wu, 2002; Jia & Liu, 2005; Lin, 2005). It is therefore reasonable to use the current revenue in the tax effort model. In addition, due to a large proportion of the government's total revenue being non-tax-sourced revenue, it is not appropriate to leave it out of the equation when discussing tax-related issues.

This research investigates the tax performance in China, and to find the key determinants of the variation of the tax revenue capacity and tax revenue effort in China. It follows the previous studies of Fauvelle-Aymar (1999), Bird *et al*. (2006), Tuan Minh *et al*. (2008), and Le *et al*. (2012). They constructed a broader fiscal revenue indicator by adding up the tax revenue and selected

non-tax-sourced revenue. This research has constructed the current revenue ratio at provincial level in China as a broader, but more accurate fiscal revenue indicator.

Under the budget management system in China, the non-tax-sourced revenue is also divided into two sections: the off-budgetary revenue and extra-budgetary revenue. The difference between these two is that the former is under budget management, as a major component of the general fiscal revenue in China's Fiscal Statistical Yearbook, while the extra-budgetary revenue is not included in the Chinese Statistical Yearbook as a component of the general fiscal revenue until 2011 (M.O.F., 1995-2015).

Since this study involves a panel analysis, which combines both the cross-section data and time-series data, one fact that should not be ignored is the changes in the coverage of data during the study period. Off-budgetary and extra-budgetary revenues are conceptually different; however, in order to better control the size of the extra-budgetary revenue and take them into budget management step by step, the central government has made an effort to merge the items in the extra-budgetary revenue into off-budgetary revenue. This effort continued until 2011, when all the extra-budgetary revenue was merged into the off-budgetary revenue, and the term "extra-budgetary revenue" vanished from China's official statistical documents (Tong *et al*., 2013; Zheng & Wang, 2013). Hence, for the purpose of data consistency and analysis accuracy, current revenue is calculated as the sum of off-budgetary and extra-budgetary revenue.

In addition, two items from the off-budgetary revenue, namely the revenue from SOEs and the planned subsidies to loss-suffering of SOEs (PSL), are excluded from the data. It was explained in Chapter 4 that according to PSL's property and the classification by UN, PSL is a subsidized fiscal expenditure in principle. Inclusion of the PSL in the off-budgetary revenue might cause data bias for some provinces. In addition, the revenue from SOEs is highly related to the PSL, as both reflect the activities of SOEs.

Hence, the current revenue ratio is calculated based on the formula given below:

$$ry = \frac{tr + obr + ebr - rsoe - psl}{gdp}$$

Equation 5-4

Where:

$ry = current\ revenue\ ratio$

$tr = tax\ revenue$

$obr = off\ budgetary\ revenue$

$ebr = extra\ budgetary\ revenue$

$rsoe = revenue\ from\ State\ Owned\ Enterprises$

$psl = planned\ subsidies\ to\ loss\ suffering\ State\ Owned\ Enterprises$

$gdp = gross\ domestic\ product$

The tax revenue data and the GDP data are both collected from China Financial Statistic Yearbooks. The data of the off budgetary revenue, extra budgetary revenue, revenue from state owned enterprises and planned subsidies to loss suffering state owned enterprises are collected from the Financial Statistical Yearbook of each province.

5.6   Obtain and generate the independent variables

The factors taken into consideration in this research as explanatory variables are grouped into six categories for the convenience of the study, which consists of a total of 11 variables for the purpose of the 11 hypotheses in this study. The six categories are traditional tax handles, GDP decomposition, population factors, income inequality, corruption level, and governmental factors. The stage of development, which is measured by the per capita GDP, and the openness level are two variables included in this study as the traditional tax handles. The industrial sector value added and service sector value added to GDP are included in the GDP decomposition category. The population factors include three variables, namely the population growth rate, population density, and non-agricultural population rate. For the category of income inequality, this study is mainly focused on the rural-urban income disparity. The corruption level in this study is reflected by the anti-corruption

effort index at provincial level. Finally, the level of dependence on central transfer and the degree of government competency are included in the governmental factors to represent the government's dependency and capacity. Table 5-4 provides the summary of all the six categories and their corresponding variables.

Table 5-4: Six categories and their corresponding variables

traditional tax handles	• per capita GDP • openness level
GDP decomposition	• industrial sector value added • service sector value added
population factors	• population growth rate • population density • non-agricultural population rate
income inequality	• urban-rural income disparity
corruption	• anti-corruption effort index
governmental factors	• level of dependence on central transfer • government capacity

5.6.1 Traditional tax handles

Piancastelli (2001) provide strong evidence that three traditional tax handles, the per capita income, the trade ratio, and the agriculture share, are the most influential variables in the tax effort model.

In Piancastelli's (2001) study, the regression analysis covers data on 75 countries during the period 1985 to 1995. The variables of per capita GNP and

the trade share explain over half of the variance of the tax effort.

Teera and Hudson (2004), Gupta (2007), and Pessino and Fenochietto (2010) all derived similar results. The significance level of the three variables in Terra and Hudson's study on tax effort of 116 countries during the period 1975 to 1998 added strong evidence to Piancastelli's conclusion.

Gupta's (2007) panel data analysis of 105 developing countries in a time period of 25 years also supported Piancastell's result (Gupta, 2007).

Based on the strong empirical evidence discussed above, two of the traditional tax handles, namely the per capita GDP and the openness level, are taken into consideration in this research. The agricultural sector-related factor is also included in this research, but taking a different approach. A detailed description is presented in the later section.

The following section provides a detailed analysis of the three variables used in the above-mentioned studies.

5.6.1.1 Per capita GDP

It is well documented in the tax effort literature that a higher level of economic development generates more public demand and expenditure, as well as a greater income and tax base to collect tax revenues (Lotz & Morss, 1967; Bahl, 1971; Tanzi & Zee, 2000; Piancastelli, 2001; Bird *et al*., 2008; Pessino & Fenochietto, 2010).

It is also widely accepted that the higher level of development an economy has the greater influence on taxation it has (Shin, 1969). A higher state of development would increase the surplus of total income where government generates tax revenues (Shin, 1969). The most popular indicator of the level of development is the per capita GDP. It is also widely used by many scholars as one of the most influential variables in the tax effort-related models even today (Piancastelli, 2001; Teera & Hudson, 2004; Gupta, 2007; Pessino & Fenochietto, 2010).

Therefore, the same indicator is also applied in this research. In order to obtain a comparable result and avoid the impact from the change of inflation, per capita GDP at each province is deflated using the per capita GDP deflator index of each province for each year.

The function of real per capita GDP in a mathematical expression is as follows:

$$rpcgdp_{it} = f(pcgdp_{it}, pcgdpid_{it})$$
Equation 5-5

Where:

$rpcgdp = real\ per\ capi\quad GDP$

$pcgdp = nominal\ per\ capita\ GDP$

$pcgdpid = per\ capita\ GDP\ deflator\ index$

$i = province$

$y = year$

The nominal per capita GDP and its deflator index data are collected from the Chinese Statistical Yearbook.

Most of the empirical studies showed a positive relationship between the per capita GDP and tax ratio, although some scholars argue that the increase in per capita GDP might have a different impact because the per capita GDP is more positively related to a progressive tax system or indirect taxes (Shin, 1969; Ghura, 1998). However, in Chapter three and Chapter four of this paper, it was revealed that China's tax system during the study period is mainly based on turnover tax, namely the indirect taxes such as value-added tax, business tax, and consumption tax, which are the dominant components in the tax revenue structure. Hence, based on the strong empirical evidence and the characteristics of China's tax structure, a positive relationship between tax effort and current revenue effort is expected in this research.

5.6.1.2 Openness level

The openness level of an economy is one of the classic, yet important tax handles. The openness level is usually measured by the share of either imports to GDP or the sum of imports and exports to GDP (Hinrichs,1965).

As early as 1965, Hinrichs (1965) detected that the share of imports in GDP has a greater explanatory power than the per capita GDP in lesser developed countries. The foreign trade sector is normally well organized and easier to manage, also with lower administrative costs (Ghura, 1998; Gupta, 2007). A high level of foreign trade, which indicates a higher openness level, normally results in a greater performance of the economy, hence improving the tax ratio. This has been proven by many other researchers (Ghura, 1998; Keen & Simone, 2004; Baunsgaard & Keen, 2010).

The previous studies have been mainly focused on inter-country analysis. According to the nature and scope of this research, it was felt that the provincial openness level should be measured as the trade share both internationally and among other provinces. However, the data relating to the local trades is rarely available. Hence in this research, the provinces' foreign trade share measured as the sum of import and export to GDP is used as the proxy of local government's overall openness level, and a positive relationship between the trade share and the tax ratio is expected. The function of the openness level in a mathematical expression is:

$$trade_{it} = \frac{exp_{it} + imp_{it}}{GDP_{it}}$$

Equation 5-6

Where:

trade = openness level

exp = total export

imp = total import

GDP = gross domestic product

i = province

t = year

The GDP, total export, and total import data are obtained from the Statistical Yearbook of each province for various years.

5.6.2 The Decomposition of GDP

The following section explains the variables related to the GDP decomposition used in this study. The variables generated from the GDP decomposition in this study were the industrial sector value added to GDP and the service sector value added to GDP.

Due to the strong connection between economic development and tax bases, the structural differences with the GDP play an essential role in the tax effort-related studies. The analysis of GDP composition/decomposition started as early as in 1970s, when Bahl (1971) included the mining share of income as one of the explanatory variables in his research on taxation in 1970. This approach was followed by many researchers. Consequently, the industrial sector-related variables, such as the mining share, manufacturing share, and industrial share in GDP, were gradually accepted and used in tax research (Bahl, 1971; Leuthold, 1991; Fauvelle-Aymar, 1999; Piancastelli, 2001; Mertens, 2003; Teera & Hudson, 2004).

However, it was not until recently, from the early 21st century, that scholars further divided GDP into service sectors, which was in turn used in the tax research. The typical variable is the share of service sector in GDP or service sector value added in GDP (Piancastelli, 2001; Chaudhry & Munir, 2010). Hence, two explanatory variables are included in this research, namely the real manufactory sector value added to GDP and service sector value added to GDP.

5.6.2.1 Industrial sector value-added

Theoretically, the industrial sector is relatively easier to tax, because it's normally well organized, and its revenue is better recorded. This is also true for China, as China's fiscal structure is largely dependent on the revenues generated from industrial sectors (Wong, 1992; Wang *et al*., 2009).

The industrial value added to GDP is calculated using the following formula:

$$ind_{it} = \frac{rind_{it}}{rgdp_{it}}$$

Equation 5-7

Where:

$ind = real\ industrial\ value - added\ to\ GDP$

$rind = real\ industrial\ production\ deflated\ by\ industrial\ deflator\ index$

$rgdp = real\ GDP\ deflated\ by\ GDP\ deflator\ index$

$i = province$

$t = year$

The industrial value added to GDP level is calculated in this research by real industrial total production and real GDP level. Each individual manufactory production value and GDP level is deflated by the industrial deflator index and GDP deflator index; hence, the real manufactory value added is calculated by the ratio of real manufactory production and real GDP. The industrial production, GDP, industrial deflator index, and the GDP deflator index are collected from the China Statistical Yearbook.

Due to the special historical relationship between the SOEs and the local government, there is a large share of contribution of industry sector towards the tax revenues. Thus, it is predicted that the industry's share is positively related to the tax ratio.

5.6.2.2 Service value-added

The calculation of the service sector value added to GDP is from the same data source and the same method as the industrial value added to GDP. The formula used is as follows:

$$ser_{it} = \frac{rser_{it}}{rgdp_{it}}$$

Equation 5-8

Where:

$ser = real\ service\ sector\ value\ added\ to\ GDP$

$rser = real\ service\ sector\ production\ deflated\ by\ service\ sector\ deflator\ index$

$rgdp = real\ GDP\ deflated\ by\ GDP\ index$

$i = province$

$t = year$

The Chinese local government tax revenue is highly reliable on value added tax. Therefore, it can be argued that a more developed service sector will lead to a higher level of tax revenue due to the positive relationship between the service sector and the sales and consumption brought by this sector.

Nonetheless, the results of the relationship between the share of the service sector in GDP and tax effort are mixed in the previous studies. The argument that a positive relationship may exist between the service sector and sales and consumption is based on one assumption that activities in service sectors are, at least mostly, formal activities. However, many scholars have pointed out that the existence of large scale informal activities in developed countries is inevitable due to the important role of informal activities in the development of the country's economy (Tanzi & Davoodi, 2000; Botlhole, 2010). Some empirical studies seem to support this view. According to the tax effort study of 75 developed and developing countries presented by Piancastelli (2001), a non-significant relationship between the service sector share in GDP and the tax effort was found. Similar results were also provided by Chaudhry and Munir (2010), when they investigated the relationship between the service sector share in GDP and the tax effort level in Pakistan; the result indicated a non-significant relationship. However, a very different result emerged in the study presented by Botlhole (2010) on the determinants of tax ratio in Sub-Saharan African countries during the period of 1990 to 2007: a significant negative sign between the service sector share in GDP and the tax-GDP ratio.

The huge divergence in the results regarding the relationship between service sector share in GDP and the tax ratio has provided strong evidence that the

influence of the service sector share in GDP on the tax-GDP ratio is strictly country-specific. Hence, it is difficult to point out the direction regarding the effect of the service sector without a systematic investigation of the size of informal activities in the service sector. In addition, relevant studies regarding the relationship between tax effort and service sector are scant.

As revealed in Chapter three and four, in China the current tax system is mainly focused on turnover taxes such as VAT, consumption taxes, and business taxes. Thus, based on the empirical finding regarding the relationship between the service sector share in GDP and the tax ratio, especially the importance of turnover taxes in China's tax structure, it is expected in this research that the variable measured as the service sector value added in GDP will produce a positive sign in the tax ratio and current revenue ratio regressions. Similarly, if the service sector in China has mostly informal activities, a positive sign is also expected in the relationship between current revenue ratio and service value added. This argument is based on the fact that a large proportion of the non-tax-sourced revenue, the local governments' fees, charges, and funds are under a two level management system between central government and local government. The rights of establishment, collecting, and spending of the governments' fees, charges, and funds are mostly in the hands of local government, and this area seriously lacks legal basis and control (Lin, 2002; Wu, 2002; Jia & Liu, 2005; Ma, 2005). Therefore, it may be argued that the greater the number of informal activities in the service sector, the higher the non-tax-sourced revenue, and hence, a higher current revenue ratio. The analysis of the difference of performance of the service sector in both tax ratio and current revenue ratio would provide valuable results for one of the hypotheses in this study: China's provincial level tax revenue performance is limited by the existence of non-tax-sourced revenue.

5.6.3 Population factors

The role of population factors in the tax-GDP ratio studies has captured the eye of researchers for a long time. The most adopted variables representing the role of population factors are the population growth rate and the population density. However, questions regarding how population factors influence the tax

effort in the model is debatable (Teera & Hudson, 2004). Hence, to understand the impact of population factors on tax and current revenue ratios, one needs to understand the characteristic of the population factor in the nation.

The population factors taken into account in this study are the population growth rate, population density, and non-agricultural population rate. Each of the variables has a special meaning in China.

5.6.3.1 Population growth rate

It is argued by Shin (1969) that a higher population growth rate would increase tax collection due to the rise in consumption and sales. However, a higher population growth rate might also have a negative relationship with tax collection due to the lag effect of capturing taxpayers (Bahl, 2004; Teera & Hudson, 2004).

While studying the impact of population growth rate on the Chinese economy in general and on tax performance in particular, a unique phenomenon should also be taken into account – the "one child policy" in China. During the opening up period in 1979, in order to improve the average family living standards, the Chinese government included a strict population control program as one of the main components of its economic reform; hence, the "one child policy" was introduced and strictly enforced (Xing, 2003). Parents who had more than one child and did not qualify as an exception were charged penalties and ostracized or even rejected from housing and welfare benefits (Mishkin, 2011, p. 162).

Since then, the State Family Planning Bureau set out targets and policy directions for each of the provincial and lower level governments. The most affected people were urban residents and government employees. Some exceptions were made for famers in rural and remote areas, families with special difficulties, and ethnic minorities. The figure of population growth rate is therefore an important indicator of how well the local governments meet the specific targets given by the State Family Planning Bureau regarding birth control (Hesketh, Lu, & Xing, 2005).

Nonetheless, the variable representing the population growth rate used in this research is the natural population growth rate, which is calculated as the ratio of the difference between the birth rate and mortality rate and total population. The birth rate is calculated as the number of new born babies in every 1,000 people within the province's total population, and the mortality rate is calculated in the same way.

The relevant data was collected from China Population and Employment Statistics Yearbook. The arithmetic expression for calculating the natural population growth rate is as follows:

$$grpop_{it} = \frac{birth_{it} - mort_{it}}{pop_{it}} * 1000‰$$

Equation 5-9

Where:
$grpop = natural\ population\ growth\ rate$
$birth = birth\ rate$
$mort = mortality\ rate$
$pop = total\ population$
$i = province$
$t = year$

It may be argued that the increase in population growth rate would raise tax collection due to the rise in consumption and sales. This is pertinent in China. As revealed in chapter three and four, China's local taxes largely rely on turnover taxes, such as value added taxes, business taxes, and consumption taxes, whereas the personal income tax only accounts for a tiny share in China's total tax revenue. In turn, it may be argued that the rate of population growth increases the tax exemption and has a lag effect on tax collection. In addition, this indicator might also reflect the degree of influence caused by the "one child policy"; thus, a negative relationship is expected between the natural population growth rate and the tax/current revenue effort.

5.6.3.2 Population density

Population density is argued to be another relevant factor in tax revenue performance due to its significant role in the level of development of the economy, as a higher population level indicates wider taxable sources (Teera & Hudson, 2004). As Shin (1969) points out, it is highly likely that the positive relationship between population density and tax revenue would be found due to the increase in consumption and sales (Shin, 1969).

In the case of China, a huge share of tax revenue is generated by value-added taxes, mainly generated from consumption and sales; hence, it is argued in this research that a positive relationship is expected between population density and tax/current revenues.

Population density is calculated by the ratio of total population and the total land area in square kilometres. Data is collected from China Population and Employment Statistical Yearbook. In a mathematical form, population density can be described as shown below:

$$dnpop_{it} = \frac{pop_{it}}{area_i}$$

Equation 5-10

Where:

$dnpop = population\ density$

$pop = total\ population\ in\ units\ of\ 10000\ people$

$area = total\ land\ area\ in\ units\ of\ square\ kilometres$

$i = province$

$t = year$

5.6.3.3 Non-agriculture population rate

As argued in Chapter two, variables related to the agriculture sector are the most important traditional tax handles till today. Agricultural activities mainly take place in rural areas, which makes it rather difficult to generate tax revenues compared to other sectors, since most of the public sector activities are urban-based (Tanzi, 1992; Teera & Hudson, 2004). A larger agricultural share in the

economic structure indicates a lower demand of governmental activities and services due to the fact that the agricultural sector is normally composed of subsistence farmers through large scale informal activities in rural areas. Hence, it is difficult for the tax authorities to control and collect tax (Ghura, 1998; Teera & Hudson, 2004; Karagöz, 2013). The empirical evidence indicates that a negative relationship between the agriculture sector share of GDP and the tax ratio was often found by many scholars (Leuthold, 1991; Tanzi, 1992; Ghura, 1998; Karagöz, 2013).

Tax generation in the agriculture sector is especially difficult in China. According to the literature review chapter, it is noticeable that tax reduction and exemption has been one of the core tax reforms in the agriculture sector since 1978. Consequently, the total agriculture-related taxes has kept decreasing. This exemption of tax and tax reduction in the agriculture sector continued until 2006, and eventually, all the agriculture-related taxes were officially abolished.

From another perspective, it may be said that the higher the non-agricultural population, the lower the agricultural section activities and the higher the tax revenues; thus, the other population variable in the tax/current revenue function used is the non-agricultural population rate.

Moreover, the non-agricultural population in China has its own special and important issues because of its close link with migration.

According to Bao, Örn, Hou, and Yaohui (2009), during the years 1982 to 1987, 30 million Chinese people migrated within or between provinces. However, this number rose to 144 million from 1995 to 2000, a size expanding by almost 5 times. Furthermore, there was a large surge of migration of rural residents to urban areas, especially to coastal areas and metropolitans (Bao *et al*., 2009). This enormous migration resulted in an unbalanced population density across the country. Thus, a change in the non-agricultural population rate also indicates the degree of migration from rural areas to urban areas. On the one hand, the migration from rural areas to urban areas provided millions of workers for urban cities. On the other hand, it boosted the urbanization level, since those

workers contributed highly to the urban economy (Knight, 2008; Shunfeng, Erqian, & Mukhopadhyay, 2009).

