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博 士 論 文

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神戸大学経済学研究科

経済学専攻

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An Insight into Fiscal Policy and Economic Growth in Asian Economies

アジア経済における財政政策と経済成長に対する洞察

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Executive Summary

Recent theoretical developments in the growth literature lead us to examine the role of fiscal policy on economic growth. However, the effect and efficacy of various kinds of fiscal measures in the empirical world are considerably debatable. If we observe the fiscal scenarios of Asian countries, we find that the taxation system, in terms of size and composition, is different from other regions of the world. This leads us to think that there may be some imbalances tied in the Asian fiscal system which are not supportive to output growth. The empirical evidence reveals no consensus on how to make a right choice in adjusting government expenditures and their sources of finance to ensure long term growth. Hence, this research emphasizes the need to shed light on fiscal issues such as size and compositional effects of government expenditure and taxation on growth, direct and indirect channels of fiscal policy and ways to enhancing tax effort. This research provides an insight into how fiscal policy affects growth and how government can enhance fiscal effort to maintain sustainable sources of finance in Asian countries.

The research consists of five chapters. Chapter 1 introduces the general background and motivation, recent theoretical developments and some issues related to the empirical literature. Chapters 2, 3, and 4 make up the main body of the research and are comprised of three independent but interrelated topics. And finally, Chapter 5 concludes the main findings of the research, draws policy implications, and guides access for further area of research. We look at recent panel data from 34 Asian countries for the period 1991-2012. Panel data estimation techniques such as fixed effects (FE), generalized methods of moments (GMM) and two-stage least squares (2SLS) methods are used to analyze empirical aspects. To deepen our understanding and clarify the econometric results, relevant graphical presentations are also introduced.

Chapter 2 is entitled "Role of Fiscal Size and Composition on Economic Growth in Asian Economies". It examines the effect of the size of government expenditure and tax revenue as well as their composition on per capita GDP growth. The research employs estimation techniques such as FE and GMM. The findings conclude that a higher size of expenditure is negatively related to economic growth. No significant relationship between the size of tax revenue and growth has been observed. Regarding the fiscal composition, property tax is found to be positively associated with growth, whereas taxes on payroll and workforce are

found to be negatively associated. Similarly, housing and amenities expenditures are found to be positively linked with growth, but surprisingly, government effort on allocating health and education expenditures are not found to be productive. It is found that moderate fiscal size and composition accompanied by effective governance enhances economic growth.

Chapter 3 is entitled "Fiscal Policy Effects on Investment and Growth in Asian Economies". This chapter develops a model to analyze the direct and indirect effects of fiscal policy on growth in a simultaneous equation framework. Two-stage least squares (2SLS) technique is used on a sample of 34 Asian countries. We find that government consumption expenditure has a negative effect on growth, while it is difficult to measure the effects of tax revenue. However, if we observe the indirect effect, debt finance has a negative effect on total investment, whereas tax-finance has a supportive effect. Additionally, public investment does not support private investment. The overall findings suggest that it is better to increase tax revenue than to increase debt finance in Asian countries, where the level of taxation is considerably low.

Chapter 4 is entitled "Evaluating Tax Effort Performance in Asian Economies". The consistently low level of taxation persisting in Asian countries over the decades raises a serious question as to whether it is possible to raise the tax revenue under the existing fiscal framework. To address this concern, we assess the key factors that characterize tax revenue performance and explain their significance by creating a tax effort index across the Asian countries. The findings indicate that trade openness, the level of urbanization and government effectiveness are all associated with the higher tax effort, whereas foreign aid and share of agriculture in the economy are negatively associated. This research contributes to the literature by exploring the role of non-tax revenue concluding that countries which are overwhelmingly dependent on non-tax revenue may be likely to have reduced tax efficiency. Furthermore, we find that many of the Asian countries have higher tax potential; improving institutional capacity and expanding the tax base can enhance the tax effort performance.

The findings have some important implications for fiscal policy reform. Debt finance does not support productive investment and higher growth. Instead, countries with low levels of tax revenue have space to increase tax revenue to scale up investment, which ultimately leads to higher growth. Public expenditure should be kept as low as possible because the government sector does not have productivity equal to of the private sector. However, the

government's role in providing special public capital is crucial for creating investment opportunities. Similarly, property tax, which has a very low share in total taxes, is positively associated with growth. Hence, it can be increased to give a positive result. Furthermore, effective government and optimal fiscal composition increase the productivity of government expenditures. This research suggests that reform in tax policy in the majority of Asian countries is feasible under the existing framework by improving administrative and government efficiency. As many Asian countries show low tax effort performance, but have higher capacity, expanding tax base or strengthening institutional quality can enhance the level of tax collection without distorting the economic activities.

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Chapter 1

Introduction

1.1 General Background and Motivation

Over the last 30 years, a large body of literature both theoretical and empirical has been put forward to examine the role of fiscal policy on growth. However, the evidence in this regard raises a number of issues. The first issue is whether bigger or smaller government enhances growth (Engen and Skinner, 1992). The Keynesian view suggests that higher government spending stimulates aggregate demand, thereby increasing the income of the consumers and hence increases the output growth. However, opponents argue that the public sector is less effective than the private sector and the transfer of capital from private to public sector through distortionary taxation crowds-out private investment reducing net output growth. The second issue is whether tax finance or debt finance is supportive to growth. The supporters of tax finance suggest that increases in tax revenues provide sustainable sources of public finance and reduce the fiscal gap, thereby suppressing the existing debt stock. While others suggest that debt finance stimulates public investment without discouraging the incentives of the private sector. The third issue is whether the composition of public expenditures and taxation matters for growth. Empirical evidence regarding these issues is quite inconsistent.

The emergence of endogenous growth theory (e.g.: Lucas, 1988; Barro, 1990; Jones and Manuelli, 1990; Rebelo 1991) around the 1990s provided a clear insight of the mechanism by which fiscal policy affects long-run growth. Subsequently, a large number of empirical tests have been carried out. However, the effect and efficacy of various kinds of fiscal measures are debatable. The recent empirical evidence is more robust and consistent, but the implications of the findings remain limited in terms of fiscal policy reform (Gemmell and Au, 2012). The fiscal scenario and needs of each country are substantially different. The same kind of fiscal reform is not suitable for each country. For instance, Asian countries are faced with low level taxation, but need higher public investment. A strong sentiment in the economy is that tax cuts provide relief to investors and is likely to enhance economic growth. However, in the Asian context, tax cuts may not be a suitable notion of fiscal reform. Hence a careful analysis is needed before taking policy measures.

Most developed nations have raised tax revenue significantly over the past century, reaching 20-30 percent of GDP, which is now common in developed countries (Myles, 2000). This implies that higher tax revenue is a pre-requisite of the fiscal sustainability as well as a measure of the fiscal standards of a developed state. In contrast, there has been very slow growth in tax revenue mobilization in most Asian countries and it is still around 12 percent of GDP. This raises a serious issue whether the tax foundation in Asian countries is strong enough or needs to be reformed. Unless developing countries maintain a certain level of tax revenue, more than 15 percent of GDP, sustainable development is difficult (Bird et al., 2004).

Persistently low taxation in Asian economies either leads to high debt stock problems or the needs to cut down on public spending. The present practices of some countries show that expenditure cuts are their first priority. But for countries with relatively lower public spending, cut backs in expenditures hamper public investment even in essential areas outside the interest of the private sector. This creates an adverse effect on growth. Alternatively, if deficit finance is used to fulfill the resource gap, it may further deteriorate the position of existing debt stock and will prone to future cost of taxation. Hence, overcoming such fiscal issues needs to focus on empirical measures than theory.

This study is motivated by a number of issues. First, fiscal policy is largely affected by country specific characteristics and generalizations derived from other countries may not apply, and empirical research which focuses on low-income countries in Asia is very rare. Second, many studies recommend that tax cuts lead to higher growth, but Asian countries already have a low level of taxation, and the critical issue is whether further tax cuts will be in favor of growth maximization or in the other way around. Third, most Asian countries operate their fiscal policy with deficit finance, and hold outstanding debt stock. These lead us to examine the effects of various kinds of fiscal measures under the restriction of existing fiscal systems. And most importantly, we are greatly interested to find out why Asian countries have long been facing low taxation. One of the issues of Asian countries that needs to be solved is how to increase tax revenue to reduce the fiscal gap and provide a sustainable source of finance for public spending.

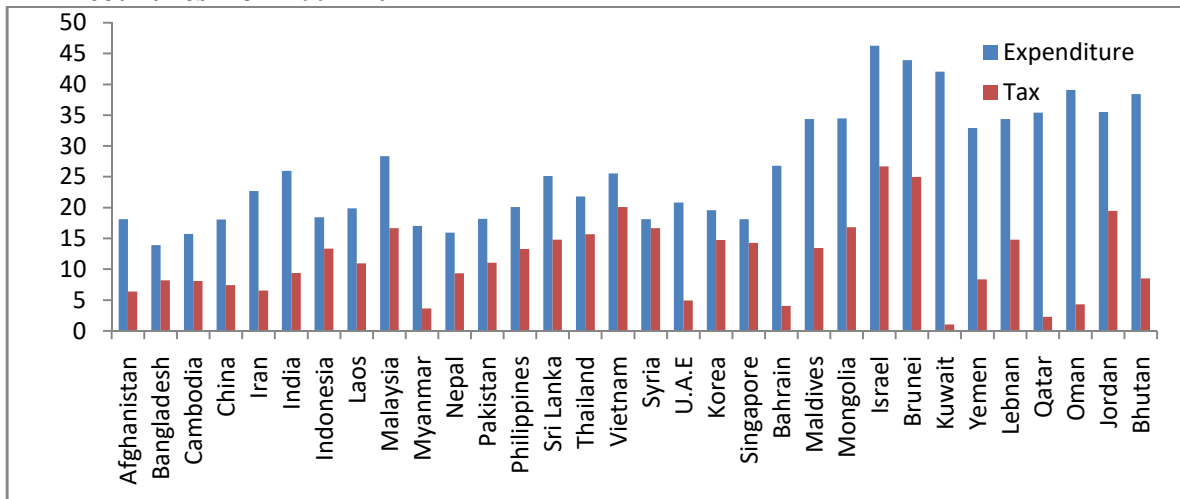
Hence, to shed light on the issues as raised above, we discuss the growth effect of size of government expenditure and taxation, and their composition in the first chapter. We observe the direct and indirect effects of fiscal instruments in the second chapter. Similarly, in the third chapter, we assess the tax effort performance and recommend ways to enhance tax effort. And finally, we discuss the policy implications of the findings in the last chapter.