As mentioned before, since the relationship between the agriculture sector's production and tax collection turned rather weak in China after the abolishing of agricultural tax, research has shown that the non-agricultural population rate is a better proxy for this research, as it can capture both the size of the agriculture sector and the urbanization level. In a mathematical form, the non-agricultural population rate can be expressed as follows:

$$napop_{it} = \frac{tnapop_{it}}{pop_{it}}$$

Equation 5-11

Where:

$napop = non\ agricultural\ population\ rate$

$tnapop = total\ non-agricultural\ population$

$pop = total\ population$

$i = province$

$t = year$

The total population and non-agricultural population data are collected from China Population and Employment Statistical Yearbook.

Based on the strong empirical and theoretical evidence discussed above, a positive relationship between the non-agriculture population rate and the tax/current revenue ratio is expected in this research.

5.6.4 Income inequality

Countless studies have provided evidence that income inequality harms investment, social and political stability, and economic growth (Hung Mo, 2000; Jędrzejczak, 2015; Zhang & Bao, 2015). Therefore, it is not surprising to find that the issue of income inequality in the world as well as in China has greatly drawn the attention of both scholars and authorities.

5.6.4.1 Urban-rural income disparity in China

It is well documented that since the openness reform of China in 1978, income inequality has been increasing at a fast pace along with rapid economic growth, especially the resident income disparity (Peng, Song, & Peng 2013). The Gini coefficient, which is a widely accepted measurement for income inequality, increased by over 150% between 1978 to 2006 (Chen, Dai, Pu, Hou, & Feng, 2010). The widening gap between rich and poor has threatened both the economic growth and the social harmony of the entire society. Along with the great achievement of fast economic growth, the not so hidden rapid growth of income inequality has become the authority's "irritating headache" (Zhang & Bao, 2015).

Using a cross-section data set in 1982, Tsui (1993) found that the disparity in urban-rural residents' incomes largely contributed to the overall inequality in China. Following the tax sharing reform in 1994, the urban-rural residents' income disparities have still not improved. Figure 5-1 depicts the divergence of urban and rural household real per capita annual income from 1978 to 2013.

Figure 5-1: Urban-rural residents' income disparities: 1978 - 2013
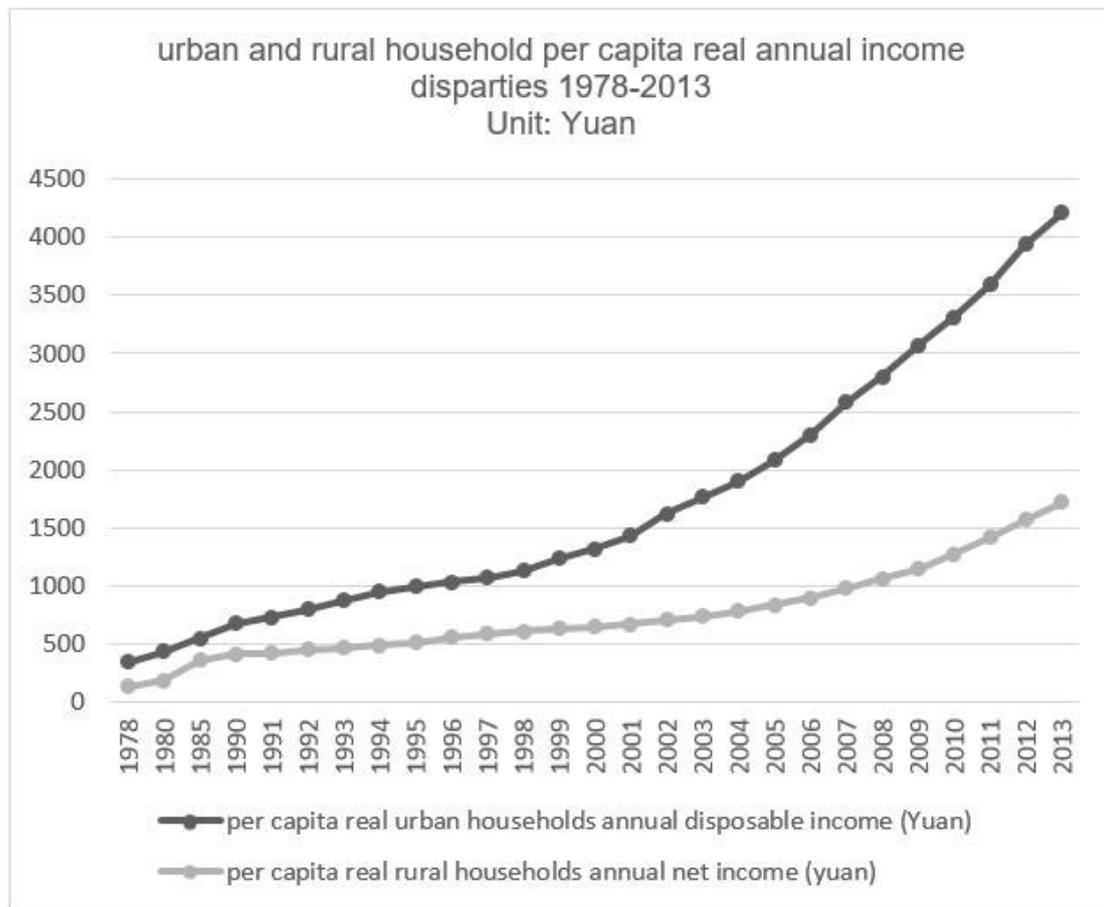
It can be seen that the income gap between the urban and rural household has been widening throughout the whole period, and especially after 1994, where the divergence shows a faster pace. In 2013, the annual average per capita disposable income of urban households was over 2.5 times larger than their rural counterparts.

5.6.4.2 Income inequality in tax effort index study

Income inequality is also documented in the tax effort index literature as one of the important social factors related to the tax revenue performance. Bird *et al*. (2006) Investigated the determinants of tax performance for selective developing countries and high income countries and included income inequality as one of the demand side variables. A significant and negative relationship was

found between the income inequality and the tax/current revenue ratio. In their stochastic frontier panel data tax ratio analysis of 113 countries, Fenochietto and Pessino (2013) reveal that the Gini index, an indicator for income equality, was highly significant and negatively related to the tax ratio.

In this study, urban-rural resident income disparity is used as the proxy of the income inequality in China, which will be explained in detail later.

5.6.4.3 Income inequality measurements

Currently, the most used statistical indicators in the field of income inequality and the area of study of the regional inequality are the Gini coefficient and the Theil index.

The Gini coefficient was first introduced by Corrado Gini in 1912, and its core idea is to measure the inequality of income or wealth (Gini, 1936). The Gini index ranks the income inequality between 0 and 1 – a Gini index of 0 indicates perfect equality, where each person or unit has equal share of income or wealth as compared to others; and a Gini index of 1 indicates extreme unbalanced inequality, where only one person or unit possesses the entire income or wealth of the whole sample. Normally, the Gini index is between 0 and 1; if the income or wealth is more equally distributed, the Gini index is closer to 0 and vice versa (Bellù & Liberati, 2006).

The foundation of the Gini index is the Lorenz curve. The Lorenz curve was first introduced in 1905 by Max O. Lorenz in his article "Methods of measuring the concentration of wealth". In the paper, Lorenz developed a simple method that illustrated the concentration of wealth and formatted it into a graphical representation. The graphical expression of the Lorenz curve can be seen in Figure 5-2 below:

Figure 5-2: The Lorenz Curve
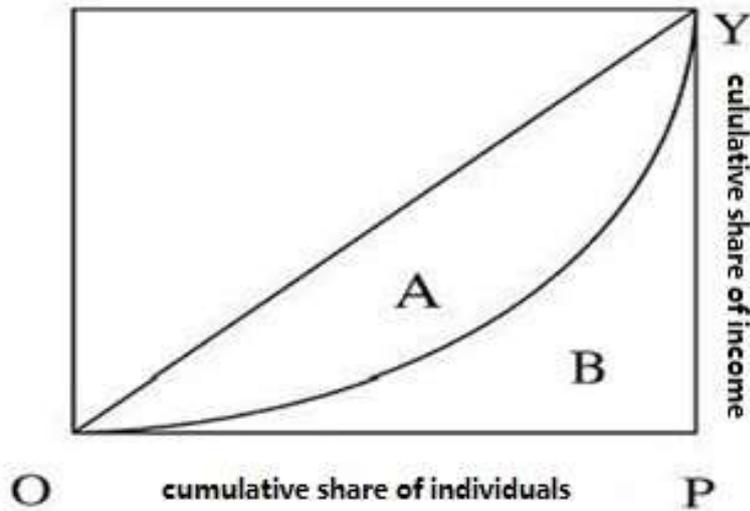
Line OP represents the cumulative share of individuals from the lowest to the highest incomes; line YP indicates the cumulative share of income earned; and line OY indicates the perfect equal distribution of income. The Lorenz curve is the actual income or wealth distribution indicated by the curve between area A and area B. Hence, the Gini index is the ratio of area A and area A+B. The larger the size of area A, the greater the income or wealth inequality.

The other indicator of income inequality is the Theil index. The Theil index was introduced in 1967 by Henri Theil. He described the Theil index as "the expected information content of the indirect message which transforms the population shares as prior probabilities into the income shares as posterior probabilities" (Theil, 1967, pp. 125-126).

The foundation of the Theil index was the information theory presented by Shannon and Weaver (1949), which measures the expected information content of the probability of occurrence of a set of events (Shannon & Weaver, 1949). In Shannon and Weaver's information theory, suppose there are n events and one of them has the possibility of occurrence x_i, then we have:

$$\sum_{n=1}^{n} x_i = 1$$

Equation 5-12

Then, the expected information content H is measured as follows:

$$H = \sum_{n=1}^{n} x_i * log \frac{1}{x_i}$$

Equation 5-13

Suppose the event's occurrence possibility is 1, then we have the expected information content H equal to 0; in contrast, if the possibilities of occurrences of all the events are equal, i.e. $x_i = \frac{1}{n}$, $n = 1, \ldots n$, then we have the maximum content of information $H = \log(n)$. Applying this theory to the income distribution analysis, suppose x_i is the income share of unit i, then the expected information content H is thus a measure of income inequality among all units (Conceição & Ferreira, 2000; Conceicao & Galbraith, 2000; Bar-Am, 2016).

Based on the Equation 5-13, we have the Theil index for n groups of people ($n = 1, \ldots i$) as follows:

$$T = \sum_{n=i}^{n} \left(\frac{I_i}{I} * ln \frac{I_i/I}{P_i/P} \right)$$

Equation 5-14

Where:

$T = Theil\ index$

$I = total\ income$

$P = total\ population$

$i = groups$

$n = 1, \ldots i.$

If the income share of a certain number of people is equal to its population share, i.e. $I_i/I = P_i/P$, then we have $\ln(1) = 0$, and hence, T = 0, which indicates perfect income distribution among n groups of people. Otherwise, the larger the Theil index, the greater the income disparity among groups.

The Gini coefficient is sensitive for middle income groups, whereas the Theil index, according to its definition, more sensitively reflects the income gaps between the two ends, i.e. the highest and the lowest (Wang & Ouyang, 2007). Thus, the Theil index is more suitable to reflect urban-rural income disparities since only two individual units are involved.

5.6.4.4 Measurement of urban-rural income disparity in China using the Theil index

According to the Theil index Equation 5-14, the urban-rural income inequality can be expressed by the following mathematical Equation 5-15:

$$income = \frac{I_u}{I_{ur}} * ln\frac{I_u/I_{ur}}{P_u/P_{ur}} + \frac{I_r}{I_{ur}} * ln\frac{I_r/I_{ur}}{P_r/P_{ur}}$$

Equation 5-15

Where:
$income = urban\ rural\ income\ disparity\ Theil\ index$
$I = total\ income$
$P = total\ population$
$u = urban\ residents\ group$
$r = rural\ residents\ group$

The total resident population, total urban resident population, and the total rural resident population are collected from China Population and Employment Statistical Yearbook. The total residents' income, total urban residents' income, and the total rural residents' income are collected from the China Statistical Yearbook.

Taking into consideration the previous empirical evidence that indicates a negative impact of income inequality on the social and economic environment, a negative sign between urban-rural Theil index and tax effort/current revenue effort is expected in this study.

5.6.5 Anti-corruption effort

5.6.5.1 Definition of corruption

It is essential to define corruption at the early stage of the related study despite the fact that the definition of corruption is still under debate. In most of the literature, a broad definition of corruption is accepted, that is to define corruption as the abuse of public power for private benefit (Bird et al., 2006; Everhart, Martinez-Vazquez, & McNab, 2009; Ionescu, 2011).

It is can be seen from the above discussion that the definition of "corruption" is still fuzzy. However, Bardhan (1997) pointed out that considering the cultural differences which exist across countries and even in regions within countries, what might be considered as a bribe in one culture might be recognized as a favour or "routine transaction" in another culture (Bardhan, 1997). Nevertheless, no one can deny that there may be some grey areas between corruption activities and non-corruption activities.

5.6.5.2 Literature regarding the relationship between corruption and tax/current revenue ratio

The phenomenon of corruption has been an important social issue since ancient times in the history of human society. The strong relationship between corruption and other aspects of economic performance has been found in a lot of research (Ghura & Hadjimichael, 1996; Bardhan, 1997; Mauro, 1997). The systematic analysis of the relationship between corruption and tax revenue performance was also carried out in late 1990s.

A typical example is of the study carried out by Ghura (1998). In the study, the authors used data from 39 countries over 11 years to examine the relationship between corruption and tax ratio. The corruption level was used as one of the explanatory variables in the panel analysis. The result showed a highly statistical negative relationship between corruption and tax ratio. Since then, studies regarding the relationship between the corruption level and tax revenue performance have mushroomed. The studies include but are not limited to those conducted by Bird *et al*. (2006), Le *et al*. (2012), and Fenochietto and Pessino

(2013).

By investigating the institutional function of the government in selected developing and high income countries, Bird *et al*. (2006) confirms from the results that the corruption level and the rule of law has the greatest explanatory power on both tax and current revenue ratio among all the institutional factors. In their study on tax and fiscal revenue capacity and effort in 110 countries Le *et al*. (2012) also confirmed the highly significant and negative impact of the corruption level in both the tax revenue ratio model and fiscal revenue ratio model. Fenochietto and Pessino (2013) Also found a positive and highly significant relationship between the controls of corruption and tax ratio in both developed and developing countries. Fenochietto and Pessino (2013) stressed that a significant increase in a country's tax capacity could be achieved by higher government efficiency, which could reduce the level of corruption. The conclusion from Fenochietto and Pessino's study infers that the level of government efficiency is positively related to tax capacity and tax effort. Conversely, a high level of corruption will adversely affect tax capacity and tax effort.

Despite the numerous studies on the relationship between tax/current revenue performance and corruption level for inter-country analysis, one can hardly find a study of tax effort index with corruption as one of the explanatory variables at intra-country analysis, especially for China, where corruption is notably known. In order to close this gap in the literature, for the first time according to the researcher's knowledge, an attempt is made to link corruption as one of the social factors with both tax and current revenue ratio models.

5.6.5.3 Guanxi and corruption in China

Corruption has its own unique meaning in China due to the prevailing "Guanxi": a special social and cultural phenomenon in China and fertile soil for corruption.

Literally, "Guanxi" refers to the interpersonal relationships and connections. However, to fully understand the meaning of the Guanxi network system in mainland China is rather difficult for people from other areas, even those from

the same ethnic group sharing the same Chinese traditions, for example, for people from Taiwan and Hong Kong (Chenting & Littlefield, 2001).

The practice of Guanxi has long been a tradition for Chinese people because of the long tradition in Chinese society that "rule by man instead of rule by law" (Fan, 2002, p. 376).

This special feature in China's socialist market economy has resulted in a unique phenomenon that the Chinese economy does not evolve towards market capitalism, but towards a relationship-based Guanxi-web capitalism (Boisot & Child, 1996; Lovett, Simmons, & Kali, 1999).

The development and practice of Guanxi prevails in China to such an extent that it has become China's most distinguished feature from western management practice. As Davies, Leung, Luk, and Wong (1995) point out, the main difference between western and Chinese practice is that written contracts and procedures play a dominant role in western management practice, whereas in China, personal relationships, i.e. Guanxi, comes first (Davies *et al*., 1995).

More importantly, Guanxi and corruption are like conjoined twins that are difficult to be separated especially when the government officials get involved in Guanxi style social networking system and corruption emerges.

However, some scholars argue that Guanxi is a valuable resource in all aspects (Davies *et al*., 1995). According to Davies *et al*. (1995), Guanxi is not something that only exists, but something that people are managing and constructing. Developing or gaining access to a particular Guanxi (personal relationship to officials or authorities) or Guanxi social networking system (personal relationships among groups of people) is known as "La Guanxi", meaning bridging personal relationships between individuals or groups of officials and authorities (Chenting & Littlefield, 2001). The practice of 'La Guanxi' has hence turned China into a breeding ground of corruption. The degree of constructing and bridging Guanxi between people has become so serious that corruption has evolved into institutionalised and intensified corruption with a huge Guanxi

web containing numerous politicians and businessmen (Fan, 2002; Wedeman, 2004; Jianming & Zhizhou, 2008).

It should be noted that after the economic reform in 1978, the government officials realized that their power is linked to greater personal benefits, where people who have no power can also reap the benefits through connections; hence, the exchange of power and favours through a Guanxi style social networking system, i.e. La Guanxi, is widely being practiced (Chenting & Littlefield, 2001).

The practice of Guanxi is often recognized as corruption by western society, and even in China, the opinions regarding how to distinguish between Guanxi practice and corruption are nowhere near being settled (Lovett *et al*., 1999).

5.6.5.4 The measurement of corruption and the anti-corruption effort

In order to best conceptualize the definition of corruption, measuring corruption is crucial. In fact, a vast array of indicators and sources from various institutions have been generated. These include the corruption in government index from the International Country Risk Guide (ICRG), Corruption Perceptions Index (CPI) from Transparency International (TI), and the Index of Control of Corruption from the Worldwide Governance Indicators (WGI) published by the World Bank. A detailed analysis of the strengths and weaknesses of these measures was provided by Javier Urra in 2007.

In China, there is no clear official definition of the term "corruption", possibly because there is no clear difference between the practice of Guanxi and corruption. However, in "the Criminal Law of the People's Republic of China" (1997), there are two articles related to the crime of corruption:

In article 382, it states that "Any State functionary who, by taking advantage of his office, appropriates, steals, swindles public money or property or by other means illegally takes it into his own possession shall be guilty of embezzlement" (NPC, 1997).

In article 385, it was noted that "Any State functionary who, by taking advantage of his position, extorts money or property from another person, or illegally accepts another person's money or property in return for securing benefits for the person shall be guilty of acceptance of bribes" (NPC, 1997).

Despite the criticisms against the subjective measurement of some of the indicators, especially the argument regarding the possibility that it might reflect personal opinion rather than the actual presence of corruption, the above-mentioned indexes are still most widely used for measuring corruption at international level (Urra, 2007). Using the corruption in government index from ICRG, Ghura (1998) examined the link between government corruption and tax effort index in a study of 39 Sub-Saharan African countries. Bird *et al*. (2006) used the index developed by (Daniel, Kraay, & Mastruzzi, 2004) to investigate the impact of governance on tax revenue performance in a large sample of countries including Latin American countries and some high income countries in Europe. Meanwhile, Le *et al*. (2012) used the Corruption Perceptions Index (CPI) and examined the relationship between corruption and countries' tax revenue performance in 100 countries.

As mentioned before, although the studies on the relationship between corruption and tax revenue performance have become prolific since the 1990s, compared with those comparative studies across countries, similar studies within the context of a single country are scant. This may be because corruption is such a complex phenomenon and difficult to calculate, and the corruption indexes published by different organizations are all focused on international comparison.

Nonetheless, some effort has been made to calculate the proper proxy for corruption at intra-country level. For instance, some scholars have investigated the total value of public investments in one or more sectors and compared it with the total value of the outcome or true final value of the sectors. By estimating the value loss during the investment-outcome process, a proxy of the level of corruption was captured (Reinikka & Svensson, 2004; Golden &

Picci, 2005; Olken, 2007; Richey, 2010). Unfortunately, this kind of indirect measurement suffers from the fact that the value loss might be caused by many other factors rather than corruption alone.

Some attempts have also been made to capture the level of corruption at sub-national level. Fisman and Gatti (2002) and Glaeser and Saks (2006) introduced the number of government officials' corruption-related crime convictions as the proxy of the degree of corruption.