1.2 Fiscal Policy Practices and Growth achievement: An Overview

A notable feature of fiscal policy in Asian countries is having low tax-GDP ratio and a persistent deficit. The size of government spending in terms of GDP is in moderate level, which is less than that of developed countries in the other regions of the world. However, the size of tax-GDP ratio is considerably low in this region. The shares of expenditure and tax revenue in GDP for 34 Asian countries over the period 1991-2012 are 27.2 and 11.4 percent, respectively. The huge gap between these amounts is fulfilled partly by non-tax revenue sources and the remaining by deficit finance. Around one third of Asian countries have non-tax revenues more than tax revenues. Especially, Organization of the Petroleum Exporting Countries (OPEC) or Arab world have significantly higher amount of non-tax revenues.

Figure 1.1 shows the average sizes of government expenditure and tax revenue in terms of GDP over the period 1991-2012. The majority of Asian countries have expenditure less than 30 percent of GDP. 11 countries out of 34 countries show the size of expenditure more than 30 percent of GDP. Countries such as Israel, Brunei and Kuwait have expenditure size more than 40 percent of GDP. Countries with lowest expenditure size comprise of Bangladesh, Cambodia and Nepal. Regarding the share of taxes in GDP, the majority of Asian countries show less than 15 percent of GDP. OPEC countries except Indonesia show a quite low level of tax-GDP ratio. Only three countries, comprising Israel, Brunei and Vietnam show tax-GDP ratio more than 20 percent. The gap between expenditure and taxation is substantially high in OPEC/Arab countries. However, non-tax revenues obtained from natural resources in rent contribute a major proportion of the total revenue. In general, countries with higher size of expenditure exhibit higher public debt stock than the countries which have lower size of expenditure. The increase in tax-GDP ratio is not enough to catch up with the increase in expenditure-GDP ratio.

Figure 1.1: Shares of government expenditures and taxes in GDP for Asian countries from 1991-2011

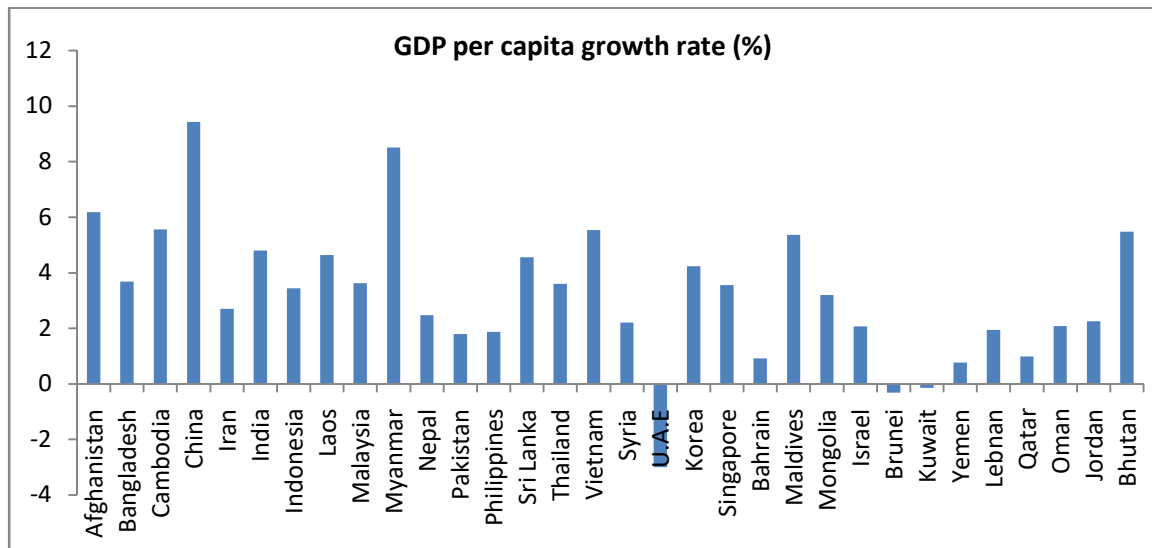


Source: Author's estimation based on the data taken from World Development Indicator (WDI), World Bank and Government Finance Statistics (GFS), International Monetary Fund (IMF).

The per capita growth performance of the Asian countries does not go hand in hand with the higher fiscal size. Instead, It shows that growth performance is inversely related to the fiscal gap or outstanding debt stock. Figure 1.2 shows the average growth performance of the countries over the period 1991-2012. The average growth rate in 34 Asian countries over the period is 3.16 percent per year. China, Myanmar, Afghanistan, Vietnam, Cambodia and India show distinct growth performance, around 5 percent or more. However, we observe that the size of the government expenditure in these countries is less than 30 percent of GDP. Countries such as United Arab Emirates (UAE), Kuwait, Brunei, Bahrain, Israel, Yemen, Lebanon, Qatar, Oman and Jordan show low growth rate, around 2 percent or below this. These countries have expenditure size more than 30 percent of GDP. The exception is Bhutan and Maldives, which show around 5 percent growth rate, although expenditure size is more than 30 percent of GDP.

Our observation shows that low fiscal gap is associated with higher and consistent growth. Singapore and South Korea have low gap between government expenditure and tax revenue, with low government size around 18-20 percent. As a consequence, they face a constant growth around 4 percent. Similar results can be seen in the case of Vietnam and Syria. To maintain the fiscal gap, countries such as Jordan, Israel and Qatar are cutting down their expenditures. This action greatly contributed them to reduce the outstanding debt stock over the period. However, majority of the countries have no significant improvement in raising tax revenue.

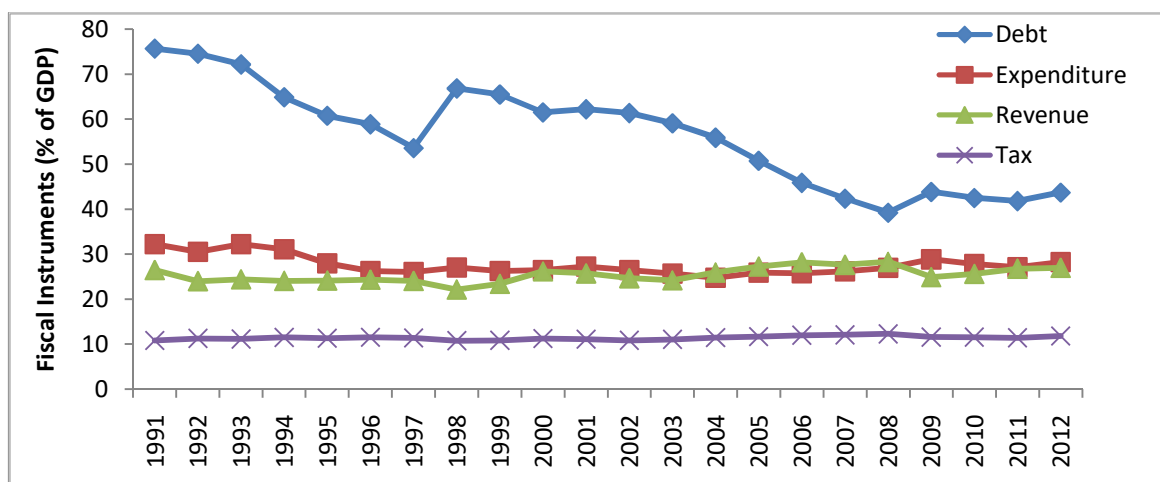
Figure 1.2: Growth performance of the countries for the period 1991-2012



Source: Author's estimation based on the data taken from WDI, World Bank.

Although Asian countries under the consideration reduced the outstanding debt stock significantly over the period, tax revenue mobilization is almost constant. The decline in public debt is due to cut back in public expenditures. Figure 1.3 shows the overall trend of the fiscal variables over the period 1991-2012. The average public debt has been reduced from 75 to 43 percent of GDP during these periods. Public spending slightly reduced from an average of 32 to 28 percent of GDP, while tax revenue raised up from 11 percent to 12 percent. In general, countries were operating with deficit finance. The graph shows that the deficit in recent years has been declining than the 1990s. Reduction in debt is good but still having low level of taxation is a serious issue which may arise the fiscal problem while meeting the growing demands for public spending in developing countries. Public expenditure in the range of 20 to 30 percent of GDP is reasonable but to meet this level, Asian countries need to improve their tax efficiency.

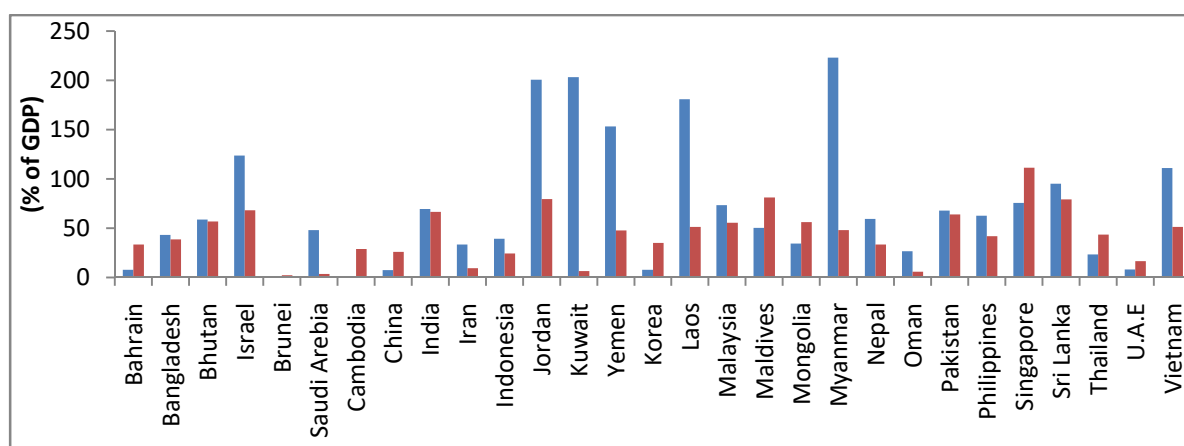
Figure 1.3: Trend of fiscal variables over the period 1991-2012



Source: Author's estimation based on the data taken from GFS and WDI.

Figure 1.4 compares the debt level between 1995 and 2012 for Asian countries.¹ In 1995 some countries had the debt stock in a considerably high level. But in 2012, it is in lower level around 45 percent of GDP. Countries such as Jordan, Myanmar, Vietnam and Kuwait had the debt level more than 200 percent of GDP. But in 2012, all countries except Singapore reduced the debt stock in a comfort level, less than 100 percent of GDP. Although the debt levels in Asian countries are not in critically threatening level, reduction of the existing debt stock would be plausible. The overall fiscal status as well as per capita income and its growth rate are shown in Appendix-1A.

Figure 1.4: Comparison of public debt between 1995 and 2012 in Asian countries



Source: WDI, World Bank.

¹ Although the data under consideration start from 1991, countries such India, Yemen, Mongolia, Pakistan, Philippines and Vietnam lack the data of public debt for the year 1991. Hence, for these countries, the data of 1995 have been selected instead of 1991.

1.3 Some Burning Issues in Growth Literature

Keynesianism vs. Non-Keynesianism: A Continuous Debate

Keynesian school of thought advocates that increased government spending can stimulate aggregate demand in the economy, which in turn enhances the output growth. When private sector is not able to increase economic activity, the government can create fiscal stimulus either by tax cuts or increasing expenditure. This produces more income to consumer and demand for goods and services increases, thereby causing more economic activity through the multiplier effect. According to Keynesian theory, government expenditure has multiplier effect greater than one, meaning that government spending causes an expansionary effect on output, while neo-classical economists argue that macroeconomic system, for instance, exchange rate regime, trade openness, and monetary policy, affect to shrink it less than one. A large body of empirical literature is against Keynesian fiscal policy. Giavazzi and Pagano (1990), Hjelm (2002) and Alesina and Perotti (1997) are the typical examples who show the spending-multiplier to be negative. Only few researches show the results in favor of Keynesianism. Blanchard and Perotti (2002) and Kharel (2012) show their results in favor of Keynesian fiscal policy.

Government Budget Constraint: A Source of Bias in Regression

While analyzing the effect of fiscal policy on growth, both expenditures and their financing sides are to be analyzed at the same time. All components of government budget, except one which is omitted to avoid perfect multicollinearity problem, are considered to find the net effect of fiscal variables on growth. Fiscal variables are interrelated to each other and omission of one category causes problem in estimating the net effect. Suppose that if we want to calculate the effect of education expenditure on growth, the net effect depends on what kind of taxation has been used to finance this. If non-distortionary taxation is used, it may give a positive result, but if distortionary taxation is used the effect may be insignificant. Hence, if the effect of only one side, either expenditure or tax revenue components, is considered in the regression, this may mislead the overall results. Kneller et al. (1999) point out this issue strongly, with the argument that ignorance of this issue leads to estimation bias. More recent literature tries to address this issue, however, a large body of literature fails to account government budget constraint.

Exogenous vs. Endogenous Growth Model

Solow-Swan (1956) growth model explains that exogenous factor such as technological progress and population dynamics determine the long-run growth path of the economy. The effect of fiscal policy has only short-run impact on the level of output. In contrast, Endogenous growth model (e.g. Romer, 1986; Lucas, 1988; Barro, 1990; Barro and Sala-i-Martin, 1992) explain the mechanism in which fiscal policy affects the long-run equilibrium of the growth path. Several empirical results justify the relevance of endogenous growth theory. However, practical implication has some limitations due to too many assumptions made under this theory. Endogenous growth theory is not able to provide the knowledge on why some poor countries are still far behind the developed one (Parente, 2000).

Functional Classifications of Taxation and Expenditure

Theoretically, government expenditures are categorized into productive and unproductive expenditures and taxation into distortionary and non-distortionary taxation. However, the categorization as productive/unproductive and distortionary/non-distortionary varies largely amongst the economists. For instance, Barro and Sala-i-Martin (1995), Devarajan et al. (1996) and Kneller et al. (1999) referred the expenditures such as general public services, defense, education, health, housing and transportation as productive expenditures while Kormendi and Meguire (1985), Summers and Heston (1988) classify defense and education as unproductive expenditure. Similarly, Taxation on income and property are generally regarded as distortionary taxation while taxation on goods and services are regarded as non-distortionary taxation. But in some models, consumption taxation distorts the decision to invest in an indirect manner (for e.g. Mendoza et al., 1997).

Endogeneity and Simultaneity Issues

The two way relationship that exists between fiscal variables and growth causes endogeneity problem in estimating the coefficient of the variables. Wagner law posits that change in per capita income affects the level of expenditure. Hence, fiscal policy not only affects growth, but growth also affects fiscal policy. The ignorance of endogeneity problem in the empirical test misleads the result. Many previous studies ignore this issue. The recent studies are able to account this issue. However, they still fail to account the simultaneity issue in which fiscal variables interact to each other. It is obvious that some kinds of taxation and expenditures

are interrelated to each other. The level of expenditure is determined by the status of taxation and vice-versa. Similarly, investment and growth has bidirectional relationship. The major fiscal variables and growth are explained by each other, constituting simultaneous effects. This issue in the fiscal policy-growth literature has largely been ignored.

1.4 Theoretical Development

According to Solow (1956)-Swan (1956) model, economies' savings rate is the certain fraction of income. In their framework, the returns to capital are only the rent and taxation and these returns have no any direct consequences on the economy. This model is popularly known as 'Exogenous Growth Model'. The exogenous growth model has limited value in its practical implication as it explains the growth process- exogenous. The technological process and population dynamics can increase the output and the growth mechanism is exogenous, meaning that the policy change has no impact on its sustained growth path. The main drawback of this model is to prevent the important factors that explain the growth mechanism due to its exogenous nature. This might be the reason why the interest on this growth model went down and did not revive until the emergence of the endogenous growth theory of the 1990s (Myles, 2000).

The incidence of endogenous growth models in the early 1990s, brought a revolution in dealing with the mechanism of long-run effects of fiscal policy on growth. These models explain that government actions such as taxation and spending pattern affects the long-run growth rate of the economy, for instance, Romer (1986), Lucas (1990), Barro (1990), Golmm and Ravikumar (1994). Romer (1986) endogenized the technological change for which accumulation of knowledge drives the long-run growth path. In his model, increasing returns to scale and externalities are the key factors which generate the growth path, while Rebelo (1991) developed a model an endogenous growth model in which these factors are not necessarily important. In endogenous growth model (for e.g. Romer, 1987 and 1990) technological progress has been applied in the form of varieties of capital goods. Lucas (1990) extended the endogenous growth model by introducing human capital accumulation on the framework used by Chamley (1981) and others. These growth models explain that countries have different institutions and varied factor productivity, due to which per capita income need not to be conversed.

Many economists contributed in explaining the mechanism by which various components of fiscal variable affect growth. Romer (1990), Grossman and Helpman (1991), Aghion and Hoiwtt (1992) and Jones (1995) developed research and development (R & D) based growth model in which technological progress is possible by the investment in research and development. Most importantly, Barro (1990) and Golmm and Ravikumar (1994, 1997) used government expenditure as an input in the production function. Similarly, Barro and Sala-i-Martin (1992) dealt with the role of tax policy in various models of endogenous growth and reached to the conclusion that tax policy stimulates the investment and growth when the social rate of returns to investments go above the private return. Similarly, Jones and Manuelli (1990) suggested that tax changes would have long-run impact on the equilibrium and growth rate. A breakthrough in traditional thinking about the impact and policy issues of taxation was the use of utility preference function in a Hicksian equilibrium framework instead of saving rate to analyze the future effect of taxation on current consumption (Lucas, 1990). In this course, Brock and Turnovsky (1981) and Chamley (1981) contributed significantly.