Fisman and Gatti (2002) weighted the conviction numbers by the police employment number and the prison inmate number to control the judicial enforcement, whereas Glaeser and Saks (2006) weighted the conviction numbers to the total state population (number of convictions per 100,000 people). This type of direct measurement of corruption has an advantage over other measurements "simply that of data availability, quality and comparability" (Fisman & Gatti, 2002, p. 27).

Hence in this study, following the path of Fisman and Gatti (2002) and Glaeser and Saks (2006), the author constructed an anti-corruption effort index based on the number of government officials' corruption-related crime convictions.

The corruption data at the Chinese local government level is relatively hard to find, and therefore, "the total registered legal case of acceptance of bribes and embezzlement" is used to proxy the corruption/anti-corruption. This type of data is also fits with the definition of corruption in China's criminal law.

As a result, based on the definition of corruption in the "the Criminal Law of The People's Republic of China", the availability of data and linking Guanxi practice with corruption in China, the anti-corruption effort in this research is named as anti-corruption effort ratio, which is calculated as the total number of registered legal cases of acceptance of bribes and embezzlement in every 1,000,000 people. It is calculated by the following formula.

$$corr_{it} = \frac{rc_{it}}{popm_{it}}$$

Equation 5-16

Where:

$corr = anti-corruption\ effort\ ratio$

$rc = total\ number\ of\ registered\ legal\ cases\ of\ corruption\ related\ crimes$

$popm = total\ population\ in\ unit\ of\ Millions$

$i = province$

$t = year$

It is worth noting that Fisman and Gatti (2002) and Glaeser and Saks (2006) used a similar approach to measure the level of corruption. However, they emphasised that the corruption ratio they obtained was to represent the level of corruption rather than anti-corruption as in the case here. As discussed earlier in this section, the presence of Guanxi in China is so serious that it is rooted in the Chinese culture, which makes even accurately defining corruption almost impossible. Moreover, the large scale of "La guanxi" practice also makes it impossible to measure corruption using a single dimension. Hence, taking into consideration the salient features of the characteristics of corruption in China, it is believed that this ratio measures the provincial governments' efforts to tackle corruption, and the term anti-corruption ratio is introduced in this study.

Following the definition of corruption in "the Criminal Law of The People's Republic of China", the corruption variable presented in this research is the total number of registered crimes committed by the state functionary involved in bribes and embezzlement, which includes embezzlement, accepting bribes, misappropriation of public funds, and malpractice-related crimes.

The data of registered legal cases of corruption-related crimes is obtained from the provincial prosecutor's office reports published in the "Procuratorial Yearbook of China", and the signs of anti-corruption index in both the tax revenue ratio model and current revenue ratio model are expected to be positive in this study.

5.6.6   Government factors

5.6.6.1   Local Government dependency on central transfers

It is argued that external financing has a displacement effect on the domestic tax revenues (Leuthold, 1991). Similar to this displacement effect, a problem called the "reverse causality" may occur (Roodman, 2008). In general, "reverse causality" refers to a phenomenon in which, due to a government or region's poor economic performance, a country or region receives external grants. However, if the country or region starts relying on the external grants, its economic performance becomes poorer and a downward spiral would be expected according to Ghura (1998).

The concept of "reverse causality" can be extended to the local government's dependency on central transfers. In China, as in many other countries, there are central government transfers to local/provincial government. This transfer can be viewed as the functioning of the external grants received by the local government.

As discussed in Chapter 4, the main purpose of the central government transfer in China is to deal with local government deficiencies and fiscal disparities between provinces. However, the reverse causality effect may occur between the central government transfer and local provincial tax effort/current revenue effort. In another words, if a local government becomes heavily dependent on the central government's transfer, its tax performance, instead of becoming better, may become worse.

 Fan and Zhang (2010) argue that the central transfer system in China has a direct impact on the local governments' economic performance. However, based on the data from 1995 to 2006, the increased amount of central transfer received by local governments was performing as a negative impact on the local economic growth rate, especially in the less developed provinces (Fan and Zhang, 2010). Litvack, Ahmad, and Bird (1998) argue that a negative relationship between government transfer and local tax effort might be expected

due to the local governments trading the transfer as a substitute for tax revenues. Bordignon, Manasse, and Tabellini (2001) also support the negative impact of central transfers to local tax revenue. The theoretical evidence is that due to the lack of information and communication between the two levels of government, local authorities tend to purposely reduce the tax revenue to obtain more central transfers (Bordignon, Manasse, and Tabellini, 2001).

It may be noted that the central government transfer in the tax/current revenue ratio models has a special property. The value of central transfers received may also be viewed as the proxy for the level of the provincial government decentralization.

As discussed in chapter 4, the tax sharing reforms during 1994 essentially involved a fiscal centralization process. Huge shares of local revenue were taken back by the central government, yet the local expenditure responsibility remained the same. Consequently, a great fiscal deficiency appeared among local governments. One of the approaches for the local government to increase revenue was to increase the non-tax-sourced revenue. Meanwhile, local governments began to rely more on the central transfers. Thus, the central transfers are also a good reflection of the impact of the 1994 centralization reforms on the provincial tax/current revenue performance.

In order to investigate the relationship between the central transfers received by provincial governments and the tax/current revenue performance, the amount of central transfers received by provincial governments has been taken into this research as the proxy of the level of dependence on the central transfers.

The arithmetic expression is as follows:

$$transpc_{it} = \frac{ctr_{it}}{pop_{it}}$$

Equation 5-17

Where:

$transpc = per\ capita\ central\ transfer\ received$

$pop = total\ population$

$ctr = total\ amount\ of\ central\ trasfers\ received\ deflated\ by\ the\ CPI$

$CP\ = consumer\ price\ index$

$i = province$

$t = year$

The total population data is collected from China Population and Employment Statistical Yearbook. The total value of central transfers received by each province is obtained from the Financial Statistical Yearbook of each province. The total amount of central transfers of each province has been deflated by the Consumer Price Index (CPI) to eliminate the effect of price changes, where the CPI data is obtained from the Statistical Yearbook of each province.

The external financial support has been proven by many early studies to have a negative impact on tax revenue performance (Lotz & Morss, 1970; Leuthold, 1991; Ghura, 1998; Chaudhry & Munir, 2010). It is therefore hypothesised in this study that the reverse causality effect may also exist in China, i.e. the fiscal transfer from central to local government decreases the local governments' motivation to explore the opportunities for increasing their tax/current revenue. Hence, a negative relationship between real per capita central transfer and tax/current revenue ratio is expected.

5.6.6.2 Government capacity

Capacity can be defined as the ability to carry out appropriate tasks (Antwi & Analoui, 2008). The main purpose of tax and revenue collection is to provide the financial support for the government's expenditure and to enhance the government's capacity in the economy in order to perform governmental functions such as wealth redistribution and economic development (Huossain, 2014).

Government capacity is very important in the economy. Overcoming market

failure, distributing income and wealth evenly, and maintaining market stabilisation are the three main functions of governments (Shoup, 1959; Gruber, 2011). Hence, the capacity of a government can be explained by its ability to utilize its functions.

As the main financial support for government capacity, the size of tax or fiscal revenue is mainly determined by the required scale of government functions. Especially in developing countries, the government requires more expenditure for public goods and services, and hence, a greater surplus for taxes, resulting in a greater tax capacity and effort (Huossain, 2014).

A higher level of government expenditure in the economy will certainly increase the need for taxation, as well as the requirement of a larger amount of fiscal revenue to provide the financial support for high quality public goods and services. Hence, the depth and width of government capacity is one of the most influential factors in the tax/current revenue capacity and tax effort.

Huossain (2014) Investigates the relationship between government capacity and fiscal expenditure and measures the government's capacity by the expenditure as a percentage of GDP. In this research, the proxy of government capacity is measured as the ratio of local government budgetary fiscal expenditure and local GDP. The mathematical expression for government capacity is as follows:

$$fexp_{it} = \frac{ex_{it}}{GDP_{it}}$$

Equation 5-18

Where:
$fexp = the\ proxy\ of\ the\ government\ capacity$
$ex = total\ budgetary\ fiscal\ expenditure$
$GDP = gross\ domestic\ product$
$i = province$
$t = year$

The data of budgetary fiscal expenditure is obtained from the Finance Yearbook of China, and the GDP figure is collected from the Chinese Statistical Yearbook. A positive relationship between the government's capacity and tax/current revenue ratio is expected to be based on the theoretical and empirical evidence.

5.7 Summary

In this chapter, the theoretical perspectives and the method used in this research are discussed. In detail, the paradigm, data source and collection approaches, hypotheses, model structuring, and all variables are presented.

As a researcher, it is essential to understand the key paradigm of the research. The research paradigm is the set of common beliefs and agreements about how problems should be understood and addressed, based on the researcher's ontological, epistemological and methodological assumptions (Kuhn, 1962; Guba and Lincoln, 1994; Sarantakos, 2012). Within the paradigm, ontology refers to what actually exists as reality, epistemology refers to how we can gain knowledge of what exists, and methodology deals with which way to obtaining knowledge (Maxwell, 2012; Killam, 2013). Ontology dictates epistemology which dictates methodology which dictates methods. All of this needs to make sense for the question being asked since the question drives everything.

The nature of this study dictates that the philosophical position of this research is the positivism paradigm: ontologically realism, epistemologically objectivism, quantitative methodology, statistical analysis method using secondary data collection approach.

As derived from the literature reviewed, the author formulated 11 hypotheses for this study:

H1: The stage of development is positively related to the tax revenue performance at provincial level in China.

H2: Development in the industrial sector is positively related to the tax revenue performance at provincial level in China.

H3: The development of the service sector is positively related to the tax revenue performance at provincial level in China.

H4: The openness level is positively related to the tax revenue performance at provincial level in China.

H5: The population growth rate is negatively related to the tax revenue performance at provincial level in China.

H6: The population density is positively related to the tax revenue performance at provincial level in China.

H7: The shrinking of agricultural sector activities is positively related to the tax revenue performance at provincial level in China.

H8: The resident income inequality is negatively related to the tax revenue performance at provincial level in China.

H9: The external grants received by the local governments is negatively related to the tax revenue performance at provincial level in China.

H10: The anti-corruption effort is positively related to the tax revenue performance at provincial level in China.

H11: The government capacity is positively related to the tax revenue performance at provincial level in China.

Based on the salient feature of China's fiscal revenue system and 11 hypotheses, this research has generated two tax effort index models, namely the tax ratio model, and the current revenue ratio model. The tax ratio model uses the ratio of actual tax collection and GDP as the dependent variable,

whereas in the current revenue ratio model, the author constructed the current revenue ratio which is the sum of tax revenue, off budgetary revenue, and extra budgetary revenue, but exclude revenue from State Owned Enterprises and planned subsidies to loss suffering State Owned Enterprises.

Each model contains the same 11 independent variables that are grouped into six categories for the convenience of the study. In addition, each individual variable is discussed in detail about their meanings and calculation methods. Each is explained in the context of China's own fiscal and social characteristics. Other than those independent variables that are previously used in other literature, this research has, for the first time in the literature of China's tax effort index studies, used the income inequality as one of the explanatory variables. In addition, this research has constructed the anti-corruption effort ratio as another explanatory variable, which is the very first in the single country tax effort index studies' literature.

Chapter six: Empirical result and discussions

6.1   Introduction

In this section, the process of data analysis and empirical results is presented, followed by a discussion on the results.

The statistics of the raw data are discussed in Section 6.2. In Section 6.3, the explanation of the raw data processing is presented. In Section 6.4, all the independent variables used in this study are tested for multicollinearity through two widely used indicators, namely the Variance Inflation Factor and the Condition Number. Section 6.5 is mainly to identify the best regression model for this study among the pooled OLS, random effect, and fixed effect regression models. Firstly, the three regression models are explained. Secondly, along with the results of the three regression models, the Breusch and Pagan Lagrangian Multiplier Test (LM test), and the Hausman test are also conducted, and the results are discussed in this section. Based on the results of the most appropriate model identified by the LM test and Hausman test, the significances and signs of each variable in both the tax ratio and current revenue ratio models can be obtained. By doing so, the hypothesis of this study can be tested. Hence in section 6.6, the summary of the testing of all 11 hypotheses and the statistical regression results for this study are presented. This is followed by section 6.7, which includes a discussion on the evaluation of both the tax ratio and current revenue ratio regression models. In section 6.8, a detailed discussion and interpretation of each variable used in the regressions is presented, and the determinants of the tax revenue and current revenue capacity are discussed and evaluated. Since the regressions provide the estimated tax capacity and the estimated current revenue capacity, the tax effort index can be contrasted, which is measured according to Equation 2-8; the tax effort index is computed as the ratio of actual tax/current revenue ratio and the estimated tax/current revenue ratio. Hence, in Section 6.9, the interpretation of tax/current revenue capacity and effort index at provincial level is presented. Finally, a brief summary is presented in section 6.10.

6.2 Descriptive statistics

In this section, a brief discussion regarding the raw data in this study is presented. The analysis of all individual data used is discussed in section 6.2.1. In order to further investigate the regional differences between provinces in terms of the variables, the arithmetic means of all variables for each province during the study period between 1995 and 2013 are computed and their divergence presented in Section 6.2.2.

6.2.1 Descriptive statistics of raw data

The descriptive statistics on the crude data are provided on all the variables used in this study. Table 6-1 below provides the descriptive statistics for the raw data.

Table 6-1: Compact table of statistical summary

Variables	Mean	Std. Dev.	Median	Max	Min
ty	0.0633	0.0253	0.0556	0.1775	0.0280
ry	0.1029	0.0248	0.1001	0.1884	0.0329
ln_rpcgdp*	9.1444	0.7590	9.1178	11.0228	7.3884
ind	0.4942	0.0999	0.5071	0.7339	0.1953
ser	0.3672	0.0642	0.3542	0.6213	0.2561
trade	0.2946	0.3479	0.1293	1.6682	0.0250
grpop	6.3378	3.5663	6.0600	16.2000	-1.8000
dnpop	0.0388	0.0539	0.0257	0.3809	0.0002
napop	0.3335	0.1623	0.2864	0.9003	0.1352
income	0.1292	0.0584	0.1266	0.3270	0.0187
transpc	13.5047	18.1610	8.3477	184.5551	1.0356
corup	32.5962	13.9129	29.4323	132.1514	9.9315
fexp	0.1833	0.1464	0.1463	1.2914	0.0492

where:

ty=tax ratio

ry=current revenue ratio

rpcgdp=real per capita GDP

ind = industrial sector value-added to GDP

ser = service sector value-added to GDP

trade = total trade share in GDP

grpop = natural population growth rate

dnpop = populaiton density

napop = non-agricultural population rate

income = urban-rural income inequality Theil index

transpc = per capita central transfer

corup = anti-corruption effort ratio

fexp = governemnt budgetary fiscal expenditure in GDP

From Table 6-1 above, some observations can be made.

Firstly, the huge differences between the minimum and maximum values in all variables possibly indicate regional disparities in terms of economic and social factors. However, the differences may be caused by regional factors as well as time factors; this is tested in the later section of spatial-temporal analyses.

Secondly, the minimum value of the population growth rate is the only variable that presents as a negative number. By looking into the data set, it is apparent that the population growth rate in Shanghai between 1995 and 2003, Beijing in 2003, and Liaoning in 2011 and 2012 were all negative. This has supported earlier arguments that birth is hugely influenced by the implementation and strength of the "one child policy". On the other hand, the most affected urban areas are Beijing and Shanghai because they are two provincial-level municipalities which were subjected to very strict enforcement of the "one child policy".

6.2.2 Descriptive statistics of cross-sectional data on the mean average between 1995 and 2013 for each provinces

In order to best investigate the regional differences, all the variables included in this research are given the arithmetic means for each province during the study period between 1995 and 2013. Table 6-2 below lists the descriptive statistics of cross-sectional data on the mean average for each of the 31 provinces.

Table 6-2: Descriptive statistics of cross-sectional data on the mean average for each provinces

Variables	Mean	Std. Dev.	Median	Max	Min
Ty	0.0633	0.0220	0.0571	0.1360	0.0405
Ry	0.1029	0.0222	0.0992	0.1717	0.0742
Ln_rpcgdp*	9.3012	0.5118	9.2068	10.4933	8.2920
Ind	0.4942	0.0834	0.5034	0.6126	0.2599
ser	0.3672	0.0619	0.3553	0.5896	0.2677
trade	0.2940	0.3359	0.1260	1.3746	0.0646
grpop	6.3378	3.1283	6.1226	12.4526	0.5908

dnpop	0.0388	0.0537	0.0258	0.2950	0.0002
napop	0.3335	0.1577	0.2952	0.8090	0.1535
income	0.1299	0.0530	0.1243	0.2357	0.0280
transpc	13.5012	11.4109	11.0272	68.4076	5.1922
corup	32.5962	7.9572	30.7941	52.5482	16.6464
fexp	0.1832	0.1299	0.1577	0.8068	0.0850

where:

ty=tax ratio

ry=current revenue ratio

rpcgdp=real per capita GDP

ind = industrial sector value-added to GDP

ser = service sector value-added to GDP

trade = total trade share in GDP

grpop = natural population growth rate

dnpop = populaiton density

napop = non-agricultural population rate

income = urban-rural income inequality Theil index

transpc = per capita central transfer

corup = anti-corruption effort ratio

fexp = governemnt budgetary fiscal expenditure in GDP

*rpcgdp has taken logarithm due to its large scale

The table 6-2 clearly shows that regional disparities exist from both economic and social perspectives.

The tax ratio and current revenue ratio performances *per se* vary significantly across provinces. The maximum value of tax ratio is 0.14, which is 3 times the minimum value. This divergence is smaller in terms of current revenue ratio, where the maximum figure is still over twice as big as the size of the minimum.

The significant difference between the maximum and minimum value, i.e., the range of the logged real per capita GDP is evidence that the economic development among provinces is extremely unbalanced. The divergence of the unbalanced development level can also be found using the regional data in Figure 6-1 below.

Figure 6-1: The average means of real per capita GDP between 1995 and 2013 in each province

the average means of real per capita GDP (100 Million Yuan) between 1995 and 2013 in each provinces

province	value
shanghai	36074.56
tianjin	28031.01
beijing	23164.63
jiangsu	20986.04
zhejiang	20080.14
guangdong	18632.50
liaoning	18122.64
fujian	17039.87
shandong	15934.95
inner mogo	14003.98
heilongjiang	12643.39
jilin	11793.21
hebei	10975.43
hainan	10822.61
chongqing	10329.34
hubei	9964.68
xinjiang	8834.76
shaanxi	8528.61
shanxi	8336.47
hunan	8220.30
henan	8200.45
qinghai	8197.32
sichuan	7765.28
guangxi	7612.74
anhui	7489.31
ningxia	7216.22
jiangxi	7003.73
tibet	6549.70
yunnan	6411.59
gansu	5561.93
guizhou	3991.90

Figure 6-1 clearly demonstrates that the development level across provinces is extremely unbalanced. The real per capita GDP level in Shanghai is over seven times higher than the lowest province, which is Guizhou. In addition, a clear pattern of geographical divergence is also revealed. Four provinces and municipalities, Shanghai, Tianjin, Beijing and Jiangsu, have the highest real per capita GDP and are all located along the eastern coastal or near coastal areas, but the four provinces, Guizhou, Gansu, Yunnan and Tibet, that show the lowest development level, are all located in remote western areas.

The biggest regional divergence also occurs in the population density and trade share in GDP variables. In the remote provinces like Qinghai, Tibet, the

population density is only between 0.0007 (10000 people/square kilometres) and 0.0002 (10000 people/square kilometres), which does not even reach 2% of the country's average. This is no doubt because of political and geographical reasons (Crowe, 2013). The Qinghai-Tibet plateau, which is a vast elevated plateau in Central and East Asia, covers the majority of land area in Tibet and Qinghai; in addition, for years Tibet has suffered from problems of socio-political instability. (Xu, 1998; Tuttle, 2015)

The regional disparities of the trade share also vary significantly. The provinces with higher trade shares in GDP are mostly located in the coastal areas. This has revealed that the coastal areas are taking their location advantages, thanks to the great influences of the open door policy (Yao & Zhang, 2001; DÉMurger, Sachs, Woo, Bao, & Chang, 2002; Fu, 2007; Hao & Wei, 2010; Whalley & Xin, 2010).

The mean level of the current revenue ratio is over 1.6 times larger than the tax ratio. This reveals the characteristic in China's provincial government fiscal revenue system, which is, the provincial governments collect noticeable amount of revenue through non-tax sourced items. Based on the definition and calculation of the current revenue of provincial governments in China, the large amount of non-tax sourced items consists of mainly government fees, charges, and funds (Lin, 2000; Zhang, 2006).