There is a continuous refinement on endogenous growth model. In recent years the course of discussion has been on composition of government expenditures and taxation. So far we know, Deverajan et al. (1996) developed the model in which composition of public spending matters for growth. Still the composition of government expenditure and taxation has been in careful consideration in empirical analysis. More recently, Aizman (2007) analyzes the equilibrium growth under considering the constraints of tax revenue and debt. A brief summary of theoretical contribution has been shown in Appendix-2B. Since a variety of existing theory yields conflicting explanations, Empirical evidence can resolve the existing debate with more plausible insights (Guseh, 1997).

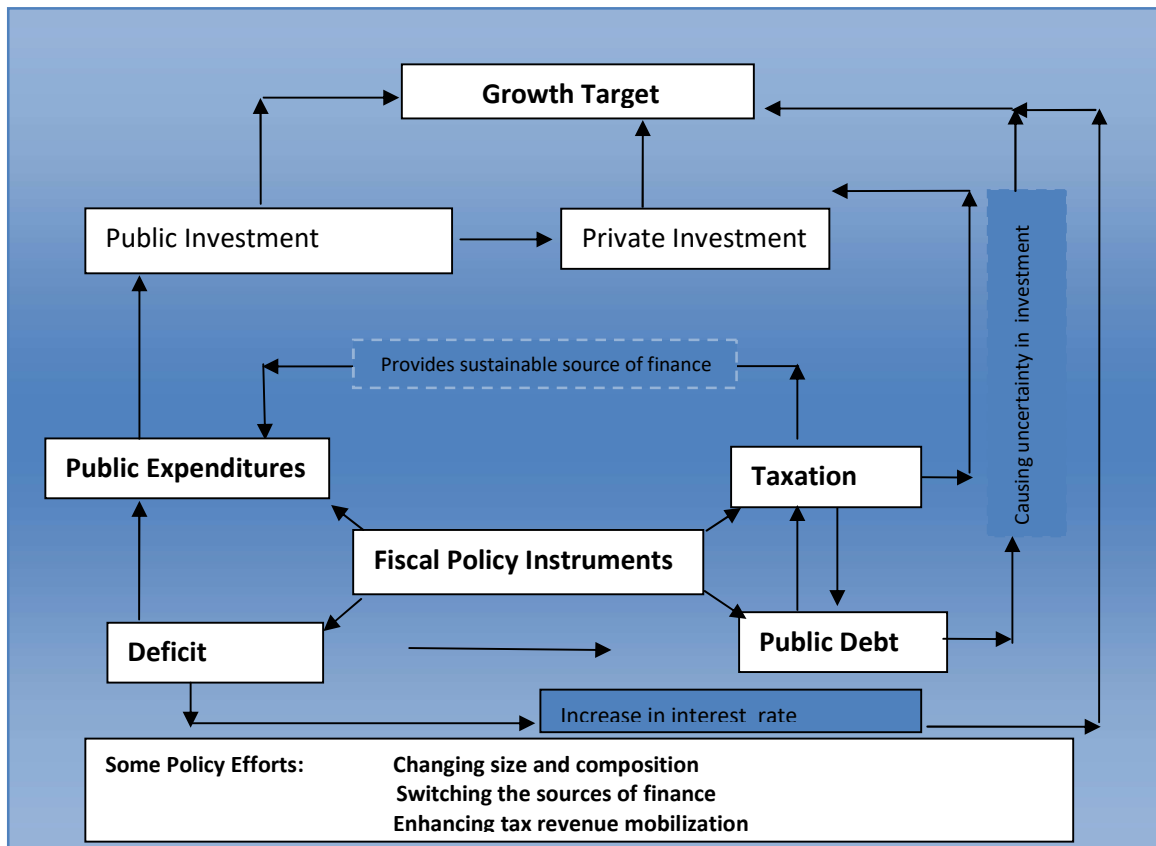
1.5 Key Concepts on Fiscal Policy and Growth

By changing the fiscal instruments such as government expenditure, taxation, deficit and public debt stock, the government can change overall output growth in the economy. This is the basic concept of fiscal policy and growth nexus. Government expenditure is a crucial element of fiscal policy by which the demand and supply side of the economy are changed. Two key points in this aspect are "In which sectors the spending has been made and what type of sources are mobilized to finance the public expenditures". The Keynesian view suggests that government purchases of goods and services increases the aggregate demand by stimulating private consumption. This ultimately leads to higher output growth. But recently the economists such as Barro (1990) and others show that productive expenditures (for e.g. expenditures on health, education, infrastructures, and energy) financed by non-distortinoary taxes (for e.g. taxes on goods and services) yield positive results on growth. In contrast, unproductive expenditures, financed by distortionary taxation, retard economic growth.

The sources of finance as well as the composition of expenditures are very important factors in fiscal policy analysis. Public investment expenditure in education enhances the factor productivity while public investment on infrastructure enhances the productivity of private capital, which in turn may increase the output growth if sources of finance are non-distortionary. But there may be the possibility of crowding-out effect on private investment due to high taxation or domestic government borrowing. When government uses large domestic borrowing to finance public spending, interest rate in the market rises and at this high interest rate, private sectors do not show incentives to invest. This may cause reduction on net investment and hence the output growth.

The growing demands for public spending in developing countries have to be compensated by higher taxation ultimately. But, higher taxation creates excess burden to private sector, which in turn reduces the private investment. On the other hand, lower taxation creates a huge fiscal gap, accumulating high debt stock. When the government faces high debt problem, further borrowing is difficult because the lender does not believe easily and have to pay more interests and even the borrowing becomes uncertain. So this makes the public investment costly and even uncertain which ultimately retards growth. Hence, the government has to make effort by observing the fiscal situation while switching the source of finance. Figure 1.4 shows a representative diagram to explain this fiscal channel.

Figure 1.5: Growth channel of fiscal policy



1.6 Structure of the Dissertation

We design five chapters to elaborate the contents of the dissertation. The first chapter introduces the basic idea about the background and burning issues related to growth literature. This chapter provides the overview of fiscal practices and conceptual framework on fiscal policy. Chapters 2, 3 and 4 are the main body of the research, which are independent but interrelated to each other. Chapter 5 concludes the overall findings of the research and provides further issues to be analyzed as a future research work.

In chapter 2, we examine the growth effect of the size of government expenditure and tax revenue and their various components. Both the fiscal size and composition are equally important to analyze growth. However, Most of the previous studies focus either the size or composition. Hence, we focus both aspects of fiscal policy at the same time. In the previous research, some components of expenditures are categorized as productive and for others non-productive. Similarly, tax revenues are also categorized into distortionary and non-distortionary. These kinds of classification are unclear and some time tends to be redundant;

heterogeneity nature of fiscal variables leads to unequal and opposite impact on growth. Thus, we treat each fiscal components as a single independent variable. We use descriptive as well as regression technique such as Fixed Effects and Generalized Method of Moments. Chapter 3 analyzes the direct and indirect impact of fiscal instruments on growth in a framework of simultaneous equations model. This chapter analyzes the indirect effects of fiscal policy on growth through investment channel. Fiscal variables, indeed, interact to each other and create simultaneity problem in estimation. This issue is largely ignored in the fiscal policy-growth literature. Similarly, in chapter 4 we observe the factors that characterize the tax revenue. The main aim of this chapter is to find the ways in which government can enhance the tax performance.

In the last chapter, we generalize the findings of the whole chapters and introduce the policy implications. This chapter also explains the limitations pertaining to the study. Finally, we recommend the direction of further research on which some researchers can turn on their eyes to enlarge the knowledge.

1.7 Chapter Summary and Remarks

This research tries to find out the answer of the research questions- Are fiscal instruments working productively in Asian economies? And how can the governments enhance their tax effort? The advancement of theory in the growth literature provides a clear insight on how fiscal policy affects long term growth, however, the empirical findings lack the consistency across the studies. Many studies ignore the key aspects of econometric issues while estimating the equations, which lead to biased results. Similarly, most of the studies focus on developed countries, very few studies are available which concentrate on low-income countries of Asia.

Asian countries have a quite low level of taxation. Over the recent two decades, there is no significant improvement on this. Higher level of taxation would provide a sustainable source of finance for public investment and also would be worthy in reducing public debt. Hence, finding the ways to enhance tax revenue is one of the important issues in fiscal policy. Beside this issue, we focus on the ways through which fiscal policy works productively. We hope that the findings of this research help in strengthening the perception we take on fiscal policy and growth nexus, and also hope that this will have important implications on fiscal policy reform.

Appendix 1

Appendix-1A Fiscal Status and Growth in 34 Asian Countries in 2012

Countries	Per capita Growth (%)	GDP per capita (US\$)	Expenditure (% of GDP)	Tax revenue (% of GDP)	Public Debt (% of GDP)	Deficit (% of GDP)
Afghanistan	11.62	416.87	25.02	7.65		-0.18
Bangladesh	4.97	597.02	16.34	10.50	38.7	1.20
Bhutan	7.61	2060.6	36.47	15.00	56.9	1.25
Cambodia	5.39	671.63	20.70	11.60	28.8	3.25
China	7.27	3348.0	24.83		26.1	2.19
India	3.42	1123.2	26.86	10.65	66.7	3.06
Iran	-3.18	3208.8	15.29	5.52	9.5	0.25
Indonesia	4.90	1731.6	19.72	11.30	24.5	1.66
Jordan	0.42	2838.5	31.24	15.25	79.6	8.22
Kuwait	2.07	29728.6	36.00	0.703	6.4	-25.69
Yemen	-2.16	778.34	36.60	7.035	47.8	6.37
Laos	6.17	707.40	14.50	15.72	51.4	0.69
Malaysia	3.90	6786.19	29.46	16.11	55.5	1.76
Maldives	1.43	4968.35	40.56	19.70	81.3	9.30
Mongolia	10.58	1629.6	46.33	18.32	56.3	5.89
Myanmar			27.15	3.80	48.0	3.84
Nepal	3.63	398.77	19.19	13.78	33.6	0.62
Oman		13884.5	43.12	2.55	6.0	-3.27
Pakistan	2.27	772.89	21.53	10.07	63.8	3.96
Philippines	4.98	1501.07	18.91	12.88	41.9	-1.96
Vietnam	4.14	986.01	27.64	20.50	51.3	4.78
Sri Lanka	9.24	1884.2	19.68	11.98	79.1	1.06
Thailand	6.15	3352.5	24.87	16.86	43.4	0.92
Iraq	6.54	2472.2	43.28	1.03		-4.13
Lebanon	0.43	7079.1	31.29	16.18		8.73
Qatar	-0.99	60246.9	30.58	8.48		-9.48
South Korea	1.58	21562.3	22.38	15.93	35.0	-1.78
Singapore	-1.13	34517.5	14.10	14.49	111.4	-8.69
Bahrain	1.43	16765.5	29.94	0.99	33.6	1.88
Israel	1.46	23091.4	40.27	22.09	68.2	1.49
Brunei	0.73	24947.1	34.82	35.36	2.4	-16.85
Saudi Arabia	3.17	17591.3	35.65	1.23	3.7	-14.45
UAE	1.18	24077.7	21.76	0.36	16.5	-11.34
Syria						

Source: WDI, World Bank and GFS, IMF.

Appendix -1B: A brief summary of theoretical contribution*

Literature	Main contribution/findings
Solow (1956)-Swan (1956)	Growth is exogenously determined; technological progress and population dynamics are the exogenous factor.
Romer (1986)	Endogenized the technological change through the accumulation of knowledge. Increasing returns to scale and externalities are the key factors which generate the growth path.
Lucas (1990)	Extended the endogenous growth model by introducing human capital accumulation
Jones and Manuelli (1990)	Tax changes would have long-run impact on the equilibrium and growth rate
Barro (1990)	Used government expenditure as an input in the production function. Productive government expenditures financed by non-distortionary taxation enhance growth.
King and Rebelo (1990)	Public policy, especially taxation, exhibits substantial effect on long-run growth.
Barro and Sala-i-Martin (1992)	Dealt with the role of tax policy in various models of endogenous growth. Tax policy stimulates the investment and growth when the social rate of returns to investments goes above the private return.
Golmm and Ravikumar (1994, 1997)	Extended the model in various forms of Endogenous growth.
Aghion and Hoiwtt (1992), Jones (1995) and Romer (1990)	Developed research and development (R & D) based growth model in which technological progress is possible by the investment in research and Development.
Deverajan et al. (1996).	Developed the model in which composition of public spending matters for growth.
Turnovasky (1999)	Explored the relationship between the size of government, economic growth, and volatility in a open economy.
Aizman (2007)	Analyzed the equilibrium growth under considering the constraints of tax revenue and debt.

*There are large numbers of theoretical contribution in the endogenous growth literature. Only a couple of representative works have been noted.

Chapter 2

Role of Fiscal Size and Composition on Economic Growth in Asian Economies

2.1 Introduction

Achieving higher and sustained economic growth is an important objective for both developed and developing nations. To meet this objective, fiscal policy has long been in practice, although there has been considerable debate over its effectiveness. A number of studies have explored whether a larger or a smaller government enhances economic growth. However, empirical findings have often been inconclusive and conflicting. Recently, the fiscal debate raised in explaining growth has been to examine the effect of fiscal composition rather than the size of the government. Previous works in this literature are empirically less clear and they extensively focus on fiscal size rather than composition. The results of the compositional effect of government expenditures are quite inconsistent, especially for the developing countries. In fact, traditional ideas regarding the link between the composition of public expenditures and economic growth is not borne out by the experiences of developing countries (Devarajan et al., 1996). A few studies recently have dealt with fiscal composition using improved econometric techniques. However, the joint effects of fiscal size and composition have been largely ignored, and the coverage lags far behind, especially in the case of developing countries in Asia.

The fiscal scenarios of Asian countries are quite different from those of the other regions of the world. The shares of government expenditure and the tax revenue in GDP are comparatively lower. They account for 27.2 percent and 11.4 percent, respectively. This region is experiencing an average annual growth of 3.16 percent. Since 1991, high-income countries have been able to increase the tax size steadily. However, low- and middle-income countries still have a problem to raise it. Public expenditures in high-income countries have been decreasing, while they have remained constant in low- and middle-income countries. With regard to the composition of tax, goods and services tax accounts for the highest proportion, with 4.68 percent of GDP; the payroll and workforce taxes account for the smallest proportion, with 0.1 percent of GDP. Similarly, general public service expenditures account for the highest proportion followed by general economic affairs-expenditures. Their

shares in GDP are 7.09 and 4.24 percent, respectively. For the period of this study, it is clear that the tax revenue from international trade and the defense expenditures have continuously decreased. In such a context, selecting an optimal fiscal size and composition that fosters economic growth has been a prime concern for developing countries in recent times.

There are a number of motivations for this study. First, the existing studies in this field are highly concentrated on Organization for Economic Co-operation and Development (OECD) or developed countries. Although a few remarkable studies are available which focus on developing countries, Asian economies, particularly low-income countries in Asia, have been largely unexamined. Second, researches of pre-1990s were prone to the misspecification of the growth model and they failed to recognize government budget constraints. Recent methodological developments in this area have addressed this issue (Gemmell and Au, 2012). However, they are still not enough to deal with the institutional effect simultaneously. Third, both fiscal size and composition are equally important for the desired growth, but this issue has been largely ignored in the existing studies. Researchers have focused on either size or composition. Fourth, a number of previous studies categorized expenditures into productive and unproductive, and derived their conclusion. However, we argue that various components of government expenditures are heterogeneous in nature and spending in various sectors leads to distinct productivity based on country-specific characteristics and institutional quality.

Hence, we try to shed light on the existing literature by investigating the link between fiscal size and composition and growth. Besides this, we point out the growth performance of the countries under the existing tax regimes and spending, which offers clear ideas for the implementation of fiscal policy. It also aims to fulfill the methodological gaps and the research vacuum in Asian countries.

2.2 Review of Literature

Two kinds of theoretical models, referred to as exogenous and endogenous, are typically used in theory to explain the growth of an economy. Exogenous models advocate that population dynamics and technological progress determine the long-run growth path of the economy and that fiscal policy is only helpful to reach the output level. In contrast, endogenous- growth models advocate that transitional effects of fiscal policy are responsible for growth, causing

to the permanent effect, meaning that fiscal policy has a long term effect on growth (Romer, 1986; Barro, 1990; Rebelo, 1991; Golmm and Ravikumar, 1994).

To recognize the recent developments with regard to this literature, it is important to note the research overview provided by Gemmell (2004). Based on the specifications of econometric model and its robustness, he grouped the existing studies into first-, second-, and third-generation studies. He explained that First-generation studies (approximately pre-1990) were generally theoretically ambiguous, and the empirical methods they used were generally cross-sectional in nature; regression models were poorly specified, and the results, were not robust. Second-generation empirical studies (mainly during the 1990s) came with the emergence of endogenous growth theory and refinements of the neoclassical model. Barro (1990), King and Rebelo (1990), and others provided clearer theoretical foundations, however, as noted by Kneller et al. (1999), empirical literature failed to account government budget constraints (GBC) properly. Third-generation studies (roughly post-2000) used panel or time series rather than cross-section data and also recognized the implications of testing the GBC; this allowed for potential growth differences from the government expenditures or taxation. Gemmell and Au (2012) reported that the results from these models appear to be more robust than those suggested by earlier approaches.

The results from previous studies vary largely. Nijkamp and Poot (2004) carried out a robust analysis and found that of the 41 studies, 29 percent concluded that higher government spending hampered growth, 17 percent found that it supported growth and 54 percent determined that it was inconclusive. Contrary to these findings, some researchers (Tanzi and Zee, 1997; Chen and Lee, 2005; Gray et al., 2007) argued that there exists a threshold link between the size of government and growth. Some early papers, such as Landau (1986), Barro (1991), Engen and Skinner (1992), and Devarajan et al. (1996), argued that bigger government was negatively related to growth. However, Slemrod (1995, 1998), and Agell et al. (1999) found no stable negative correlation between the size of government and economic growth, while Atkinson (1995) found inclusive findings.

Kneller et al. (1999) advanced the empirical model by specifying a growth model. They specified growth model with the recognition of GBC and calibrated government spending into productive and unproductive; and grouped taxation into distortionary and non-distortionary. Their results from OECD countries showed that distortionary taxation reduced

growth, while non-distortionary taxation did not; and productive government expenditure enhanced growth, while non-productive reduced it. This was supported by many other studies later. Easterly and Rebelo (1993) found that spending on transport and communication was productive, but the effect of taxation was difficult to identify. However, the same components of government expenditures or tax revenue were found to be insignificant in some studies while showing up as significant in others. The significance of the observed relationship between different fiscal components and growth is found to be quite random. The reason behind this randomness is due to the differed methodology they used and varied sample groups made across the studies.

Among the recent studies, Afonso and Jalles (2011) is a more comprehensive research, which is based on the data set of a large panel of developed and developing countries. This study found that government expenditure was negatively associated with growth, whereas revenue had no significant effect on growth. The results showed that education and health spending favored growth, whereas social spending was detrimental to growth. Similarly, Gemmell et al. (2014) examined OECD countries and found that infrastructure and education spending enhanced growth, but social welfare spending reduced the GDP level. Afonso and Furceri (2008) examined from the sample of 44 developing countries and found that human capital spending was associated with higher growth in Africa and agriculture and education spending were linked with higher growth in Asia.