6.3 Data processing

The dataset in this research contains a total of 31 provinces and covers a 19-year period, from 1995 to 2013. The estimation process is performed by STATA 13 econometric software packages. Logarithms format was applied to all the variables to reduce the scale problem of the variables and to adjust the positively skewed distribution to more normal. In addition, logarithms format is also used to model the relationship between dependent variables and independent variables into percentage change relationships. Furthermore, all the explanatory variables have been given a first order time lag to best capture the coefficients. Table 6-3 illustrates the re-constructed variables after taking logarithms and one-year time lag into account, and these are the data entered

in the regression model.

Table 6-3: Re-constructed variables descriptions (1996 – 2013)

Variable	N	Mean	SD	Median	Min	Max
ln_ty	589	-2.82	0.34	-2.89	-3.57	-1.73
ln_ry	589	-2.3	0.23	-2.3	-3.41	-1.67
ln_rpcgdp	589	9.14	0.76	9.12	7.39	11.02
ln_ind	589	-0.73	0.23	-0.68	-1.63	-0.31
ln_ser	589	-1.02	0.16	-1.04	-1.36	-0.48
ln_trade	587	-1.72	0.94	-2.05	-3.69	0.51
ln_grpop	576	1.68	0.75	1.81	-6.91	2.79
ln_dnpop	589	-3.97	1.45	-3.66	-8.52	-0.97
ln_napop	589	-1.2	0.44	-1.25	-2	-0.1
ln_income	584	-2.17	0.53	-2.07	-3.98	-1.12
ln_transpc	587	2.08	1.02	2.12	0.03	5.22
ln_corup	589	3.41	0.37	3.38	2.3	4.88
ln_fexp	587	-1.86	0.53	-1.92	-3.01	0.26

6.4 Detecting multicollinearity for the variables used for the regressions

This section is focused on the detection of the possibility of multicollinearity. A multicollinearity issue, which is the existence of near-linear relationships among the explanatory variables, is a problem which may exist in any econometric framework. A high level of multicollinearity may result in biased and inaccurate regression results by inflating the standard errors, and thereby threatening the reliability of the regression results (Farrar & Glauber, 1967; Prunier, Colyn, Legendre, Nimon, & Flamand, 2015).

One of the ways to detect multicollinearity is to look into the correlation matrix. A high correlation between two variables often indicates a high possibility of multicollinearity. However, this method is considered unreliable because the existence of a high degree multicollinearity does not require high bivariate correlations between variables.

To deal with the problem in multiple regression models mentioned above, there are two widely used indicators to measure the degree of multicollinearity between independent variables, namely the Variance Inflation Factor (VIF), and the Condition Number (CN) (Bizeti, Carvalho, Souza, & Destro, 2004; Tu, Kellett, Clerehugh, & Gilthorpe, 2005; O'brien, 2007; Miles, 2014).

A rough role for VIF is that it should not be greater than ten, otherwise the interference of multicollinearity needs to be taken into account (Tattar, Ramaiah, & Manjunath, 2016). In addition, moderate multicollinearity problems exist if the condition number is between 100 and 1000; if the condition number is larger than 1000, it indicates the almost linear-dependence of the covariates. However, the multicollinearity problem is not an issue if the condition number is less than 100 (Bizeti, Carvalho, Souza, & Destro, 2004; Tattar, Ramaiah, & Manjunath, 2016). In table 6-4 below is the multicollinearity diagnostics using VIF and UN for all the independent variables.

Table 6-4: The multicollinearity diagnostics for all the independent variables

Variable	VIF	Tolerance	Eigenval	Condition Number
ln_rpcgdp	4.45	0.2247	10.3879	1
ln_ind	2.75	0.3635	0.7101	3.8248
ln_ser	2.64	0.3787	0.4755	4.6742
ln_trade	2.68	0.3727	0.1423	8.5432
ln_grpop	1.83	0.5467	0.0951	10.4523
ln_dnpop	3.66	0.2732	0.0622	12.9247
ln_napop	5.19	0.1926	0.0508	14.3001
ln_income	3.14	0.3186	0.0343	17.405
ln_transpc	6.58	0.152	0.0271	19.585
ln_corup	1.91	0.5228	0.0075	37.144
ln_fexp	5.35	0.187	0.0056	43.007
Mean VIF	3.65		0.0017	79.3261

As shown in the table above, since all VIF is less than 10 and the condition number is less than 100, the degree of multicollinearity is not an issue.

6.5 Identifying the most appropriate regression model

Generally speaking, there are three types of data in the empirical analysis: time series, cross-section and panel data. The time series data covers a single or multiple variables' variance within a single unit of sample overtime, and the cross-section data describes a single or multiple variables variances among a group of samples at a specific time point. Panel data, however, considers multiple variables among a group sample and in different time periods. In other words, the panel data has two dimensions: time and space (Gujarati, 2009). The panel data which combines the time series and cross-section data has several advantages, such as a higher degree of freedom and a rich sample variability (Hsiao, 2006).

The dataset in this research contains 31 provinces covering a time period of 19 years from 1995 to 2013, hence a panel regression is used.

Three regression models, pooled OLS regression model, random effect regression model, and a fixed effect regression model, are built and run for both tax revenue effort and current revenue effort. In order to identify the best appropriate model for this study, two tests were also performed: the Breusch-Pagan LM test for the random effect model against the pooled OLS model, and the Hausman test for the fixed effect model against the random effect model.

In short, there are in total six regression models which have been built and run, and the best appropriate regression models have been identified by the Breusch-pagan LM test and Hausman test. The strategy of identifying the most appropriate regression model is summarized in the chart 6-1 below.

Chart 6-1: The strategy of identifying the most appropriate regression model

```mermaid
flowchart LR
    A[Tax revenue effort Pooled OLS model] --> B[Breusch-Pagan LM test for the random effect model against the pooled OLS model]
    C[Tax revenue effort random effect model] --> B
    C --> D[Hausman test for the fixed effect model against the random effect model]
    E[Tax revenue effort fixed effect model] --> D
    B --> F[Identify the best appropriate tax revenue effort model]
    D --> F

    G[Current revenue effort Pooled OLS model] --> H[Breusch-Pagan LM test for the random effect model against the pooled OLS model]
    I[Current revenue effort random effect model] --> H
    I --> J[Hausman test for the fixed effect model against the random effect model]
    K[Current revenue effort fixed effect model] --> J
    H --> L[Identify the best appropriate current revenue effort model]
    J --> L
```

6.5.1 Pooled OLS model for tax ratio and current revenue ratio regression

The pooled OLS regression model (or Constant Coefficients Model) pooled all observations, regardless of the variations of the coefficients within any specific province. The assumption behind the Pooled OLS is the non-stochastic of the explanatory variables, and the independent and identical distribution of the error term with zero mean and constant variance (Gujarati, 2009). The assumption of the Pooled OLS ignores the individual effects or the

uniqueness of different individual units. This may create a possibility of an issue with heterogeneity i.e., the variance is not constant.

In this research, by adopting the pooled OLS model, the regression has pooled all the observations together and does not distinguished the uniqueness of individual provinces, assuming that heterogeneity or individuality of the provinces does not exist.

The pooled OLS regression results for the tax ratio and current revenue ratio are provided in Table 6-5 below.

Table 6-5: Pooled OLS regression results for the tax ratio and current revenue ratio model

Pooled OLS regression for tax ratio (Ln_ty) and current revenue ratio (Ln_ry)									
tax ratio (Ln_ty)					current revenue ratio (Ln_ry)				
Variables	Coef.	Std. Err.	t	P>t	Variables	Coef.	Std. Err.	t	P>t
ln_rpcgdp L1.	0.241	0.048	5.07 ***	0	ln_rpcgdp L1.	0.092	0.042	2.2 **	0.028
ln_ind L1.	0.137	0.049	2.78 ***	0.006	ln_ind L1.	0.147	0.043	3.37 ***	0.001
ln_ser L1.	0.569	0.070	8.08 ***	0	ln_ser L1.	0.550	0.062	8.88 ***	0
ln_trade L1.	0.067	0.017	3.98 ***	0	ln_trade L1.	0.047	0.015	3.22 ***	0.001
ln_grpop L1.	0.002	0.013	0.17	0.868	ln_grpop L1.	- 0.007	0.012	-0.6	0.548
ln_dnpop L1.	0.107	0.010	10.68 ***	0	ln_dnpop L1.	0.087	0.009	9.89 ***	0
ln_napop L1.	0.194	0.031	6.3 ***	0	ln_napop L1.	0.092	0.027	3.38 ***	0.001
ln_income L1.	0.095	0.025	3.81 ***	0	ln_income L1.	0.042	0.022	1.89 *	0.06
ln_transpc L1.	- 0.352	0.034	-10.42 ***	0	ln_transpc L1.	- 0.300	0.030	-10.1 ***	0
ln_corup L1.	0.140	0.030	4.72 ***	0	ln_corup L1.	0.139	0.026	5.32 ***	0
ln_fexp L1.	0.808	0.051	15.73 ***	0	ln_fexp L1.	0.606	0.045	13.4 ***	0
Total number of observations: 541					Total number of observations: 541				
Prob>F (F test) = 0.0000					Prob>F (F test) = 0.0000				
R-squared = 0.8003					R-squared = 0.6566				
Adjusted R-squared = 0.7894					Adjusted R-squared = 0.6378				
t statistics in parentheses: * 0.1≥p>0.05, ** 0.05≥p>0.01, *** p≤0.01									

The results reveal that most of the variables are significant in both the models and have the expected signs, except for the population growth rate and income inequality.

It seems the population growth rate is not significant in either the tax ratio model or current revenue ratio model. The income inequality is significant in both models, whereas the signs in both models are positive, which is an unexpected result and contradictory to the prediction in this study.

The traditional tax handles, the real per capita GDP and foreign trade share in GDP, are all positively and significantly related to both the tax ratio model and current revenue model. The pooled regression model reveals that traditional tax handles still play a critical role in the tax effort index model. This finding is consistent with previous empirical studies (Piancastelli, 2001; Teera & Hudson, 2004; Gupta, 2007; Pessino & Fenochietto, 2010).

Apart from the traditional tax handles, the GDP decomposition is also revealed as important in terms of improving tax/current revenue performance. Both the industrial value-added in GDP and service sector value-added to GDP are positively and significantly related to both the tax ratio model and current revenue ratio model. This finding confirms the strong relationship between the structural differences within the GDP and the tax/current revenue performance.

The result also indicates the importance of population factors in the tax effort index models. Population density and the non-agricultural population rate are all positively and significantly related to both the tax ratio model and current revenue model. These results are consistent with the previous empirical studies and the prediction in this study.

The anti-corruption factor is revealed as positively and significantly restated to both tax ratio and current revenue ratio. This result is consistent with all previous empirical studies that have indicated a negative relationship between the corruption level and tax revenue performance (Ghura & Hadjimichael,

1996; Bardhan, 1997; Mauro, 1997). Moreover, it is also discussed in Chapter 5 that the"guanxi" practice makes corruption in China serious and distinctive (Boisot & Child, 1996; Lovett *et al*., 1999; Chenting & Littlefield, 2001; Fan, 2002). Hence, this result reveals that the tax and current revenue at provincial level government can be significantly improved by containing the"guanxi" practice.

Governmental factors also play a critical role in both models. The significance and negative sign of the real per capita central transfer in both models match the expectation of this research, that the tax/current revenue capacity are negatively influenced by the lack of financial independency. The same relationship is found between the government budgetary fiscal expenditure in GDP and the tax/current revenue ratio. This reveals the importance of government capacity in tax/current revenue capacities.

One important finding by comparison of the tax ratio OLS model and current revenue ratio OLS model is that the two models share great similarity. All the variables share the same sign in both models. In addition, except for the real per capita GDP and income inequality variables, the remaining 9 variables have the same significant level in both models. This may be the evidence of the argument that non-tax sourced revenues in the current revenue are similar to tax revenue in terms of function and nature.

6.5.2 Random effect regression for the tax ratio and current revenue ratio

The major drawback of the pooled OLS regression model is the possible existence of individual heterogeneity. One of the approaches to dealing with the heterogeneity influence is to perform the random effect regression.

The random effect model (error components model) takes a disturbance term approach by treating the intercept as a random variable with a mean value. However, a strict condition of the random effect model is that the composite error term shares no correlation to any of the explanatory variables within the

model in order to avoid inconsistent estimation of the regression coefficients (Gujarati, 2009, pp. 602-603).

The random effect regression results for the tax ratio and current revenue ratio are provided in Table 6-6 below.

Table 6-6: Random effect regression results for the tax ratio and current revenue ratio models.

Random-effects GLS regression for tax ratio (ln_ty) and current revenue ratio (ln_ry)									
tax ratio (ln_ty)					current revenue ratio (ln_ry)				
variables	coefficients	standard errors	Z-values	p>|z|	variables	coefficients	standard errors	Z-values	p>|z|
ln_rpcgdp L1.	0.151	0.044	3.4 ***	0.001	ln_rpcgdp L1.	0.167	0.045	3.74 ***	0.00
ln_ind L1.	0.416	0.076	5.5 ***	0.00	ln_ind L1.	0.313	0.076	4.11 ***	0.00
ln_ser L1.	0.218	0.086	2.53 **	0.011	ln_ser L1.	0.171	0.088	1.94 *	0.053
ln_trade L1.	0.068	0.014	4.76 ***	0.00	ln_trade L1.	0.007	0.015	0.45	0.655
ln_grpop L1.	-0.014	0.009	-1.67 *	0.096	ln_grpop L1.	-0.014	0.009	-1.55	0.122
ln_dnpop L1.	0.073	0.018	3.96 ***	0.00	ln_dnpop L1.	0.079	0.017	4.56 ***	0.00
ln_napop L1.	0.220	0.037	5.87 ***	0.00	ln_napop L1.	0.094	0.038	2.48 **	0.013
ln_income L1.	0.000	0.021	-0.01	0.993	ln_income L1.	-0.059	0.022	-2.66 ***	0.008
ln_transpc L1.	-0.269	0.023	-11.71 ***	0.00	ln_transpc L1.	-0.271	0.024	-11.3 ***	0.00
ln_corup L1.	0.019	0.021	0.95	0.344	ln_corup L1.	0.041	0.022	1.88 *	0.06
ln_fexp L1.	0.684	0.044	15.47 ***	0.00	ln_fexp L1.	0.669	0.046	14.61 ***	0.00
Total number of observations: 541					Total number of observations: 541				
Wald chi2 (28) = 2752.83					Wald chi2 (28) = 529.46				
Prob>chi2 = 0.0000					Prob>chi2 = 0.0000				
sigma_u =0.10289594					sigma_u =0.09012791				
sigma_e = 0.07220304					sigma_e = 0.07555822				
intra-class correlation (rho) = 0.67006348					intra-class correlation (rho) = 0.58726077				
within R-squared = 0.8528					within R-squared = 0.4958				
Between R-squared = 0.7185					Between R-squared = 0.5996				
Overall R-squared = 0.7154					Overall R-squared = 0.5259				
t statistics in parentheses: * 0.1≥p>0.05, ** 0.05≥p>0.01, *** p≤0.01									

In the random effect model, all the variables show the expected signs in both models. Comparing with the OLS model, the random effect model shows different results.

Firstly, the foreign trade share in GDP has lost its significance in the current revenue ratio model. Secondly, the population growth rate shows a significant relationship to the tax ratio in the tax ratio model. Thirdly, the income inequality and anti-corruption variables appeared as significant in the current revenue model. Apart from the differences, the two models still share a high degree of similarity. All variables show the same and expected signs in both models. Amongst the nine variables that show significant signs in the tax ratio model, seven are also revealed in the current revenue ratio model to be significantly related to the current revenue ratio. These seven variables are: real per capita GDP, industrial value-added in GDP, service sector value-added in GDP, population density, non-agricultural population rate, real per capita central transfer, and government budgetary fiscal expenditure in GDP.

The different results between the pooled OLS regression model and the Random effect regression model is because that the pooled OLS regression ignores the individual effects or the uniqueness of different individual units, whereas the random effect regression model accepts the individual effects by treating the intercept as a random variable with a mean value. Hence the Breusch-Pagan LM test is performed in the next section to identify the most appropriate regression model between Pooled OLS and Random effect.

6.5.3 The Breusch-Pagan LM test

In order to test which model is appropriate from the random effect and pooled OLS, the Breusch-Pagan LM test for the random effect model against the pooled OLS model is performed for both the tax ratio regression and current revenue regression. The testing process were completed in the STATA and the results are listed in Table 6-7.

Table 6-7: Breusch-Pagan LM test

Breusch and Pagan Lagrangian multiplier test for random effects					
Null hypothesis: no significant difference/panel effect across units					
Estimated results of LM test for tax ratio (Ln_ty) regression			Estimated results of LM test for current revenue (Ln_ry) ratio regression		
ln_ty[id,t] = Xb + u[id] + e[id,t]			ln_ry[id,t] = Xb + u[id] + e[id,t]		
	Var	sd=sqrt(Var)		Var	sd=sqrt(Var)
Ln_ty	0.1070448	0.327177	Ln_ty	0.0477431	0.2185021
e	0.0051611	0.0718408	e	0.00571	0.0755646
u	0.0095949	0.0979536	u	0.0077076	0.0877932
test:var(u)=0			test:var(u)=0		
Chibar2(01)=1654.25			Chibar2(01)=1152.92		
Prob>chibar2=0.0000			Prob>chibar2=0.0000		

Based on the LM test for both the tax ratio and current revenue ratio regressions, both tests reject the null hypothesis, which is the non-existing panel effect, at the significant level P< 0.00. Hence, it is concluded that there is evidence of significant uniqueness across provinces, therefore a random effect regression model is a better model than the polled OLS regression model.

6.5.4 Fixed effect regression for tax ratio and current revenue ratio

The fixed effect model accepts individual heterogeneity by adopting the dummy variable technique by allowing each individual to have their own intercept value, whereas each individual intercept is time-invariant; in other words, they do not vary over time (Gujarati, 2009, p. 596). The basic idea allowing each cross-sectional unit to have a fixed intercept corrects the biased slope of the pooled OLS regression, when the fixed intercept effects are ignored.

As the fixed effect regression model deals with the possibility of the existence of heterogeneity by acknowledging the individuality among observations in this study, the fixed effect model allows each province to have its own intercept value. However, it is further assumed that the intercept of different provinces may vary from each other, but the intercept does not change over

time. Table 6-8 illustrates the fixed effect regression result for the tax ratio and current revenue ratio.

Table 6-8: Fixed effect regression results for tax ratio and current revenue ratio models

Fixed effect regression for tax ratio and current revenue ratio									
tax ratio					current revenue ratio				
variables	coefficients	standard errors	T-values	p>|t|	variables	coefficients	standard errors	T-values	p>|t|
ln_rpcgdp L1.	0.115	0.066	1.73 *	0.084	ln_rpcgdp L1.	0.395	0.069	5.71 ***	0.000
ln_ind L1.	0.554	0.086	6.44 ***	0.000	ln_ind L1.	0.360	0.090	3.99 ***	0.000
ln_ser L1.	0.151	0.095	1.58	0.115	ln_ser L1.	0.245	0.100	2.45 **	0.014
ln_trade L1.	0.075	0.015	4.93 ***	0.000	ln_trade L1.	0.027	0.016	1.73 *	0.084
ln_grpop L1.	-0.019	0.008	-2.23 **	0.026	ln_grpop L1.	-0.024	0.009	-2.75 ***	0.006
ln_dnpop L1.	0.101	0.102	0.98	0.326	ln_dnpop L1.	0.569	0.107	5.31 ***	0.000
ln_napop L1.	0.226	0.042	5.32 ***	0.000	ln_napop L1.	0.132	0.044	2.96 ***	0.003
ln_income L1.	-0.016	0.024	-0.67	0.506	ln_income L1.	-0.098	0.025	-3.87 ***	0.000
ln_transpc L1.	-0.273	0.026	-10.4 ***	0.000	ln_transpc L1.	-0.208	0.028	-7.56 ***	0.000
ln_corup L1.	0.019	0.020	0.95	0.342	ln_corup L1.	0.055	0.021	2.6 **	0.010
ln_fexp L1.	0.629	0.046	13.71 ***	0.000	ln_fexp L1.	0.629	0.048	13.1 ***	0.000
Total number of observations: 541					Total number of observations: 541				
F(28,482) = 102.19					F(28,482) = 19.44				
R-sq: within = 0.8558					R-sq: within = 0.5304				
R-sq: between = 0.5755					R-sq: between = 0.3110				
R-sq: overall = 0.5909					R-sq: overall = 0.2028				
corr(u_i, Xb) = -0.2174					corr(u_i, Xb) = -0.9739				
Prob>F (F test) = 0.0000					Prob>F (F test) = 0.0000				

sigma_u = 0.20131233	sigma_u = 0.84942613
sigma_e = 0.07220304	sigma_e = 0.07555822
intra-class correlation (rho) = 0.88602348	intra-class correlation (rho) = 0.99214964
t statistics in parentheses: * $0.1 \geq p > 0.05$, ** $0.05 \geq p > 0.01$, *** $p \leq 0.01$	

Note: The regression results of the fixed effect model is provided in the later part of this chapter.