Similarly, Benos (2009) examined the evidence from a small sample (14 EU countries) and found that public expenditures on infrastructure enhances growth; however, spending on education, health, housing-community amenities, environmental protection, recreation and culture had no significant effect on growth. He also explored that distortionary taxation had a negative effect on growth. In contrast, Ormaechea and Morozumi (2013) studied the data from 56 countries and found that the composition of expenditure did not have a robust effect on growth. However, reallocation involving a rise in education expenditures compensated by a reduction in social protection spending had a positive and statistically robust effect on growth. Christie and Rioja (2011) claimed that the initial fiscal condition and composition was important for the long-run growth. Their results revealed that for the countries with an already low share of tax revenue, public investments financed by an increase in tax gave a positive result, but if tax share was already high, only suitable adjustment in the composition of public expenditures yielded growth.

The scant research on Asian economies includes a study by Abdullah et al. (2009), who looked at 13 Asian countries and found that health and education expenditure have positive and statistically significant impact on real per capita GDP, whereas defense expenditures, and distortionary taxation had a significantly negative impact on real per capita GDP. Abdon et al. (2014) also showed that the composition of tax and expenditure mattered to growth in developing Asia. The results revealed that property taxes and education expenditures induced growth. A brief summary of literature review on this topic has been shown in Appendix-2E.

There is no consensus regarding the effect of individual fiscal components. Theory and some empirical works show that productive expenditures enhance growth and unproductive do not. The same holds true for non-distortionary and distortionary taxation. While we attempt to examine the effect of individual fiscal components from the past studies, generalization of the results becomes more difficult. Hence, this research tries to strengthen the existing ideas regarding the link between fiscal size and composition and growth and fills the research gap in the Asian region, especially in low- and middle-income countries.

2.3 Empirical Model

Our growth model incorporates the core ideas of neoclassical and endogenous growth models. Both models accept the production technology as a function of labor and capital ($Y = f(K, L)$). In addition, endogenous growth model includes government expenditure as an additional input into the production function, defining growth as a result of capital accumulation for which fiscal policy plays a great role (e.g. see Barro, 1990). Lucas (1988) emphasize that investment in human capital increases factor productivity and hence the growth. Levine and Renelt (1992), checked the robustness of the variables used in the standard growth regression and found that initial per capita income, investment, population growth and primary/ secondary enrollment are the robust variables for growth regression. Subsequently, Sala-i-Martin (1997) checked the robustness of the research and found that 59 variables were correlated with growth, favoring the results of Levine and Renelt (1992).

Hence, following the previous empirical studies such as Landau (1986), Barro (1991), Kneller et al. (1999) and Benos (2009), we can define a growth model which contains both fiscal and non-fiscal variables. Importantly, Kneller et al. (1999) point out that growth model suffers from the specification bias, raising the issue to address GBC. A growth regression

should include the expenditure as well as financing side, which means that taxation and other income sources should be included. However, to avoid perfect multicollinearity, one component of the government budget should be omitted. Hence we specify the model as follows:

$$g_{it} = \alpha + \sum_{i=1}^k \beta_i X_{it} + \sum_{j=1}^{m-1} \lambda_j Y_{jt} + u_{it} \dots\dots\dots(1)$$

where g_{it} is growth of GDP per capita (output) of country i at time t . X_{it} is the vector of non-fiscal variables and Y_{jt} is the vector of fiscal variables, and u_{it} is the disturbance term. β and λ s are the corresponding coefficients. The m^{th} variable of Y_{jt} is assumed to be omitted to avoid the perfect multicollinearity problem. We consider equation (1) only for measuring the effect of size of government expenditure and tax revenue.

Moreover, Devarajan et al. (1996) show that fiscal composition also matters on growth. However, he only admits the composition of government expenditure. Considering the GBC, we expand the model by introducing the composition of tax revenue as well.

$$g_{it} = \alpha + \sum_{i=1}^k \beta_i X_{it} + \sum_{j=1}^{m-1} \lambda_j Y_{jt} + \sum_{l=1}^n \Phi_l Z_{lt} + u_{it} \dots\dots\dots(2)$$

where Z_{lt} is the vector of fiscal composition and Φ s represent the corresponding coefficients. The composition is based on the functional classification of Government Finance Statistics (GFS) of International Monetary Fund (IMF). Equation (2) measures the effects of fiscal sizes as well as their compositions. Many of the previous studies ignore the fact that fiscal size and fiscal composition matter simultaneously.

We fix the explanatory variables based on the research gaps underlying in the existing studies. The proxy for labor is labor force participation (labor_force) and that of physical capital is capital formation or investment. Since per capita growth is also dependent on human capital, education is taken as a proxy with an important difference. Mostly the previous studies took the literacy rate, primary school enrollment or secondary school enrollment as a proxy for education. It is because of the situation of the data they used, generally the period of the 1960s-1990s. However, the increasing importance of tertiary education in present should not be underestimated in this competitive world. Hence, we take tertiary education as a proxy for education.

In developing countries, foreign direct investments also play an important role in development (Dabour, 2000). They not only provide necessary investments, but also reflect the stability of politics and policy. Similarly, trade openness, inflation and government effectiveness play important roles in determining factor productivity. Trade openness and government effectiveness are expected to have positive impact on growth while inflation has negative impact. The total government expenditure and tax revenue are the fiscal variables of interest. We estimate the equations (1) and (2) to capture the effects of both fiscal size and composition. (The details of the variables are given in Appendix-2A.)

We use fixed effects regression (FE) and generalized method of moments (GMM) to estimate regression equation. Our data covers of relatively short periods and we assume that time-invariant fixed factor affects each country's economy. Hence, we prefer to use FE. However, to avoid possible cross-sectional dependence and econometric problems, such as heteroscedasticity and autocorrelation, we report the p- value associated with robust standard error, as developed by Driscoll-Kraay (1998).² To reduce the bias in estimation caused due to the use of lagged term of the independent variable (initial per capita GDP- initial gdp_pc) and potential endogeneity problem, we use Arellano and Bond's difference GMM as an alternative method of estimation.

2.4 Data Analysis

2.4.1 Data

We use annual data from 34 Asian countries (Appendix-2B) for the period 1991 to 2012. Most of the data are taken from World Bank Indicator- 2014 and some are taken from World Economic Outlook 2014, IMF. Tax revenue and Total government expenditure are measured in terms of percentage of GDP. Decomposed variables of government expenditure and tax revenue are taken from GFS, IMF. The classification of tax revenue and expenditure is based on the functional classification of GFS (2001), IMF. To account the fiscal composition, all expenditures and tax revenue variables are measured in terms of the percentage of total expenditures and total taxes, respectively. The government effectiveness indicator covers the

² This method applies non-parametric covariance matrix estimation techniques that yield robust standard errors. It is free from the problem of cross-sectional dependence as well as heteroscedasticity and autocorrelation.

data from 1996.³ The variables under consideration are shown in Appendix-2A. We focus the data sample to the developing countries, especially for low- and middle-income countries in Asia. The data are analyzed by grouping it into low- and middle-income countries and high-income countries.⁴ Although many studies examined the five-year average, we do not because our data does not cover a long time period and averaging the data may significantly reduce the number of observations as well as lose the generality. The correlation matrix, as shown in appendix -2C, shows that there is no multicollinearity problem among the variables we used.

2.4.2 General Overview

The average per capita GDP growth in Asian countries has been 3.1 percent per annum. Looking at country-wise performance, we find that Bangladesh, India, Mongolia, and Myanmar showed improved performance after 2000, whereas the opposite is true for Korea and Bahrain. In the UAE, there has been almost negative performance of growth every year. China has shown very good growth performance over the study period.

The average share of expenditures in GDP for the period was 27.2 percent. Similarly, the average share of tax revenue in GDP was 11.4 percent; it was slightly higher in high-income countries and lower in low- and middle-income countries within Asian economies. The average expenditures in high-income countries were 33.1 percent and average expenditures in low- and middle-income countries were 26.1 percent. Similarly, average tax revenue in GDP was 13.9 percent in high-income countries and 11 percent in low- and middle-income countries.

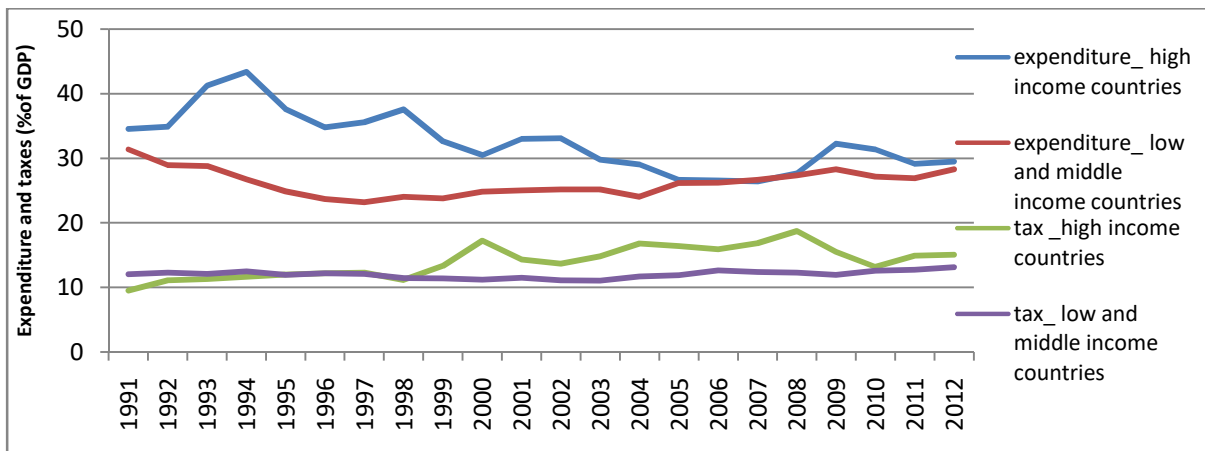
Figure 2.1 shows the general trend in expenditures and taxes for different income groups. In high-income countries, the size of government expenditure has declined, whereas tax revenue has increased rapidly. In low- and middle-income countries the size of the tax gradually

³ Government effectiveness is the indicator formed based on a number of surveys comprising a large number of respondents by Daniel Kaufmann, Aart Kraay and Massimo Mastruzzi to measure the perception of the quality of public services, the quality of civil services and the degree of its independence from political forces, the quality of public policy formulation and the credibility of the government's commitment and level of implementation.