6.5.5 The Hausman test

As indicated by the Breusch-Pagan LM test, the Random effect regression model is a better model than the polled OLS regression model. However, a further test is needed because it is unclear whether the fixed effect regression model is better than the Random effect regression model.

Regarding the fixed effect model, as Kmenta (1986) states, the fundamental question that needs to be considered is whether the sacrifice of the degree of freedom by the introduction of the dummy variables is really necessary. In other words, there is a possibility that the dummy variables indicate a lack of knowledge of failure of capturing relevant explanatory variables that are time-invariant or time-variant, but maintain the same value in all cross-sectional units (Kmenta, 1986, p. 633; Gujarati, 2009).

If this is the case, then the random model, to answer the question whether the dummy variables indicate a lack of knowledge by taking a disturbance term approach by trading the intercept as a random variable with a mean value, is a better fit than the fixed model.

In order to identify which model is the best fit for this study, the Hausman test on the fixed effect model against the random effect model for both the tax ratio and current revenue ratio has been performed. The testing processes were completed in the STATA and the results are listed in Table 6-9 below.

Table 6-9: Hausman test

Hausman test for fixed effect model
Null hypothesis: the unique errors are not correlated with the regressors (preferred model is random effects)

Estimated results of Hausam test for tax ratio (Ln_ty) regression	Estimated results of Hausman test for current revenue (Ln_ry) ratio regression
chi2(15) = (b-B)'[(V_b-V_B)^(-1)](b-B)	chi2(16) = (b-B)'[(V_b-V_B)^(-1)](b-B)
Chibar2(15)=66.44	Chibar2(16)=78.75
Prob>chibar2=0.00	Prob>chibar2=0.00

In both tax and current revenue ratio models, the results of the Hausman tests reject the null hypothesis at significance level P<0.00. Hence, it can be said that the fixed effect model is more appropriate than the random effect model for both tax and current revenue regressions. Thus to summarize, the Breusch-Pagan LM test and the Hausman test, the fixed effect regression model is used as the best appropriate regression model for both tax ratio model and current revenue ratio model in this study.

6.6 Hypotheses testing and regression results summary

Based on the statistical evidence presented on the Breusch-Pagan test and Hausman test, it can be concluded that the fixed effect model is the best fit in this study. Before analysing the regression results, the hypotheses are presented and tested.

Through the literature review of tax effort and capacity using regression approach in chapter two, the author of this study constructed elven testable hypothesis. They are:

H1: The stage of development is positively related to the tax revenue performance at provincial level in China.

H2: Development in the industrial sector is positively related to the tax revenue performance at provincial level in China.

H3: The development of the service sector is positively related to the tax revenue performance at provincial level in China.

H4: The openness level is positively related to the tax revenue performance at provincial level in China.

H5: The population growth rate is negatively related to the tax revenue performance at provincial level in China.

H6: The population density is positively related to the tax revenue performance at provincial level in China.

H7: The shrinking of agricultural sector activities is positively related to the tax revenue performance at provincial level in China.

H8: The resident income inequality is negatively related to the tax revenue performance at provincial level in China.

H9: The external grants received by local governments are negatively related to the tax revenue performance at provincial level in China.

H10: The anti-corruption effort is positively related to the tax revenue performance at provincial level in China.

H11: The government capacity is positively related to the tax revenue performance at provincial level in China.

Based on the results from table 6-8, the 11 hypothesis for this study are tested. Firstly, the null hypothesis (H_0), and alternative hypothesis (H_1) of each hypothesis in this study are listed in table 6-10 below.

Table 6-10: List of null hypothesis and alternative hypothesis of each hypothesis in this study

Main Hypothesis of this study	Null and alternative hypotheses	
H1	H_0	there is no positive relationship between the stage of development and the tax revenue performance at provincial level in China

	H_1	There is a positive relationship between the stage of development and the tax revenue performance at provincial level in China
H2	H_0	There is no positive relationship between the development in the industrial sector and the tax revenue performance at provincial level in China.
	H_1	There is a positive relationship between the development in the industrial sector and the tax revenue performance at provincial level in China.
H3	H_0	There is no positive relationship between the development of service sector and the tax revenue performance at provincial level in China.
	H_1	There is a positive relationship between the development of service sector and the tax revenue performance at provincial level in China.
H4	H_0	There is no positive relationship between the openness level and the tax revenue performance at provincial level in China.
	H_1	There is a positive relationship between the openness level and the tax revenue performance at provincial level in China.
H5	H_0	There is no negative relationship between the population growth rate and the tax revenue performance at provincial level in China.
	H_1	There is a negative relationship between the population growth rate and the tax revenue performance at provincial level in China.
H6	H_0	There is no positive relationship between the population density and the tax revenue performance at provincial level in China.
	H_1	There is a positive relationship between the population density and the tax revenue performance at provincial level in China.
H7	H_0	There is no positive relationship between the shrinking of agricultural sector activities and the tax revenue performance at provincial level in China.
	H_1	There is a positive relationship between the shrinking of agricultural sector activities and the tax revenue performance at provincial level in China.
H8	H_0	There is no negative relationship between the resident income inequality and the tax revenue performance at provincial level in China.
	H_1	There is a negative relationship between the resident income inequality and the tax revenue performance at provincial level in China.
H9	H_0	There is no negative relationship between the external grants received by the local governments and the tax revenue performance at provincial level in China.
	H_1	There is a negative relationship between the external grants received by the local governments and the tax revenue performance at provincial level in China.
H10	H_0	There is no positive relationship between the anti-corruption effort and the tax revenue performance at provincial level in China.
	H_1	There is a positive relationship between the anti-corruption effort and the tax revenue performance at provincial level in China.
H11	H_0	There is no positive relationship between the government capacity and the tax revenue performance at provincial level in China.
	H_1	There is a positive relationship between the government capacity and the tax revenue performance at provincial level in China.

For a better visual analysis, Table 6-11 illustrates the summary of the fixed effect regression results for both tax and current revenue ratios, where the significance level and signs of all 11 variables are presented.

Table 6-11: Signs and significance level of all independent variables

Variables	Tax ratio			Current revenue ratio		
	Sign	Significant	Significant level	sign	Significant	Significant level
Per capita GDP	+	Weakly significant	$0.1 \geq p > 0.05$ *	+	Highly significant	$p \leq 0.01$ ***
Industrial sector value-added to GDP	+	Highly significant	$p \leq 0.01$ ***	+	Highly significant	$p \leq 0.01$ ***
Service sector value-added to GDP	+	Not significant	$p > 0.1$	+	significant	$0.05 \geq p > 0.01$ **
Openness level	+	Highly significant	$p \leq 0.01$ ***	+	Weakly significant	$0.1 \geq p > 0.05$ *
Population growth rate	−	significant	$0.05 \geq p > 0.01$ **	−	Highly significant	$p \leq 0.01$ ***
Population density	+	Not significant	$p > 0.1$	+	Highly significant	$p \leq 0.01$ ***
Non-agriculture population rate	+	Highly significant	$p \leq 0.01$ ***	+	Highly significant	$p \leq 0.01$ ***
Urban-rural resident income disparity	−	Not significant	$p > 0.1$	−	Highly significant	$p \leq 0.01$ ***
Dependency on central transfers	−	Highly significant	$p \leq 0.01$ ***	−	Highly significant	$p \leq 0.01$ ***
Anti-corruption effort	+	Not significant	$p > 0.1$	+	Highly significant	$p \leq 0.01$ ***
Government capacity	+	Highly significant	$p \leq 0.01$ ***	+	Highly significant	$p \leq 0.01$ ***
* $0.1 \geq p > 0.05$, ** $0.05 \geq p > 0.01$, *** $p \leq 0.01$						

From table 6-11, it can be seen that all the variables have achieved the expected signs in both tax ratio model and current revenue ratio model.

In the tax ratio model, except the service sector value-added to GDP, population density, urban-rural resident income disparity, and anti-corruption effort, all other variables are statistically significant at level $p<0.1$. Among which, the industrial sector value-added to GDP, openness level, Non-agriculture population rate, dependency on central transfers, and government capacity are highly significant at level $p<0.01$. Hence, H_3, H_6, H_8 and H_{10} are failed to accept in the tax ratio model, and all other hypotheses are accepted at significant level of $P<0.1$. In the current revenue ratio model, however, all variables are significant at level $p<0.1$. In addition, except the service sector value-added to GDP and openness level, all other variables are highly significant at level $p<0.01$. Therefore, all hypotheses are accepted in the current revenue ratio model.

It is revealed in the hypotheses testing results that some factors are main determinants for both tax revenue performance and current revenue performance. These factors are: stage of development, development in the industrial sector, openness level, population growth rate, shrinking of agricultural sector activities, external grants received by the local governments, and government capacity. However, four factors, namely development in the service sector, population density, resident income inequality, and anti-corruption effort, are main determinants in current revenue performance, but not for tax revenue performance. Detailed discussions and interpretation of the results are presented in section 6.7 and 6.8.

6.7 Evaluation of the tax ratio and current revenue ratio regression models

The aim of this research is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. In this section, the overall fitness of the models is evaluated, followed by discussions of the respective variables.

Table 6-12 illustrates the summary of fixed effect regression results for both tax and current revenue ratios.

Table 6-12: Tax ratio and current revenue ratio fixed effect regression models results summary

fixed effect regression results for tax ratio and current revenue ratio					
tax ratio			current revenue ratio		
variables	coefficients	p>|t|	variables	coefficients	p>|t|
ln_rpcgdp L1.	0.1147	0.084*	ln_rpcgdp L1.	0.3952	0.000***
ln_ind L1.	0.5544	0.000***	ln_ind L1.	0.3599	0.000***
ln_ser L1.	0.1507	0.115	ln_ser L1.	0.2453	0.014**
ln_trade L1.	0.0746	0.000***	ln_trade L1.	0.0274	0.084*
ln_grpop L1.	-0.0188	0.026**	ln_grpop L1.	-0.0243	0.006***
ln_dnpop L1.	0.1006	0.326	ln_dnpop L1.	0.5689	0.000***
ln_napop L1.	0.2258	0.000***	ln_napop L1.	0.1316	0.003***
ln_income L1.	-0.0160	0.506	ln_income L1.	-0.0978	0.000***
ln_transpc L1.	-0.2735	0.000***	ln_transpc L1.	-0.2081	0.000***
ln_corup L1.	0.0192	0.342	ln_corup L1.	0.0548	0.010***
ln_fexp L1.	0.6292	0.000***	ln_fexp L1.	0.6293	0.000***
rho = 0.8860			rho = 0.9921		
Prob>F (F test) = 0.00			Prob>F (F test) = 0.00		
* 0.1≥p>0.05, ** 0.05≥p>0.01, *** p≤0.01					

Overall, both the tax ratio and current revenue ratio performed well.

The test of the fixed effect model generated some interesting and important results. F test of both tax revenue regression and current revenue regression are significant at P<0.05 level as shown in table 6-10. Furthermore, the fraction of variance due to individual effects (intra-class correlation) in tax

revenue regression is performing well with an explanatory power of 89%; and this figure in the current revenue regression is 99%.

The regression result implies that the tax ratio may not represent the true tax revenue performance in China, because some items in non-tax sourced revenues are similar to the concept of tax.

As a result, the current revenue ratio, which contains the non-tax sourced revenue, fit better than the tax ratio. Variables that are significant in the tax ratio model are also significant in the current revenue ratio, with the same signs. In addition, two variables, the income inequality variable and corruption, have been proven to have significant impact on the tax ratio in a number of previous studies. However, these two variables were statistically non-significant in the tax ratio regression, but statistically highly significant in the current revenue ratio regression, with expected signs that support the previous studies.

6.8   The determinants of the tax revenue and current revenue capacity

6.8.1   Real per capita GDP

The empirical findings of this research show that there is a significant positive relationship between the level of economic development and both tax revenue capacity and current revenue capacity. Real per capital GDP, as the most used proxy for the level of economic development, is one of the traditional tax handles to explain tax performance.

It is argued that higher economic developing level is the source of increasing public demand and expenditure, and the driving power of the income and tax base (Piancastelli, 2001; Teera & Hudson, 2004; Gupta, 2007). This is also true in China. The real per capita GDP has a significant impact on both the dependent variables. This indicates that the provincial economic development level is one of the key determinants for raising tax revenue and current revenue.

However, the level of the impact of the real per capita GDP on tax performance

is slightly different in the tax ratio regression model and current revenue regression model. The per capita GDP in the tax ratio regression is significant at level of p<0.1, whereas in the current revenue ratio regression the per capita GDP has a much higher significant level of p<0.01. It can be argued that a high stage of development of economy would increase the surplus of total income, since governments are able to generate tax revenues (Lotz & Morss, 1967; Shin, 1969; Bahl, 1971; Tanzi & Zee, 2000; Piancastelli, 2001; Bird *et al.*, 2008; Pessino & Fenochietto, 2010). However, as explained earlier, at a provincial level, local governments are generating more non-tax sourced revenue than the tax revenue from other sources. This is why it is argued that the tax performance is better examined using the current revenue model.

6.8.2 Industrial sector value-added

The industrial sector value-added in the GDP, as one of the traditional tax handles in the empirical literature, shows its positive influence on both the tax revenue ratio and current revenue ratio. It has been argued that the significant role that the industrial sector plays in the tax performance might be due to the fact that the activities in the industrial sector are normally well-recorded and organized (Bahl, 1971; Leuthold, 1991; Fauvelle-Aymar, 1999; Piancastelli, 2001; Mertens, 2003; Teera & Hudson, 2004). Furthermore, the industrial sector also contributes the most GDP growth in China. (Wong, 1992; Wang *et al.*, 2009).

6.8.3 Service sector value-added

The service sector value-added in GDP has shown a non-significant relationship with tax revenue capacity, with p>0.11. In contrast, it shows a significant positive relationship with the current revenue capacity at level P< 0.014.

This distinctive difference may stem from the existence of large scale of informal activities in the service sector. As argued in Chapter 5 an expanding service sector will raise the total sales and consumption of the citizens. China's local government tax revenue relies heavily on indirect taxes such as turnover taxes (Wang, 2004). This directly influences the level of sales and

consumption. However, the tax capacity has failed to capture the true contribution of the service sector.

The significant relationship between the service sector value-added in GDP and the current revenue capacity has added the evidence of large scale of informal activities in the service sector, which has enlarged the true tax base. As discussed in Chapter 5, after the tax sharing reform in 1994, the local government were granted more autonomy in collecting and administering the government fees and charges so that these fees and charges have become the major component of the off-budgetary revenues and the extra-budgetary revenue. The administration on the government's fees and charges are seriously lacking in legal basis and control (Lin, 2000; Ma, 2005; Wong & Bird, 2008; Shen, 2011; Shen *et al*., 2012; Tong *et al*., 2013; Zheng & Wang, 2013). The expanding service sector with large scale informal activities has certainly provided local government with the opportunities for collecting fees, charges, and funds, and which has even become the breeding ground of corruption for some government officials.

6.8.4 Foreign trade share in GDP

The foreign trade sector is similar to the industrial sector - normally well-organized and easier to manage, in addition has lower administrative costs (Ghura, 1998; Gupta, 2007).

It is argued by many scholars that a high level of foreign trade, which indicates a higher openness level, indicates a greater performance of the economy, hence improving the tax revenue performance (Ghura, 1998; Keen & Simone, 2004; Baunsgaard & Keen, 2010).

Supporting the literature, a significant positive relationship between the foreign trade shares in GDP with the tax revenue capacity in China is found in this research, regarding the positive influence of the openness level to the tax revenue performance.

The trade share in the GDP in the current revenue regression has also

generated a positive sign, which indicates that the openness level also increases the current revenue performance. However, the significance level is much weaker than that of the tax revenue regression. This is possibly due to the relationship between the openness level and the transparency of government policy. The current revenue includes not only the tax revenue, but also a large percentage of other non-tax sourced revenue. The main components of the noticeable amount of non-tax sourced revenue are government fees, charges and funds, which are rather complex, but less transparent, and lack relevant lawful doctrines. In contrast, the foreign trade sectors have record formal activities under a strict control and administration (Ghura, 1998; Gupta, 2007). Hence, it is reasonable to argue that although the openness level is represented by the foreign trade share in a GDP boosted local economy and has a positive influence on the current revenue performance, its influence is much less than the tax revenue because some of the current revenue sources are based on informal activities, which are less controlled than administered areas.

6.8.5 Population growth rate

The indicator of population growth rate has shown a negative impact in both the tax ratio and current revenue ratio models.

It is worth noting that after the opening up reforms in late 1970s, the Chinese government considered strict population control to be one way to improve the average family living standards, and the "one child policy" in China was strictly enforced (Xing, 2003). Hence, the natural population growth rate decreased rapidly, as it is can be illustrated in Figure 6-2 below.

Figure 6-2: Natural population growth rate in four main regions
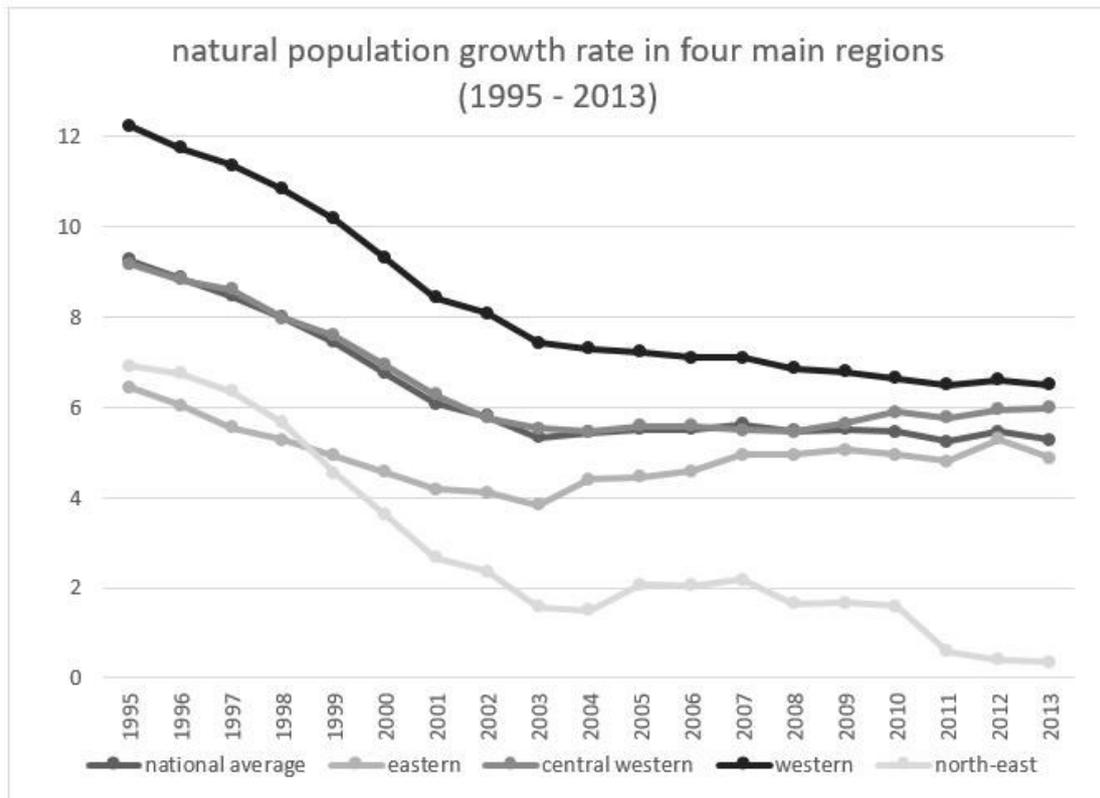
Data source: (N.B.S., 2014)

As illustrated in Figure 6-2 above, the natural population growth rate has been restricted by the "one child policy", and the most affected region is the eastern region, with the average natural population growth rate in the region below 1% in 2012 and 2013.

As a result, the negative relationship between the population growth rate and the tax revenue capacity was found in this study as expected. This is consistent with the previous study. It is argued that the rate of population growth increases the tax exemption and has a lag effect on tax collection (Shin, 1969; Bahl, 2004; Teera & Hudson, 2004). In addition, it is also reveals that the "one child policy" has limited the negative impact of natural population growth rate on the tax capacity.

6.8.6 Population density

Population density is one of the most important factors in macroeconomic literature due to a close relationship with the economic scales (Teera &

Hudson, 2004). A high level of population density indicates large consumption needs and public service requirements. Hence, it is reasonable to consider the population density as one of the important tax bases in China.

The relationship between the tax revenue capacity and the population density in this study was positive but not significant. This finding is consistent with another tax effort index study in China, which was conducted by Wang *et al*. (2009). As Wang, Shen and Zou (2009) argue, the influence of the population density on China's tax capacity could result in two diverging outcomes. On the one hand, higher population density may indicate high tax exemptions and on the other, it could also lead to a reduced tax administrative cost (Wang *et al*., 2009). In their study, a non-significant relationship between population density and the tax ratio was found, which confirmed their early concerns regarding the uncertainty of the impact from the population density to China's tax capacity.

Strikingly, the influence of the population density on the current revenue ratio is clear. The study shows that it yielded the expected positive sign and a high significant level with $p < 0.01$. Given the existing turnover based tax system, which relies highly on consumption and sales taxes (Wang, 2004), this result further confirms the failure of the current tax ratio to capture the true tax base in China.

6.8.7 Non-agricultural population rate

As stated in Chapter 5, the non-agricultural population variable has two meanings. On the one hand, it is a good proxy for urbanization, and on the other, it is also an indicator of migration.

The measurement of the urbanization level is usually the ratio of urban population and total population (Zhang & Song, 2003). Hence, the increase in the urbanization level or urban growth could be caused by two factors: the natural rise in population of the existing urban population, and the increase in immigration from rural to urban areas (Unicef, 2012). Therefore, it is not appropriate to measure the urbanization level in China by simply taking the

ratio of the urban registered population to the total population. Considering that the critical prior condition in defining "urban" population is that the population is not primarily engaged in agricultural activities (Unicef, 2012), the non-agricultural population rate is also seen as the proxy of the level of urbanization in China in this study.

The non-agricultural population factor in both the tax revenue ratio and current revenue ratio performances shows positive signs and is highly significant at a level of $P<0.01$.

As Tanzi (1992) argue, most public sector activities are urban-based, hence urbanization indicates a wider tax base for the tax revenue. The highly significant relationship between the non-agricultural population and the tax revenue ratio provides strong evidence for this argument.

Migration is the other aspect which the non-agricultural population rate represents. It was stated in Chapter 5 that from 1995 to 2000, extensive migration occurred, in addition to a surge of migration of rural residents moving to urban areas, especially coastal areas and metropolitan cities (Knight, 2008; Bao *et al*., 2009; Song, 2009).

The result of this study revealed that migration has a positive impact on both tax and current revenue performance at provincial level. The positive contribution made by rural-urban migrants is well documented in the literature. In the 20 years between 1978 and 1999, there was a total of 174 million rural migrant workers in urban areas, which created the largest migration flow in human history (Zhang & Song, 2003). In the 21st century, the number of rural migrant workers has shown no sign of decreasing. The Chinese rural-urban migration comprised around 140.41 million people in 2008 alone. In 2010, this figure increased to 153.35 million, and 163.36 million in 2012 (N.B.S., 2013). The huge number of migrants have become the main labour force in urban manufacturing sectors, and is one of the main reasons for the fast pace of economic growth in China (Qu & Zhao, 2014).

The migrants mostly work in wholesale and retail, restaurants and hotels, and other service-related industries as shown in Figure 6-3.

Figure 6-3. Allocation of migrants in industry: 2002 - 2007
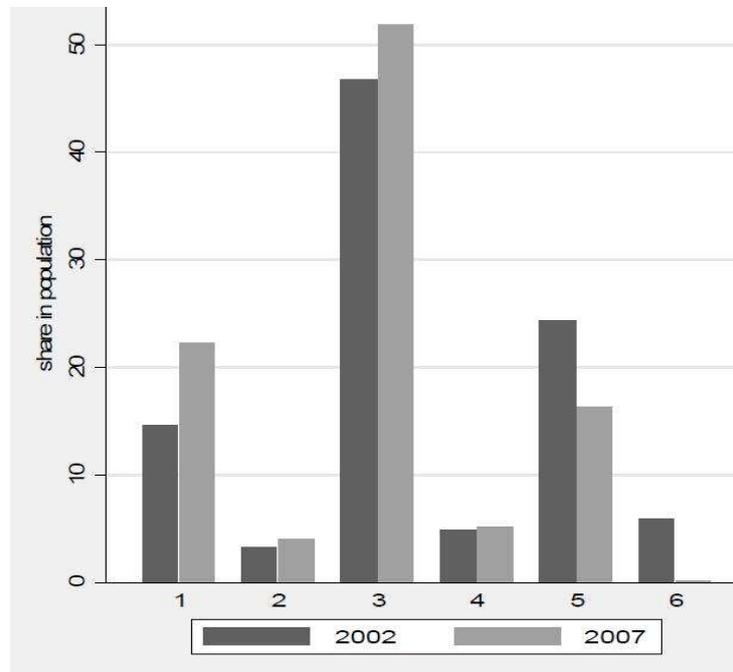
Note:
1: agriculture, mineral, manufacturing, construction.
2: electricity, gas, and water and transportation and IT;
3: wholesale and retail, restaurant, and hotel;
4: finance, real estate, health and social security, education, arts and media, science and technical services;
5: services.
6: government and public administration and others.
Data source: Qu and Zhao (2014) Evolution of the Chinese rural-urban migrant labour market from 2002 to 2007

Therefore, there is no doubt that the migrant workers from rural areas boost the urbanization level, and the increase in the non-agricultural population has helped raise consumption and sales in urban areas, where most of the service sector activities are based.

Similar results were found in the relationship between the non-agricultural population factor and the current revenue ratio performance, which indicates that the non-tax revenue, similar to the tax revenue, is urban based.

6.8.8 Per capita central transfer

It has been pointed out in previous literature that the central transfers from the central government to the local government services as external grants has a negative impact on the tax revenue performance due to the displacement effect and reverse causality effect (Leuthold, 1991; Ghura, 1998). The main purpose of the central government transfers are to deal with local fiscal difficulties and help balance the fiscal gaps among the provinces.

In this research, both the significant levels in the tax ratio and current revenue ratio regression have shown a high significant level of $p < 0.01$ with the expected negative signs. This proved that the central transfers received by provincial governments supress the incentives of local governments to explore the opportunities of increasing the tax/current revenue. In addition, the recentralization reform in 1994 has led to a lower fiscal decentralization at the provincial level, hence reducing the local governments' motivations of increasing tax capacity.

6.8.9 Income inequality

It is argued that a wide income gap can result in a lower level of trust in the public regarding the function of the fiscal system on the issue of revenue redistribution, social justice and fairness, thus enhancing the exit option for paying taxes (Bird *et al*., 2006; Pessino & Fenochietto, 2010). It is also widely accepted that along with fast economic growth, the income gap in China has been increasing at a fast pace since the openness reform in 1978 (Cheng, 2007; Chen *et al*., 2010; Peng *et al*., 2013; Xie & Zhou, 2014). Amid the increasing resident income gap, the urban-rural resident income gap is also expanding at a fast pace. The ratio between urban and rural residents' income was 2.57 in 1978, and this figure reached 3.13 in 2011 (Li, Wang, Zhu, & Zhao, 2014). The fast increasing income gaps have becomes the authority's "irritating headache" and a "burning issue" in China (Fan & Sun, 2008; Zhang & Bao, 2015).

Previous studies on the relationship between income inequality and tax/current revenue ratio are scant, especially in the case study for a single

country. Nonetheless, in all the limited cross-country studies on the relationship between income inequality and tax/current revenue ratios, negative and significant relationships have been found (Bird *et al*., 2006; Pessino & Fenochietto, 2010; Fenochietto & Pessino, 2013).

In this research, however, although an expected negative sign was yielded for the income inequality variable in the tax ratio regression model, the result was not significant. This is a rather unexpected result, given income inequality is such a serious issue in China, and the existence of the regional tax performances.

In the current revenue model, the income inequality variable yields an expected negative sign. Differing from the result in the tax revenue model, the income inequality variable is highly significant, relating to the current revenue capacity at P< 0.01 level. This result is consistent with the previous studies. These results may be explained by the following reasons.

Firstly, the current revenue has a wider revenue base than the tax revenue. It is proven throughout the literature and the tax revenue regression model that the tax base is mostly connected to urban activity related factors, such as industrial sectors, foreign trade, and urbanization.

Secondly, the great influence of income inequality, measured by the urban-rural Theil index, on the current revenue model implies that the current revenue base is not only from urban citizens, but also extended to the migrants from the rural areas. For example, the migrants were often charged 'education administrative fees', which was exempted for urban citizens. Therefore, a broader revenue base makes the current revenue more sensitive to not only economic factors, but also some important social factors, such as the rural migrants.

The significant impact of this variable is found in the current revenue model and not the tax revenue model, which has further empirically verified the issue which stated early in this study - that the tax revenue does not represent the

"true" tax revenue by the definition of tax. Instead, the current revenue possibly more accurately represents the "true" revenue capacity of tax in China.

6.8.10 Anti-corruption effort

Corruption has been widely proven to be negatively related to tax performance in the literature. This is because a higher corruption level indicates lower government efficiency and an institution's credibility is adversely affected, hence harming economic activities (Johnson, Kaufmann, McMillan, & Woodruff, 2000; Everhart *et al*., 2009).

Corruption is common in"guanxi", making corruption in China different. The practice of"guanxi" has been a Chinese tradition for a very long time, and the development and practice of "guanxi" is so prevalent that it has become one of China's most distinctive features. This has led to China evolving towards to a relationship-based "guanxi"-web capitalism rather than market capitalism (Boisot & Child, 1996; Lovett *et al*., 1999; Chenting & Littlefield, 2001; Fan, 2002).

Due to the common practice of "guanxi", it is difficult to explain corruption solely through personal behaviour, since it is a social and cultural phenomenon, which often stems from the practice of "guanxi".

The empirical studies on the corruption level and the tax/current revenue ratio has also been well-documented. Ghura (1998) in his study found a significant negative impact of corruption on the tax ratio in Sub-Saharan Africa countries. Fenochietto and Pessino (2013) in their 113 country tax effort index study also found a positive and highly significant relationship between the controls of corruption and the tax ratio in both developed and developing countries.

The studies presented by Bird *et al*. (2006) and Le *et al*. (2012) also yielded similar results. It may be noted that differing from their previous studies, Bird *et al*. (2006) and Le *et al*. (2012) used the current revenue ratio and fiscal

revenue ratio as one of the dependent variables. The current revenue ratio and fiscal revenue ratio in their studies share similarities to China's local governments' current revenue ratios: they all include non-tax sourced revenues other than taxes.

In this study, the positive sign of the anti-corruption effort has been achieved, both in the tax ratio and current revenue ratio model. This is similar to the results of the income inequality and the anti-corruption effort variable, which although not significant in the tax ratio model, is highly significant in the current revenue ratio model.

The generation of the expected positive signs in both the tax ratio model and current revenue ratio model proved that in a relationship-based capitalist economy, the illicit feature of the "guanxi" practice has a negative influence on the level of corruption, which, in turn, influences the government tax/current revenue performance.

One of the valuable findings from the results is the differences in the significant level between the two models. The anti-corruption effort variable in the tax ratio model is not significant, whereas in the current revenue ratio model, it is highly significant. This significance level differences may be explained by two reasons.

One the one hand, this may be caused by the special features of the relationship between the central and local tax authorities. Taxes are strictly enforced and administered by the central government. Local governments have minimal autonomous power over taxes, including deciding tax categories and tax rates (Zhan, 2013). Moreover, the utilization of tax revenue is supervised by the central government and lawfully enforced (Lin, 2005). However, the collection of fees at the local government level is excessive and arbitrary, seriously lacking any legal basis and control (Lin, 2005; Ma, 2005; Zhang, 2006; Gao, 2010), thus leaving difficult negotiations or grey areas in the process of fee collection and utilization as the breeding ground for corruption (Zhan, 2013).

On the other hand, the different significant level of anti-corruption variable in the tax ratio and current revenue ratio model may be explained using the same reason as the one explaining the income inequality results: the current revenue has wider revenue base than the tax revenue, hence it is more sensitive to social factors; thus, the revenue in the current revenue ratio model truly reflects the scope and magnitude of the tax revenue.

In addition, the highly significant relationship between the anti-corruption effort variable and the current revenue ratio also reveals that there are large amounts of informal, even illegal activities within the revenue collection system, which lacks legal regulations (Lin, 2005), leaving room for the practice of corruption and "guanxi" arrangements.

This results also provide strong evidence that the study of tax/current revenue performance is country-specific. Corruption has a negative impact on government efficiency. In China, due to the existence of large scale non-tax sourced revenue, the negative impact from corruption is not detected until the investigation goes deep into the sub-categories of off-budgetary revenues and the extra-budgetary revenues. Hence, it is vital to link country-specific characteristics when investigating the role played by corruption in the tax effort index studies.

6.8.11 Government fiscal expenditure in GDP

Chapter 5 suggests that the main purpose of revenue collection is to enhance the government's capacity in the economy and for it to better perform functions through government expenditure; thus, government capacity is an important influencing factor for the tax/current revenue capacity and effort. This is especially so in China since the expenditure responsibility has been highly decentralized and local governments take up the majority of the expenditure responsibilities.

According to the findings of the regression results, a high level of provincial government capacity, which is proxied by the local government budgetary

fiscal expenditure in GDP is significantly positive, related to both the tax ratio and current revenue ratio at the significant level of P < 0.01. This finding shows that government capacity is also one of the main determinants of the tax/current revenue capacities.

6.9   Measuring tax/current revenue capacity and effort

6.9.1 Introduction

The aim of this study is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level.

Following the empirical studies on the tax capacity and effort, in particular the study by Fauvelle-Aymar (1999) who constructed the current revenue capacity/effort, and the study by Bird *et al*. (2006), who constructed the government revenue effort/capacity, this study, for the first time in literature, has constructed both the tax capacity/effort, and current revenue capacity/effort at the provincial level to examine tax performance in China.

Based on the discussions in Chapter 2, the tax effort index is calculated. There are two steps in obtaining the tax effort index. First, an estimated tax/current revenue capacity is required, which is generated through the regressions, e.g., the fixed effect model. Second, the tax/current revenue effort index is calculated by the ratio of actual tax or current revenue ratio and estimated tax or current revenue capacity.

The following Equation (6-1) is used for calculating the tax effort index.

$$Tax\ effort\ index = \frac{\frac{T}{Y}}{\frac{\hat{T}}{Y}} = \frac{T}{\hat{T}}$$

Equation 6-1

Where:

$T = actual\ tax\ revenue\ collection$

$Y = GDP$

$$\frac{\hat{T}}{Y} = estimated\ tax\ revenue\ capacity\ generated\ from\ the\ regression\ result$$

It is noteworthy that the tax/current revenue capacity and effort generated from this study are relative tax capacity and effort, and do not infer the feasibility of the extent of the actual tax/current revenue performance by absolute value, but indicate the degree of variation of tax/current revenue capacity and effort. As argued by Tanzi and Zee (2000) the tax ratio approach indicates the degree of variation of tax effort, and should not be used to reflect the optimal taxation (Tanzi & Zee, 2000). More importantly, the tax effort index approach is to explain tax effort variances, in other words, instead of answering what the tax effort level is, the tax effort index approach is an attempt at answering the question of why there are differences between the observations in the whole sample (Bahl, 1971).

6.9.2 Tax/current revenue capacity

Tax capacity is the government's hypothetical ability to raise tax revenue for the purpose of public finance within the existing tax base (Bahl, 1971, 1972; Akin, 1973; Wang *et al*., 2009).

Taking the special characteristic of China's fiscal system into consideration, in addition to the tax revenue, this researcher constructed the provincial current revenue capacity. The current revenue not only includes the tax revenue, but also includes the extra-budgetary revenue and off-budgetary revenue, but excludes SOE-related revenue and expenditure.

The tax capacity of the provincial governments is the hypothetical ability to raise revenues from taxes, including local taxes and central-local shared taxes; and the current revenue capacity of provincial governments is the hypothetical ability to generate revenues from not only tax collection, but also various government fees, funds and charges.

As aforementioned, even though the tax revenue is the main component in the fiscal revenue system in China, it is not sufficient to analyse the tax revenue related issues by studying the tax revenue capacity alone due to the existence of a large share of non-tax sourced revenue. This has led to a situation where the potential revenue capacity of provincial governments cannot be simply represented by the tax capacity, otherwise a large component of the local government revenue, non-tax sourced revenues, is overlooked.

By comparing the relationship between the tax capacity and the current revenue capacity, the potential basis of the non-tax sourced revenue can be analysed at the provincial level, hence some suggestions regarding the administration of the non-tax sourced revenue as well as enhancing the tax revenue performance can be made.

6.9.3 Tax/current revenue effort

Tax effort is another very important term relating to the tax capacity. Generally speaking, tax effort is the measure of the extent to which an area or government unit utilizes their effort to collect tax revenue under the given hypothetical tax capacity. The measurement of tax effort takes the ratio between actual tax collection and hypothetical tax capacity.

In this study, following Bird *et al*. (2006), Tuan Minh *et al*. (2008), and Le *et al*. (2012), the current revenue effort was constructed and measured in the same way as the tax effort. Hence, the current revenue effort is defined in this study as the extent to which the provincial government units generate current revenue from their given current revenue capacity.

The comparison between the tax effort and current revenue effort in China at provincial level has important significance regarding taxation. It is well-known that tax revenue plays a crucial role in the government fiscal system in the market-oriented economy; however, in order to present a better policy implementation, it is vital to see the whole picture of the government's fiscal revenue system. This is especially important to China due to the fundamental

difference between the tax revenue and non-tax sourced revenue in local government fiscal revenue system.

In order to investigate the regional disparity of tax performance, all 31 provinces in this study are further categorized into four main regions: the eastern, western, central and north-eastern regions. The eastern region includes Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan;the western region includes Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang; The central region includes: Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan; and the north-east region includes Liaoning, Jilin and Heilongjiang. The rationale for this classification is based on the statistics that China's National Statistics Bureau publish to capture the divergence of the social and economic development in different regions of China.

6.9.4 Provincial tax revenue effort vs. tax revenue capacity

Table 6-13 shows the results of the average tax revenue effort and tax revenue capacity of each province between 1996 and 2013.

Table 6-13: Average tax effort and tax capacity (1996 - 2013)

province	tax effort	tax capacity	province	tax effort	tax capacity
Beijing	1.422	9.736	Hubei	0.863	5.498
Tianjin	0.808	9.552	Hunan	0.849	4.886
Hebei	0.803	5.475	Guangdong	0.865	8.752
Shanxi	1.016	6.432	Guangxi	1.021	5.048
Inner Mongolia	1.232	4.471	Hainan	1.526	5.009
Liaoning	0.911	7.366	Chongqing	0.956	6.425
Jilin	0.812	6.116	Sichuan	1.056	5.448
Heilongjiang	0.847	6.141	Guizhou	1.376	5.349
Shanghai	0.978	16.309	Yunnan	1.457	5.631
Jiangsu	0.781	7.872	Tibet	1.171	3.965
Zhejiang	1.101	6.389	Shaanxi	0.999	6.035
Anhui	0.949	5.891	Gansu	1.014	5.310
Fujian	0.916	6.271	Qinghai	1.111	5.059
Jiangxi	0.952	5.361	Ningxia	1.076	6.069
Shandong	0.732	6.705	Xinjiang	1.361	4.663

Henan	0.769	5.332	National average	1.024	6.405
Eastern region	0.946	8.037	Westen region	1.152	5.290
Central region	0.900	5.567	North-east region	0.857	6.541

From table 6-13 above, it can be seen that the tax effort performance at the provincial level demonstrates a regional disparity. Tax effort varies from region to region, but the tax effort and tax capacity for individual provinces often does not follow the same pattern. The national average tax effort level is 1.024. However, 11 provinces have higher tax effort performance than the national average, and 20 provinces have lower than the national average tax effort performance.

Comparing the performance of tax effort with that of tax capacity, there are significant regional variations. The most obvious example is the Eastern region, which is the most developed region in China and has the highest tax capacity at the level of 8.037%, whereas its tax effort is only 0.946, below the national average of 1.024 (Table 6-11). A similar phenomenon is found in the north-east region, with tax capacity of 6.541%, and tax effort of 0.857 respectively, which is the lowest among all four regions. Strikingly, the western region has the highest tax effort among all regions at 1.152; however, its tax capacity is the lowest in all four regions at 5.29%.