⁴ Classification is done as of World Bank, 2015. Low-income countries are defined as those with a GNI per capita of \$1,045 or less in 2013; middle-income economies are those with a GNI per capita of more than \$1,045 but less than \$12,746; high-income economies are those with a GNI per capita of \$12,746 or more. Lower-middle-income and upper-middle-income economies are separated at a GNI per capita of \$4,125.

increased from 1991 to 2012. We find that government expenditure declined in the first half of the period and again increased in the second half of the period. The gap between expenditures and tax revenue was higher in high-income countries before 2000, but after 2000, it was higher in low- and middle-income countries. Thus, high-income countries have been stepping up their tax efforts and budget-balance effort faster than low- and middle-income countries. Tax-GDP ratio in low- and middle-income countries was almost constant over the period.

Figure 2.1: Trend in government expenditure and tax revenue



Source: Author's calculation based on the data taken from WDI, World Bank.

2.4.3 Graphical View: Fiscal Size and Growth

Figure 2 shows the general trend as well as the link between fiscal size and economic growth. We find a negative link between per capita GDP growth and the size of expenditures during the period under study. Their movements seem to be in opposite directions. However, in the case of tax revenue, we do not find any negative relationship. Instead, we see a positive correlation. If we compare the growth performance against the size of expenditure and tax revenue country-wise (see Figures 1.1 and 1.2), we find that countries with smaller size of government expenditure (average expenditures between 10 and 20 percent), have a higher growth performance (e.g.: China, Korea, Afghanistan, Myanmar, and India). Conversely, Arab countries show larger size of expenditures, but have lower growth rates.

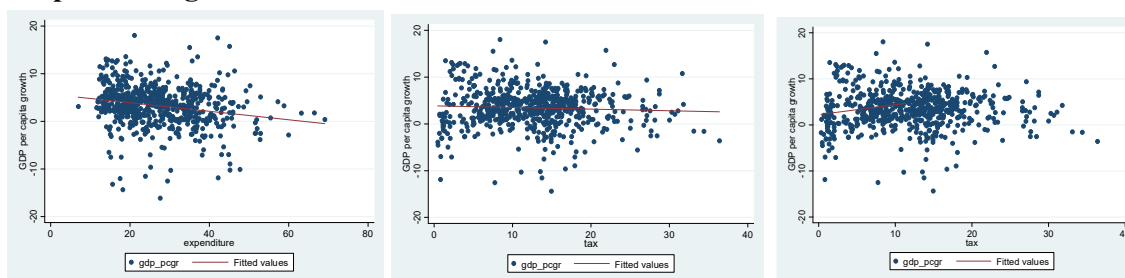
Figure 2.2: Trend in expenditure and tax revenue against per capita GDP growth



Source: Author's estimation based on the data taken from WDI and GFS.

To check whether these trends truly exist, we fit a scatter regression line as in Figure 3. First diagram shows a negative relationship between government expenditure and per capita GDP growth. Second diagram is the line for the relationship between tax revenue and growth, but we find no significant negative relationship. Now we limit the regression line for the tax revenue which is less than average as shown in the third diagram. Interestingly, for low level of taxes (less than average), it is found to be positively correlated with growth.

Figure 2.3: Correlation between government expenditure and tax revenue and per capita GDP growth

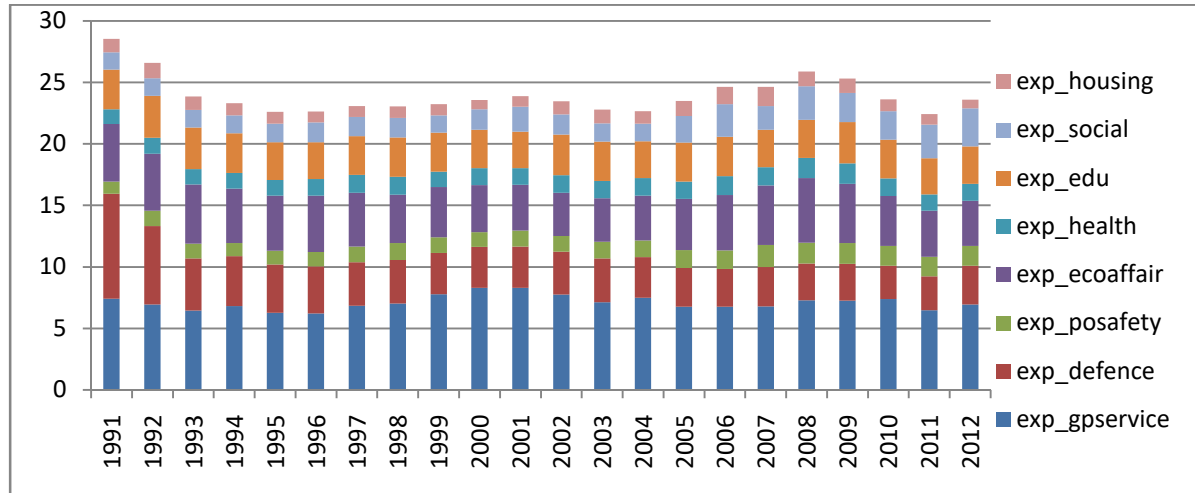


Source: Author's estimation based on the data taken from WDI and GFS.

2.4.4 Fiscal Composition and Trend

There was no significant change in the composition of public expenditures in Asian countries between 1991 and 2012. Figure 4 shows that expenditures on general public services account for the highest proportion of all. Defense expenditures also account for a large proportion. A significant change can be observed in the case of defense expenditure and social protection-expenditures. Defense expenditures decreased gradually from 1991 to 2012, whereas social protection-expenditures increased steadily. The total size of expenditure gradually decreased.

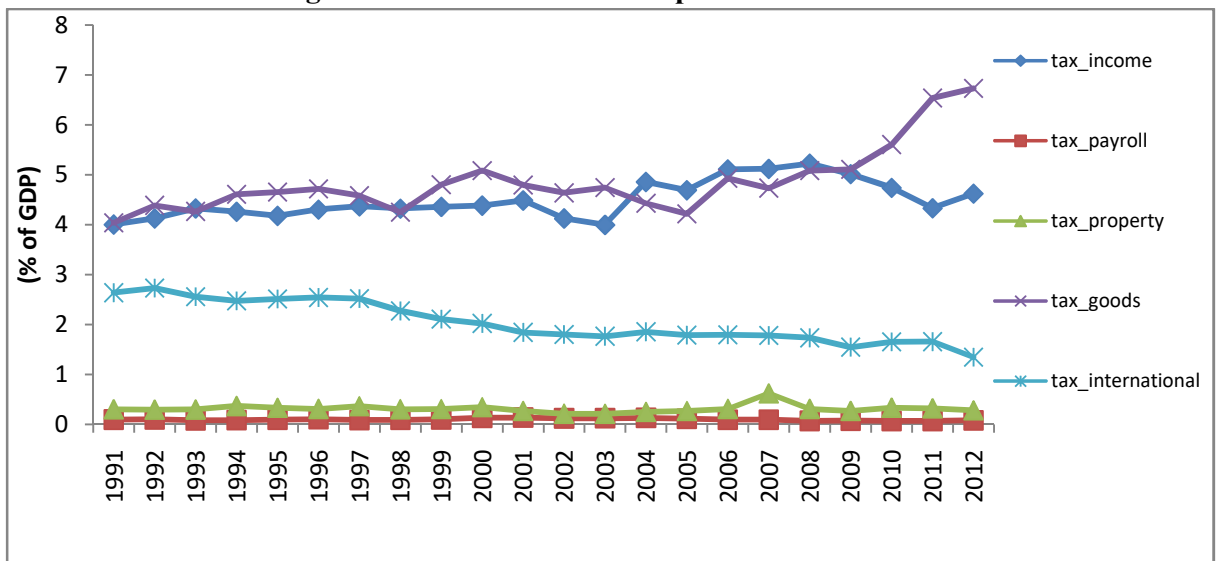
Figure 2.4: Composition and trend of government expenditure (% of GDP)



Source: Government Finance Statistics (GFS), IMF.

Turning to the composition of tax revenues (Figure 2.5), we find that the average share of taxes on goods and services in GDP accounts for the highest proportion of all taxes. In contrast, the payroll and workforce taxes account for the lowest proportion. From 1991 to 2012, there was a drastic increase in the goods and services taxes, but the taxes on international trade decreased significantly. Property taxes made no significant contribution to revenue.