The discussion above reveals an interesting phenomenon in China - that the regions with higher tax capacity tend to have lower tax effort, and vice versa. This may be because less developed regions lack tax resources, but due to the expenditure in decentralization, local governments face great fiscal stress, hence a higher tax effort is detected (Shen, 2011; Shen *et al*., 2012; Wu, Feng, & Li, 2015).. In contrast, the more developed regions are relatively abundant in tax resources, thus the lower tax effort appears. The average tax effort and tax capacity at the provincial level are depicted in the scatter chart in Figure 6-4.

Figure 6-4: The scatter chart of average tax effort and tax capacity of each province
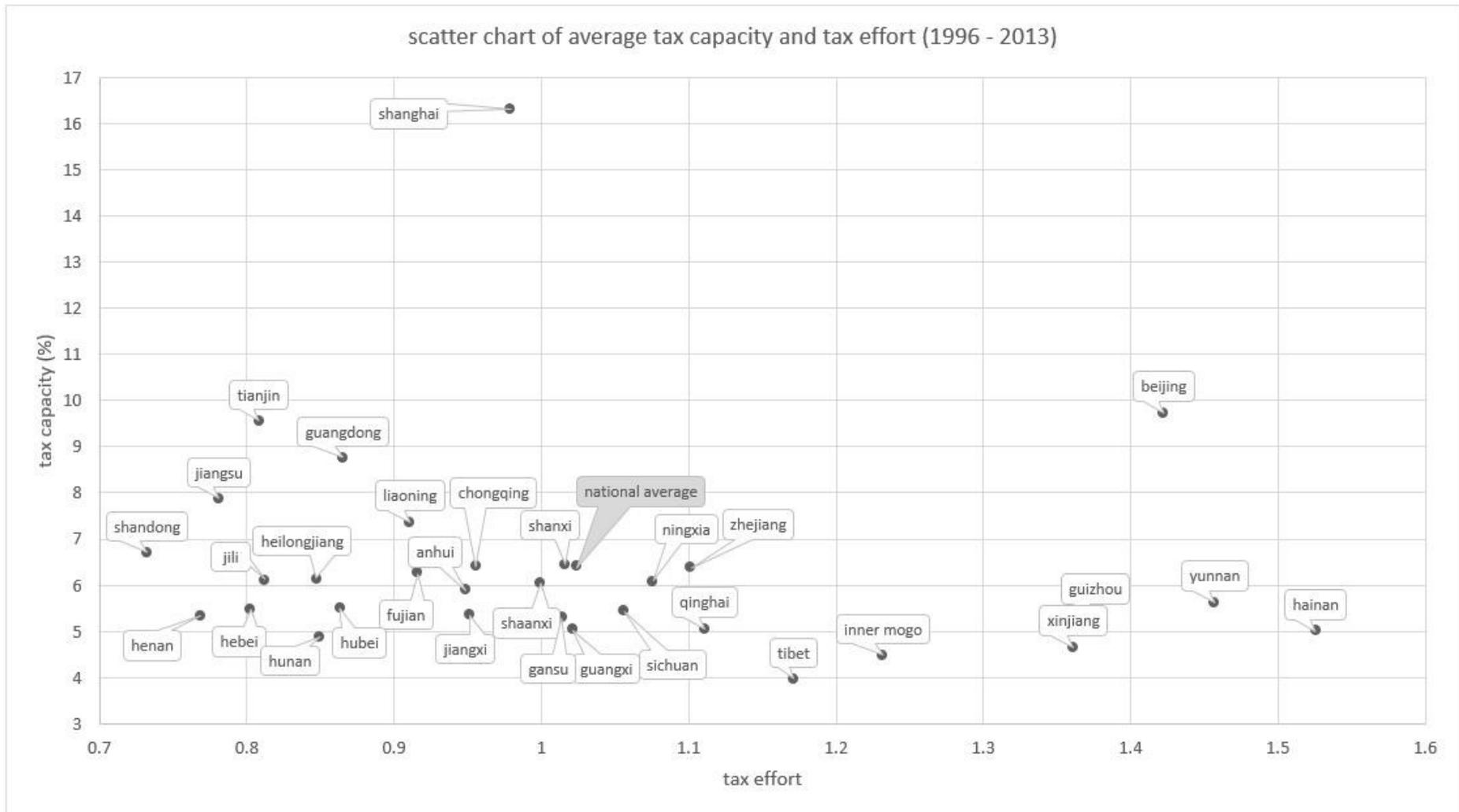
Shanghai shows a very high tax capacity compared to the other provinces due to its special economic and political position and its high level of economic development. However, its tax effort is much lower than the national average.

Shanghai is located in the middle of China's eastern coastline with easy access to the Yangtze River – this golden waterway links to the eastern China Sea, and the foundation of the Yangtze River Delta area, the most populated and economically developed area in China. (Yang, Luo, & Ji, 2016) Since the opening up policy and the trade liberalization, China has been recognized as the "workshop of the world", and Shanghai has become the undeniable main gate of this workshop. (Dobrescu & Dobre, 2015)

Shanghai also takes great advantages from the central policies for its dramatic social and economic development (Yang, 2002). In particular, during the period between 1993 and 2003 when Jiang Zemin served as the President of the People's Republic of China and during 1998 and 2003 when Zhu Rongji served as the Premier of the People's Republic of China. What these two central leaders had in common was that they both served as former Mayors of Shanghai. As a result, Shanghai has experienced its rapid renovation and development by taking great central policy advantages from these two former central government leaders like no one else. (Dobrescu & Dobre, 2015) Hence the great geographical and political advantages may be the reason why Shanghai is such an extreme case in terms of tax capacity in this study.

Apart from the extreme case of Shanghai, the diagram above shows that there is a negative relationship between the tax effort and the tax capacity. Provinces with higher tax capacity tend to have a lower tax effort, and vice-versa. This discrepancy may indicate low efficiency in the taxation performance at provincial level. It is expected that if there is an efficient government, a higher tax capacity should result in a higher tax effort. However, in China, there are very few provinces that have high tax capacity and at the same time, a high tax effort.

Tianjin, Guangdong, Jiangsu, Liaoning and Shandong are typical provinces that have high tax capacity but low tax effort. Increasing the tax collection and enforcement by the tax administration should result in a better taxation performance.

In contrast, Hainan, Yunnan, Guizhou, Xinjiang, Inner Mongolia, and Tibet show a different pattern. They all have high tax effort but low tax capacity. In other words, these provinces are generating tax revenues through heavy tax effort from a relatively narrow tax capacity. Fiscal deficit is possibly the reason, and greater attention from the central government to help these local governments may be needed.

The remaining provinces suffer from low tax capacity and low tax effort by different degrees. These provinces are facing a double challenge. On the one hand, the local government needs to develop a greater tax base potential and on the other hand, local governments also need to enforce their tax administration to raise their tax effort.

6.9.5 Provincial government current revenue effort and current revenue capacity

Table 6-14 shows the results of the average current revenue effort and current revenue capacity of each province between 1996 and 2013.

Table 6-14: Average current revenue effort and current revenue capacity (1996 - 2013)

Province	current revenue effort	current revenue capacity	province	current revenue effort	current revenue capacity
Beijing	0.379	45.968	Hubei	0.726	11.608
Tianjin	0.286	39.695	Hunan	0.897	10.123
Hebei	0.589	12.591	Guangdong	0.505	21.891
Shanxi	1.134	10.758	Guangxi	1.215	8.133
Inner mongolia	3.024	2.898	Hainan	1.093	10.339
Liaoning	0.634	17.382	Chongqing	0.785	13.035
Jilin	0.898	9.562	Sichuan	1.258	8.085
Heilongjiang	1.150	7.272	Guizhou	1.632	7.738
Shanghai	0.143	126.596	Yunnan	1.831	6.842
Jiangsu	0.381	25.878	Tibet	8.167	0.930

Zhejiang	0.591	18.479	Shaanxi	1.181	8.947
Anhui	0.709	13.434	Gansu	2.140	4.539
Fujian	0.758	13.470	Qinghai	4.843	1.813
Jiangxi	1.020	9.656	Ningxia	1.639	6.640
Shandong	0.427	18.986	Xinjiang	4.164	2.489
Henan	0.536	13.992	National average	1.443	16.444
Eastern region	0.530	31.992	Westen region	2.657	6.007
Central region	0.837	11.595	North-east region	0.894	11.405

The regional disparity in terms of current revenue effort reveals a different picture compared to the tax effort regional disparity.

The tax revenue effort of the western region is ranked as the highest among all four regions at 2.657. A similar result has also been revealed in the current revenue analysis. However, its current revenue capacity is 6.007%, which is ranked as the second highest among all four regions, compared to the highest tax revenue capacity.

The eastern region is an example of unbalanced current revenue effort and current revenue capacity. The current revenue capacity of the eastern region is 31.992%, which is the highest among all four regions, whereas the current revenue effort is 0.53, which is the lowest in all four regions. Its current revenue effort lags behind the other three regions.

The current revenue capacity and current revenue effort in the north-east region and the inland central region show the same pattern as in the tax capacity – tax effort analysis – despite the current revenue effort being greater than the current revenue capacity for the central region.

Two extreme cases are found in the above chart: Shanghai and Tibet. Shanghai appears as having the highest current revenue capacity; however, its current revenue effort is the lowest among all provinces. In contrast, Tibet has the lowest current revenue capacity at 0.930%, whereas its current revenue effort is 8.167, which is ranked as the highest of all provinces.

Geographically, Shanghai is an eastern coastal city, one of the centres of the open-door policy frontline, whereas Tibet is the most remote province in China, and has suffered from political instability for a very long time.

As mentioned before, Shanghai is both geographically and politically more advanced than other areas in China, whereas Tibet is one of the poorest provinces in China. It is conjecturable that Shanghai has a great hypothetical current revenue capacity, but has not utilized its effort to collect them. However, in Tibet, the fiscal stress has forced the local government to push hard on the effort to collect revenues even though the hypothetical capacity is very low, possibly caused by its geographical disadvantages and both social and political problems (Xu, 1998; Davies, 2009; Crowe, 2013; Tuttle, 2015). Figure 6-5 illustrates the current revenue capacity and current revenue effort in all 29 provinces. Shanghai and Tibet are not included due to their extreme values.

Figure 6-5: Scatter chart of average current revenue capacity and current revenue effort (1996-2013)

scatter chart of average current revenue capacity and current revenue effort without Shanghai and Tibet (1996 - 2013)
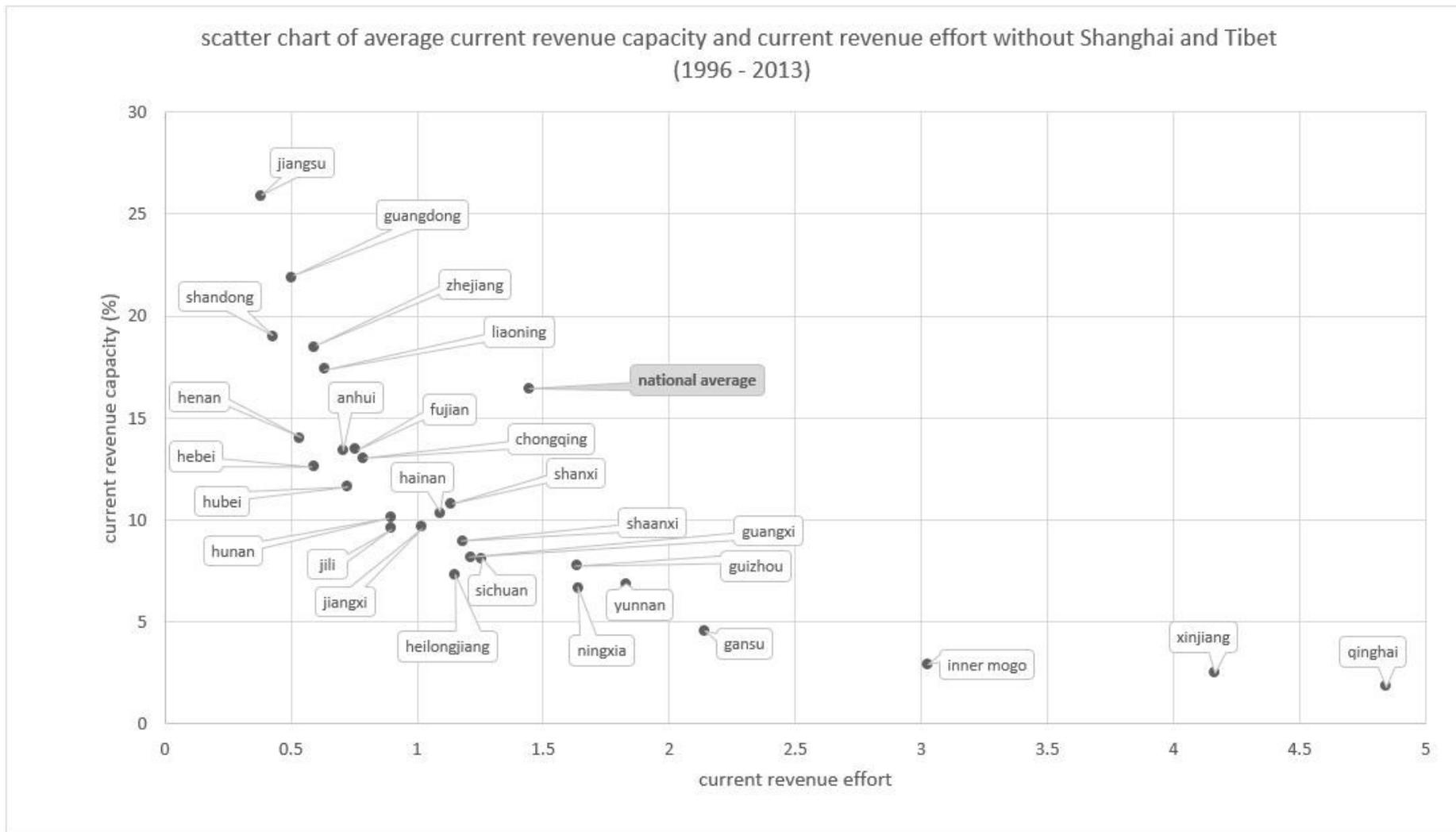
It was found that from the tax effort – tax capacity analysis that provinces with higher tax capacity tend to have lower tax effort. This phenomenon also exists in the current revenue analysis. Provinces which have higher current revenue capacity also tend to have lower current revenue effort. Jiangsu, Guangdong and Shandong are three provinces with the highest current revenue capacity, but with the lowest current revenue effort. In contrast, Qinghai, Xinjiang and inner-Mongolia are three provinces that have the lowest current revenue capacity, but their current revenue efforts are the highest among all provinces in this study.

6.10 Summary

In this chapter, the process of statistical analysis, the empirical results, and the discussion on the results are presented.

The dataset in this research contains a total of 31 provinces and covers a 19-year period, from 1995 to 2013. Through the descriptive statistics of raw data, it is revealed the existence of significant regional disparities in terms of economic and social conditions, especially in terms of stage of development, population density, openness level, and current revenue ratio.

Before proceed to regression analysis, all independent variables are tested for multicollinearity using the Variance Inflation Factor and the Condition Number. A rough role for VIF is that it should not be greater than ten, and the condition number is less than 100 (Bizeti, Carvalho, Souza, & Destro, 2004; Tattar, Ramaiah, & Manjunath, 2016). Since the test result of all independent variables' VIF is less than 10 and the condition number is less than 100, the degree of multicollinearity is not an issue for the later regression process.

In order to identifying the best appropriate regression model among the pooled OLS, random effect, and the fixed effect regression model, all three regressions are ran, discussed and tested by the Breusch-pagan LM test and Hausman test. Based on the statistical evidence presented on the Breusch-

Pagan test and Hausman test, it can be concluded that the fixed effect model is the best fit for both tax ratio and current revenue ratio in this study.

As the outcome of the literature reviewed, the author of this study constructed elven testable hypothesis. Based on the significance level obtained from the regression results, all 11 hypothesis are tested. The hypothesis testing result is briefly summarized in the table 6-15 below.

Table 6-15: Brief summary of main hypothesis testing result

Main hypothesis	Tax ratio	Current revenue ratio
H1: The stage of development is significantly related to the tax revenue performance at provincial level in China.	Accepted	Accepted
H2: Development in the industrial sector is significantly related to the tax revenue performance at provincial level in China.	Accepted	Accepted
H3: The development of the service sector is significantly related to the tax revenue performance at provincial level in China.	Failed to accept	Accepted
H4: The openness level is significantly related to the tax revenue performance at provincial level in China.	Accepted	Accepted
H5: The population growth rate is significantly related to the tax revenue performance at provincial level in China.	Accepted	Accepted
H6: The population density is significantly related to the tax revenue performance at provincial level in China.	Failed to accept	Accepted
H7: The shrinking of agricultural sector activities is significantly related to the tax revenue performance at provincial level in China.	Accepted	Accepted
H8: The resident income inequality is significantly related to the tax revenue performance at provincial level in China.	Failed to accept	Accepted
H9: The external grants received by local governments are significantly related to the tax revenue performance at provincial level in China.	Accepted	Accepted
H10: The anti-corruption effort is significantly related to the tax revenue performance at provincial level in China.	Failed to accept	Accepted
H11: The government capacity is significantly related to the tax revenue performance at provincial level in China.	Accepted	Accepted

The test of the fixed effect model generated some interesting and important results. The current revenue ratio, which contains the non-tax sourced

revenue, fit better than the tax ratio with evidence from a higher explanatory power. In addition, two variables, the income inequality variable and corruption that have been proven to have significant impact on the tax ratio in a number of previous studies, were statistically non-significant in the tax ratio regression, but statistically highly significant in the current revenue ratio regression, with expected signs that support the previous studies. The regression result implies that the tax ratio may not represent the true tax revenue performance in China, because some items in non-tax sourced revenues are similar to the concept of tax.

All independent variables are yield expected signs in both tax and current revenue ratio regression models, but with different level of significance. Based on the regression results, it is clear that the stage of development, development in the industrial sector, openness level, population growth rate, shrinking of agricultural sector activities, external grants received by the local governments, and government capacity are all the main determinants for both tax and current revenue capacity. However, four factors, namely development in the service sector, population density, resident income inequality, and anti-corruption effort, are main determinants in current revenue performance, but not for tax revenue performance. Furthermore, all independent variables are discussed in each of their own section to discover the meaning of their own results.

Through the regression results, the estimated tax/current revenue capacity for each of 31 provinces in China were generated. Following the tax effort index equation which was discussed in Chapter 2, the tax effort index was calculated for each of 31 provinces. Hence, the tax effort, tax capacity, current revenue effort, and current revenue capacity were discussed and compared. This study revealed that serious regional disparities are existing in both tax capacity and tax effort. In addition, it is also revealed a negative relationship between provincial tax revenue capacity and tax effort: the regions with higher tax capacity tend to have lower tax effort, and vice versa. The similar result was also found in the current revenue capacity and effort.

Chapter seven: Conclusions and recommendations of this study

7.1　Introduction

The research aim of this study is to find the key determinants of the variation of the tax revenue capacity in China, and to evaluate China's tax revenue performance at provincial level. The primary purpose of this study is to seek answers to the following questions:

1. What are the key determinants affecting the tax capacity in China at provincial level?
2. How did the tax revenue perform in China at provincial level?
3. Is there any regional variation of tax performance at the provincial level?
4. What policies may be suggested to improve the tax revenue performance in China?

Based on the outcomes of the literature reviewed, and with the research aim of this study, the following hypotheses have been put forward:

H1: The stage of development is positively related to the tax revenue performance at provincial level in China.

H2: Development in the industrial sector is positively related to the tax revenue performance at provincial level in China.

H3: The development of the service sector is positively related to the tax revenue performance at provincial level in China.

H4: The openness level is positively related to the tax revenue performance at provincial level in China.

H5: The population growth rate is negatively related to the tax revenue performance at provincial level in China.

H6: The population density is positively related to the tax revenue performance at provincial level in China.

H7: The shrinking of agricultural sector activities is positively related to the tax revenue performance at provincial level in China.

H8: Resident income inequality is negatively related to the tax revenue performance at provincial level in China.

H9: The external grants received by local governments are negatively related to the tax revenue performance at provincial level in China.

H10: The anti-corruption effort is positively related to the tax revenue performance at provincial level in China.

H11: The government capacity is positively related to the tax revenue performance at provincial level in China.

In order to answer research question one, the above hypotheses are tested and the econometric quantitative method is applied for these purposes. Furthermore, the data used in this study covers the period between 1995 and 2013 on 31 provinces, autonomous or municipal cities directly under the control of the central government. The guide-lines and procedures of how the research questions have been answered and how the research aim has been achieved are briefly summarized below.

Firstly, through a detailed investigation into the taxation system and government revenues in China, this study found a more accurate indicator for tax performance in China. Specifically, the existence of non-tax sourced revenue is the most significant characteristic in China's government fiscal revenue system, especially at local government level where the government fees, charges and funds are collected as non-tax sourced revenue although often without a legal basis. It is argued in this study that this non-taxed sourced revenue in essence bears the nature of taxes. Therefore, the author stresses that China's current revenue, which includes both tax revenue and non-tax sourced revenue, may more appropriately represent the magnitude and scope of the tax performance in China.

Secondly, based on the salient feature of China's fiscal revenue system discussed above, and the 11 hypotheses formulated based on the literature reviewed, two regression-based tax effort index models were constructed, namely the tax revenue ratio model, and the current revenue ratio model. The same 11 explanatory variables are used in these two models. The purpose of

building the two regression models are to obtain the estimated tax and current revenue capacity and to find the determinants of tax revenue performance.

As a result of these regressions, all 31 provinces' tax and current revenue capacities are calculated, which are used for further calculation of the tax and current revenue effort indices. Since both the tax capacity indices and tax effort indices are the measurement of tax performance, research question two and three are answered.

Finally, based on all the results and outcomes mentioned above, the author is able to provide suggestions for policy makers to improve the tax revenue performance in China, thus, research question four is answered.

The remainder of this chapter provides more detailed analysis of the regression results, which is followed by the contributions of this research. Finally the limitations and further studies are also provided.

7.2 The main findings from the regression results

7.2.1 Model building process

Based on the salient feature of China's fiscal revenue system, along with the conventional tax revenue ratio as one of the dependent variables, the author constructed the current revenue ratio as the second dependent variable to represent the true tax-like revenue performance in China.

The tax ratio is measured as the ratio of actual tax collection in GDP, and the current revenue ratio is measured as the ratio of actual current revenue collection in GDP, where the current revenue is the sum of tax revenue and non-tax sourced revenue, which excludes State Owned Enterprise revenues and planned subsidies to loss-suffering of SOEs (PSL). The reason for excluding State Owned Enterprise revenues and PSL is that according to PSL properties and classification by the UN, PSL is a subsidized fiscal expenditure in principle. Inclusion of the PSL in the off-budgetary revenue might cause

data bias for some provinces. In addition, the revenue from SOEs is highly related to the PSL as both reflect the activities of SOEs.

In terms of the independent variables, 11 variables which fit with six categories were selected. These six categories were: the traditional tax handles, GDP decomposition, population factors, income inequality, corruption, and governmental factors. The independent variables included in this research are selected economic and social factors based on the hypotheses generated from the literature reviewed, which are the expected determinants of tax revenue performance.

In order to identify the best fit regression model, three regression models were built and run for both the tax revenue ratio and current revenue ratio, the pooled OLS model, random effect and fixed effect regression models. Having performed the Breusch-Pagan LM test and the Hausman test, the fixed effect model was revealed to be the more appropriate regression model for this study.

7.2.2 The fitness of the model

Overall, the F test of both tax revenue regression and current revenue regression are significant at $P<0.05$ level. The fraction of variance due to the individual effects (intra-class correlation) in the tax revenue regression performs well with the explanatory power of 89% and this figure in the current revenue regression is 99%.

Therefore, the regression results of both the tax ratio model and the current revenue ratio confirms the fitness of the models. Within the tax ratio regression model, seven explanatory variables were found to be significantly related to the tax ratio. In contrast, in the current revenue ratio regression, all the variables are statistically significant. This further demonstrates the appropriateness of introducing the current revenue as a more comprehensive yet accurate indicator of China's tax performance.

7.2.3 The comparison between the tax ratio model and the current revenue model

Comparing the tax ratio model with the current revenue ratio model, it is apparent that the current revenue ratio model is a more appropriate model to explain the tax performance in China. This is proved by the regression results which obtained some variables such as service sector value-added in GDP, population density, income inequality, and the level of corruption, all of which were not significant in the tax ratio model, but highly significant in the current revenue model. These results demonstrate that China's provincial level tax revenue performance has been underestimated by the existence of non-tax sourced revenue. Therefore, the author believes that the current revenue model should be used when examining China's tax performance at the provincial level.

7.3 Analysis of the regression results

7.3.1 The key determinants affecting the tax capacity in China at provincial level

Based on the regression results provided in Chapter 6, the key determinants affecting the tax capacity in China at provincial level are presented below.

7.3.1.1 The economic factors and the tax handle

The results of this study confirms that the tax capacity in China at provincial level is considerably affected by economic factors such as the stage of development, development of the industrial sector and service sector, and openness level. Provinces with a higher stage of development and industrial sector development were all found to significantly affect the tax capacity positively. The openness level and development of the service sector are also positively affecting the tax capacity but its level of significance is lower than that of the stage of development and industrial sector development.

7.3.1.2 Population factors

The natural rate of population growth, the population density and non-agricultural population rate are the population factors included in this study as

the explanatory variables to explain the tax performance. It is observed that due to the implementation of the one child policy and the subsequent enforced birth control, the natural rate of population growth has not been so high during the period covered in this study. A negative relationship between the natural population growth rate and the tax revenue performance in this study is assumed and confirmed by the regression result. This is consistent with the previous study that the natural rate of population growth had a lagged effect of capturing taxpayers in tax collection (Bahl, 2004).

The other two independent variables, the population density and the non-agricultural population rate, have all shown a positive impact on both tax and current revenue performance. It should be noted that the share of the non-agricultural population is used as a proxy for the urbanization and migration since these two are interrelated. The high level of urbanization is often found in the developed areas which attract rural workers. While the rural workers raise the level of urbanization, they also generate a higher demand for public goods and commodities, thus bringing increased sales and consumption in the urban area.

7.3.1.3 Governmental factors

Another variable relating to the relationship between the central and local government, is the central transfers, which have been found to have a negative impact on the provincial tax capacity. This to say that the greater the central transfer that local governments received, the lower tax capacity it had. This finding is also consistent with the previous literature, which indicated a displacement effect and reverse causality of external finance to the domestic tax revenues. (Lotz & Morss, 1970; Leuthold, 1991; Ghura, 1998; Chaudhry & Munir, 2010).

Government capacity in this study is proxied by the government's fiscal expenditure in GDP and found to be one of the main determinants of the local tax capacity. This finding is consistent with the theoretical assumption that a

higher level of government capacity could increase the surplus for taxation (Huossain, 2014).

7.3.1.4 Income inequality and anti-corruption effort

In terms of the other two social variables of income inequality and corruption, the expected signs have been achieved but are not statistically significant in the tax capacity model. However, in the current revenue model, they are both significant with the expected positive signs. The author conjectures that this may be because the tax ratio cannot fully represent the true tax revenue performance in China. This is because the author argues that the current revenue ratio has been proved to more accurately reflect the true tax revenue than the tax ratio, hence the income inequality and the anti-corruption effort are considered as two of the main determinants of tax capacity.

7.3.2 Tax performance and its regional variation at the provincial level

Using the conventional regression approach, the author calculated the tax capacity and tax effort indices. Both of them demonstrates the existence of regional disparity, as the main characteristic of China's regional tax revenue performance. The highest tax capacity appears in the eastern region, which also has the highest level of economic development represented by the real per capita GDP. In contrast, the western region has the lowest real per capita GDP level, and also has the lowest tax capacity.

When the detailed investigation was conducted for the individual provinces, a striking pattern is observed: there is a negative relationship between tax capacity and tax effort for some provinces; they have high tax capacity but low tax effort, and vice-versa. For example, Shanghai, Jiangsu, Guangdong and Shandong are four provinces or municipality cities under the direct control of the central government, with the highest current revenue capacity. However, their current revenue effort indices are the lowest among all provinces.

This regional disparity of tax performance possibly indicates poor efficiency in tax collection and management at provincial level. In an efficient government

governed society, a high tax effort often goes hand-in-hand with high tax capacity since an efficient government is more likely to fully utilise the tax capacity (Fauvelle-Aymar, 1999; Bird *et al*., 2006). It seems that the efficiencies of China's local governments vary significantly leading to the existence of regional disparity in tax performance.

7.4   Policy implications

Government fiscal revenue plays a key role in the economic reforms and development in China (Lin, 2000) . China's local governments' fiscal revenues mainly consist of tax revenue, off-budgetary revenue, and extra-budgetary revenue. The results of this study have revealed that China's tax revenue is mainly determined by economic factors. However, when the current revenue was used as the indicator of tax performance, the result showed that not only economic factors but social factors are also equally important. In addition, from the regional tax revenue performance aspect, the study clearly confirms the existence of the regional disparity of tax or current revenue capacity and the mismatch between the tax/current revenue capacity and lower tax/current revenue effort in some provinces.

As Bird *et al*. (2006) stated that for developing countries with poor tax revenue performance, it would not help much by telling them to "find oil" or "rearrange nature's bounty" (Bird *et al*., 2006, p. 4). By the same token, it would be not much help to address the regional disparities of tax/current revenue effort by suggesting the central government use its political power to narrow the gap. Nonetheless, some policy recommendation may be made.

7.4.1 Regulation of the informal activities in the service sector

It was found that the service sector is statistically non-significant in relation to the tax ratio but highly significant in the current revenue ratio model. This implies that large scale informal activities in the service sector and tax evasion may exist. China's tax system mostly relies on the turnover taxes that are collected mainly from sales and consumption in the service sector. By

regulating the informal activities in the service sector, the government is able to tackle tax evasion and increase the tax base.

7.4.2 Adjustment or reform on turnover taxes to capture a larger population tax base

The regression results in the tax revenue ratio model reveal a positive but not significant relationship between the population density and the tax capacity; however, in the current revenue ratio model regression results, the relationship was positive and highly significant. Through the discussion on China's taxation system, it is clear that it is mainly turnover tax based, which relies highly on consumption and sales tax. Based on these facts, the failure of the current formal tax system to capture the true tax base in China can be confirmed.

7.4.3 Adjustment on the strategy of the central transfer system for greater incentives of tax collection by local government and balancing regional disparities in tax revenue

As revealed in Chapter 4, the main purpose of the central transfers are to deal with local fiscal difficulties and help balance the fiscal gaps among the provinces. However, based on the regression and hypothesis testing results from this study, central transfers significantly suppress the incentive of local governments to explore the opportunities to increase the tax/current revenue. In addition, the recentralization reform in 1994 has reduced local government motivation to increase tax capacity. Furthermore, through the analysis of provincial governments' tax/current revenue capacity and effort indices, there are large regional disparities among provinces in terms of tax/current revenue capacity and effort. Therefore, the author suggests that the strategy of using a central transfer system should be adjusted to reduce the negative impact on local government incentives and motivation to explore tax capacity by their own effort, but also to balance the regional disparities in terms of tax revenue performance.

7.4.4 Control of urban-rural resident income disparity

As discussed in the earlier chapters, a wide resident income gap can result in a lower level of trust in the public regarding the function of the fiscal system on the issue of revenue redistribution, social justice and fairness, thus enhancing the exit option for paying taxes (Bird *et al*., 2006; Pessino & Fenochietto, 2010). It is also revealed that the resident income disparity in China has been increasing at a fast pace. Based on the results from this study, the urban-rural resident income disparity has a negative influence on both tax capacity and current revenue capacity. In addition, its influence on the current revenue capacity is highly significant.

7.4.5 Strengthen the anti-corruption campaign

Through the findings in the literature reviewed, corruption has been widely proven to be negatively related to tax performance. This argument is also proven in this study by the regression results and hypothesis testing. The positive sign of the anti-corruption effort has been achieved in both the tax ratio and current revenue ratio regression model, and the positive influence of the anti-corruption effort to current revenue capacity has been proven to be highly significant. Based on the above discussion, it is suggested in this study that the authorities should strengthen the anti-corruption campaign for the purpose of higher government efficiency and institution credibility, thus improving the tax revenue performance at provincial level in China.

7.4.6 Legislation and regulation of the non-tax sourced revenue

It is revealed in chapter four that a large proportion of fees, charges and funds have become important sources of local government revenue and the collection of these non-tax sourced revenues largely lack the legal bases and control from the central government. In addition, it is argued that this large portion of non-tax sourced revenue in China matches the content of taxes in concept. This is further proven by the results of this study. Compared to the tax ratio regression model, the current revenue ratio regression model (which contains both tax revenue and selected non-tax sourced revenue) fits better in the tax effort index model. it may be stressed that China's tax authority should

consider reclassifying the majority of tax-like non-tax sourced revenues into tax revenue, or regulate the non-tax sourced revenue for the purpose of a more legalized and controllable revenue system.

7.5   Contribution of this study

This section highlights the merits and main contribution of this study to the literature.

In the existing literature of tax revenue performance studies, there are few studies that use the tax effort index regression approach within a Chinese context. Nonetheless, researchers have been mainly focused on economic factors such as the stage of development, GDP decomposition and the openness level. It is widely acknowledged in the literature of inter-country tax effort index studies that the tax revenue performance is not only determined by economic factors, but also the social and political factors. However, the salient feature of China's fiscal revenue system, i.e. the non-tax sourced revenue that arguably bears the nature of tax revenue in concept, have been widely ignored. In addition, a wide range of social and political factors that might also be determinants of China's tax revenue performance were also missing from the literature. Against this background, a gap in the literature has clearly grown, which is the lack of a holistic and comprehensive inner-country tax effort index regression approach study on the tax performance in China.

Therefore, the main contribution of this study is that it is the first of its kind where a holistic and comprehensive tax effort index study has been undertaken and contextualised in China at provincial level, taking into consideration China's fiscal, economic and social salient features.

Listed below are more detailed discussions of the specific contributions made in this study.

Firstly, for the first time the author has constructed the current revenue ratio as the second dependent variable to represent the broader fiscal revenue and

true tax-like revenue performance for studying the tax effort index in China. Following the previous studies of Fauvelle-Aymar (1999), Bird *et al*. (2006), Tuan Minh *et al*. (2008), and Le *et al*. (2012), this study has used the conventional tax ratio as the first dependent variable, and the current revenue ratio as the second dependent variable, which is a broader fiscal revenue indicator trying to capture the more true tax-like revenue performance in China's tax system. The current revenue ratio is measured as the ratio of the sum of tax revenue and non-tax sourced revenue to GDP. However, it must be noted that the composition of the current revenue ratio in China is very different from the revenue variable used by the scholars in the previous studies.

Secondly, this study has used the rural-urban income disparity Theil index as one of the explanatory variables in the tax revenue and current revenue models for China's tax performance study. The resident income inequality is cited in the tax effort index studies as one of the important social factors related to the tax revenue performance (Bird *et al*., 2006; Fenochietto & Pessino, 2013). The rural-urban income gap in China has been widening since the open door reform in1978, and the income disparity has become a serious issue and a primary concern to the Chinese authorities. (Chen *et al*., 2010; Peng *et al*., 2013; Zhang & Bao, 2015). However, there is no relevant study on the relationship between income inequality and tax/current revenue performance in China. This study fills this gap in the literature by constructing the Theil index of urban-rural income inequality in both the tax revenue ratio model and current revenue ratio model.

Thirdly, for the first time in the tax effort index literature, the author has constructed a new variable of anti-corruption in a single country tax effort index model within the China context. Studies regarding the relationship between corruption and tax revenue performance are scant. In the limited cross country studies, the data on the corruption level or anti-corruption effort are normally from international organizations such as the corruption in

government index from the International Country Risk Guide (ICRG), Corruption Perceptions Index (CPI) from Transparency International (TI), and the Index of Control of Corruption from the Worldwide Governance Indicators (WGI) published by the World Bank. According to the researcher's best knowledge, no one had previously used a country specific corruption data directly for the tax performance study.

Following the studies undertaken by Fisman and Gatti (2002) and Glaeser and Saks (2006), this study has constructed the variable of anti-corruption effort, which is measured by the total number of registered legal cases of acceptance of bribes and embezzlement in every 1,000,000 people. The introduction of this variable into the single country panel data tax effort index study yielded significant results.

Overall, the main contributions of this study are twofold. First, by constructing and using three new variables (the current revenue ratio as the dependent variable, and anti-corruption effort and urban-rural income inequality Theil index as two of the explanatory variables), this study has improved the tax effort index model. Second, by including variables capturing China's salient economic and social features, the author has enriched the study on tax performance in China.

7.6   The limitations of this study

This study presents a comprehensive tax effort index study in China, and the research aims have been accomplished. However, there are some limitations in this study that need future scholars to investigate.

Firstly, because no researcher has ever constructed a broader fiscal revenue and true tax-like revenue performance for studying the tax effort index in China, this research used the sum of the tax revenue and selected categories of non-tax revenues to represent the current revenue. However, theoretically,

the true tax-like revenue can be further broken down and more accurately calculated using more disaggregated data sources, for instance the fee collection related statistics data.

Secondly, in this study, the author has used a quantitative approach to construct the anti-corruption effort, which is measured by the total number of registered legal cases of acceptance of bribes and embezzlement per 1,000,000 people. However, throughout the literature, there are traditional measurements and approaches to directly measure the corruption level using qualitative data or both. The lack of detailed corruption data at provincial level makes the use of the traditional approach impossible. This may prevent the reader from seeing a clearer picture of the relationship between the corruption and tax revenue performance, and may also make international comparison difficult.

Thirdly, primary data could be used in analysing China's tax revenue performance to further strengthen the validity and reliability of the data and possibly obtain more accurate results. All the data used in this research are secondary data collected from statistical yearbooks and reports published by the Chinese government authorised organizations, and no primary data was obtained and used in this study. Secondary data has its advantages such as ease of access, time saving, less expensive to obtain, and it provides the feasibility of regional comparison (Ghauri, 2005). These advantages are especially important for this study due to the fact that this study requires a large amount of data, which was very difficult to obtain by the author. In addition, comparison between provinces is a vital part in this study. However, compared with primary data, the disadvantages are also clear. Firstly, secondary data may provide a vast amount of information, but this may not always be the most appropriate data for a particular research study. However, primary data may be more appropriate because it is collected specially for the purpose of one particular study (Denscombe, 2014). Secondly, because secondary data are collected through a third party, there is also a lack of

control over data quality compared to primary data that is collected by the researcher (Saunders, 2011).

7.7 Suggestions for further studies

Firstly, this research has examined the relationship between China's provincial level tax revenue performance and certain economic and social factors. The data set covers 31 provinces and 19 years. For future research, it is suggested that more data covering a longer time period could be applied for a more comprehensive study.

Secondly, this study has only examined the tax performance and its determinants at the provincial level. In the future, an attempt could be made to conduct similar research at the national level using aggregate data. This would allow the comparison made between China and other countries in terms of tax performance.

Thirdly, an alternative approach to the measurement of resident income inequality in China may be used in future studies. Currently, the most used statistical indicators in the field of income inequality are the Gini coefficient and the Theil index. Each of these indices has its advantages and disadvantages as discussed in Chapter Five. This study used the Theil index to represent the rural-urban residents' income inequality due to the availability of the data. It would be interesting to see an alternative approach: the use of Gini coefficient to be used as the indicator of income inequality and linking it with the tax performance.

And finally, it is the salient feature in China's fiscal revenue system, i.e. the existence of non-tax revenues and its likeness to taxes in concept, which leads this study to use the current revenue ratio as one of the indicators of the tax capacity in the tax effort index model. However, as aforementioned in the literature review, issues regarding the non-tax revenues commonly exist among developing countries. Hence, it will be interesting to see the results

from a comparison study between China and other emerging countries using similar indicators.

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Endnotes

[1] The Advisory Commission on Intergovernmental Relations was a United States' organization that established in 1959, the main purpose of this organization was to provide consultancy service regarding to intergovernmental co-operation and efficiency. This organization was replaced by the American Council on Intergovernmental Relations in 1996.

[2] The nature of the socialist transformation is to establish socialist public ownership of the means of production. In terms of details, there were three major aspects of this transformation, namely "the three major transformations", and they are first, socialist transformation in agriculture; second, socialist transformation in handicrafts and capitalistic industry; and third, socialist transformation in commerce. The socialist transformation was started in 1953 and by the end of 1956, it was almost finished in the national level. (Wang, 1984)

[3] The political purpose of The Great Leap Forward (1958-1961) was to rapidly transfer China into a socialist society through fast industrialization and agricultural collectivization. This political upheaval was widely recognized by scholars as a great disaster not only to the national economy, but also to the nation as a whole, and in many ways contributed to the Great Famine during the year of 1959 and 1961, which was one of the most tragic events in history. (Bachman, 2006; Houser, Sands, & Xiao, 2009; Yueh, 2010; Song, 2013)

[4] The Cultural Revolution, which was started in 1966 and ended in 1976, was a political upheaval in which Chairman Mao was trying to regain political control after he lost ground at the end of the great Leap Forward. (Yueh, 2010)

[5] The "two declines" is the same as the "two ratios", or the "declines of the two ratios".