Figure 2.5: Tax revenues: composition and trends



Source: Author's estimation based on the data taken from GFS, IMF

2.5 Empirical Results

We analyze the effects of fiscal size and composition at first separately and later jointly, using FE and GMM techniques. Table 2.1 reports the regression results, showing the effects of aggregate fiscal variables- government expenditure and tax revenue. Different control variables have been used in each specification to see whether the effect of public expenditure and tax revenue change.

In the final regression (specification 8), we observe that the variables suffer from heteroscedasticity and autocorrelation, indicating that P-value for both kinds of tests are significant. In addition, in cross-country analysis, macroeconomic variables are more likely to suffer from cross-sectional dependence causing estimation bias (Driscoll-Kraay, 1998). Hence, we report the fixed effects (within) regression results with Driscoll-Kraay's robust standard error. The Hausman test also suggests that the fixed effects model is suitable than random effects for our study.

Specifications 1 in table 2.1 includes only five regressors, namely initial per capita GDP, investment, population growth, government expenditure and tax revenue. From specification 2, we add other control variables one by one until reaching to the final specification 8. We find that the addition or omission of control variables does not affect the sign of government expenditure, which is constantly negative. However, tax revenue does not show any consistent result while changing the number variables. This variable is not significant in all specifications. To see the effect of total revenue instead of tax revenue, we specify the model with total revenue in equation 6. But total revenue also shows no significant relationship with growth.

As expected, we find that initial GDP per capita and population growth have a negative impact on growth while investments have a positive effect on growth. Similarly, foreign direct investments are also found to be positively associated with per capita growth. Inflation is found to be significant and negatively associated with growth. Other non-fiscal variables, such as labor force participation and trade openness are insignificant while education is also found to be positively associated with growth although it is not significant in all specifications. The proxy for the institutional variable, government effectiveness, which was largely ignored in previous studies, is also found to have a positive effect on growth. The result is robust across different specifications of the model as specified in Table 2.1.

Table 2.1: Regression results for measuring the effects of fiscal Size

Determinants	Dependent variable: GDP per capita growth							
	Specifications							
	1	2	3	4	5	6	7	8#
initial gdp_pc	-0.0002*** (-2.91)	-0.001*** (-2.98)	-0.001*** (-3.17)	-0.0005*** (-3.22)	-0.001** (-2.57)	-0.001** (-2.80)	-0.001** (-2.74)	-0.001*** (-4.37)
investment	0.15*** (3.01)	0.22*** (4.33)	0.21*** (4.29)	0.10** (2.20)	0.17** (2.75)	0.18*** (5.98)	0.19*** (5.13)	0.22*** (3.62)
popln_gr	-0.90*** (-3.25)	-0.99*** (-3.64)	-1.00*** (-3.36)	-0.81*** (-3.48)	-1.02*** (-3.36)	-1.01*** (-5.29)	-0.99*** (-4.68)	-0.97*** (-3.73)
exp_totl	-0.12*** (-3.28)	-0.12** (-2.67)	-0.13*** (-2.92)	-0.24*** (-3.65)	-0.17*** (-3.32)	-0.23*** (-5.14)	-0.23*** (-4.90)	-0.31*** (-6.57)
tax	0.06 (0.84)	-0.05 (-0.48)	-0.05 (-0.48)	0.02 (0.43)	0.01 (0.13)		-0.11 (-1.38)	-0.06 (-0.46)
education		0.14** (2.10)	0.16** (2.41)		0.13 (1.47)	0.06* (1.73)	0.08 (1.39)	0.03 (0.37)
trade_open			-0.01 (-0.80)	0.01 (1.06)	-0.01 (-0.74)	0.009 (2.03)	0.009 (0.53)	0.007 (0.32)
inflation				-0.09*** (-3.31)		0.07*** (2.39)	-0.07** (-2.59)	-0.12*** (4.63)
fdi				0.12** (2.35)	0.08 (1.18)	0.08* (1.78)	0.07 (1.23)	0.10 (1.43)
labor_force					0.17 (1.60)	0.04 (0.55)	0.006 (0.09)	0.03 (0.30)
gov_effectiveness								1.90*
revenue						-0.04 (-0.95)		(1.83)
No. of observations	496	346	341	471	335	331	331	216
R ²	0.28	0.40	0.41	0.39	0.42	0.53	0.53	0.55

Note: ***, **, and * indicate that variables are significant within the 1%, 5% and 10% levels, respectively. t statistics in the parentheses. # Modified Wald test for group-wise Heteroscedasticity: $\chi^2 = 950.34$, $\text{prob} > \chi^2 = 0.000$, Wooldridge test for autocorrelation in panel data: $F(1,26) = 5.59$, $\text{prob} > F = 0.027$

Initial GDP per capita has coefficient -0.001 in the final specification. Negative sign implies that there is a negative association between previous year's GDP per capita and economic growth. When GDP per capita of previous year increases by US \$ 100, per capita GDP growth rate decreases by 0.1 percent. The negative relationship between the initial GDP per capita and economic growth is due to conditional convergence of the economy, implying that countries which have higher initial GDP per capita experience lower growth in the future. It is due to the neoclassical perception that countries which have a lower capital labor ratio at starting point, leads to low per capita output, are expected to faster growth due to diminishing returns to investment. But the value of conditional convergence is found to be very low.

Our prime interest is to find the effects of the size of government spending and tax revenue on growth. The results show a significant negative correlation between the share of government expenditure in GDP and per capita growth, regardless of the control variables we used. However, we do not find any robust relationship between the tax revenue and growth. The correlation between them seems to be positive but is not significant in all specifications.

The coefficients of the government expenditure range from -0.12 to -0.31, which are significant within 1 percent level across all specifications. The negative sign implies that share of government expenditures in GDP (size of government) retards growth. The result shows that when the share of government expenditures in GDP increases by 1 percentage point, the per capita GDP growth reduces by 0.12 to 0.31 percent. Regarding the size of the tax revenue, we do not find any significant relationship with growth, which contradicts the majority of previous findings that advocate negative effect of taxation. One of the reasons for this may be due to the low level of taxation existing in the Asian economies. We replace the tax revenue by total revenue (in specification 6) but do not observe any significant relationship.

Keeping all other control variables the same as in the previous specification, we include aggregate fiscal variables and their compositional elements as shown in Table 2.2. This model accounts for the fiscal size as well as fiscal composition at the same time. Here, we include the composition of expenditure in terms of the percentage of the total size of the expenditure and the composition of tax revenue in terms of the percentage of the total tax revenue. Specifications 1 and 2 show the regression results, omitting tax-composition and expenditure-composition, respectively, but specification 3 includes all compositional elements without government effectiveness. Similarly, specification 4 contains all variables with government effectiveness. The effects of public spending and tax revenue remain the same as in previous models.

Table 2.2: Regression results for measuring the effects of fiscal size and composition

Estimation Method: Fixed Effects				
Dependent Variable: GDP per capita growth				
Specifications				
Determinants	1	2	3	4
initial_gdp_pc	-0.001*** (-5.09)	-0.001*** (-3.73)	-0.001*** (-4.77)	-0.001*** (-6.55)
investment	0.21*** (3.19)	0.20*** (3.80)	0.24*** (3.21)	0.34*** (3.46)
popln_gr	-0.99*** (-5.22)	-0.90*** (-4.89)	-0.94*** (-5.24)	-0.96*** (-5.92)
fdi	0.10 (1.35)	0.09 (1.38)	0.13** (2.08)	0.10** (2.25)
Inflation	-0.09** (-2.25)	-0.07** (-2.05)	-0.09** (-2.30)	-0.18*** (-6.32)
trade_open	0.02 (0.82)	0.02 (1.05)	-0.005 (-0.27)	0.009 (0.40)
education	0.18*** (3.00)	0.06 (1.11)	0.20*** (3.85)	0.21*** (6.67)
labor_force	-0.02 (-0.16)	-0.14 (-1.81)	-0.11 (-1.16)	-0.14 (-1.32)
exp_totl	-0.36*** (-4.47)	-0.30*** (-3.93)	-0.41*** (-5.23)	-0.70*** (-8.31)
tax	-0.08 (-0.60)	-0.16 (-1.58)	-0.18 (-1.47)	-0.01 (-0.08)
gov_effectiveness				1.73* (1.75)
comp_tax_income		0.009 (0.24)	-0.005 (0.07)	0.05 (0.56)
comp_tax_payroll		-0.16*** (-2.98)	-0.19** (-2.73)	-0.11 (-1.01)
comp_tax_property		0.13** (2.11)	0.25** (2.40)	0.34*** (3.76)
comp_tax_goods		0.005 (0.16)	-0.02 (-0.49)	0.02 (0.22)
comp_tax_international		0.02 (0.64)	-0.004 (-0.09)	0.02 (0.26)
comp_exp_gpsservice	0.10** (2.26)		0.06 (1.41)	0.10 (1.39)
comp_exp_defense	-0.05 (-0.83)		-0.09 (-1.15)	-0.07 (-0.77)
comp_exp_posafety	0.0008 (0.01)		-0.11 (-0.63)	-0.66*** (-4.86)
comp_exp_ecoaffair	0.09 (1.68)		0.04 (0.67)	0.04 (0.60)
comp_exp_housing	0.21*** (3.43)		0.21*** (3.65)	0.24** (2.07)
comp_exp_health	-0.31** (-2.63)		-0.37** (-2.42)	-0.04 (-0.34)
comp_exp_edu	-0.01 (-0.15)		-0.05 (-0.64)	-0.13** (-2.08)
comp_exp_social	0.01 (0.25)		-0.02 (-0.38)	-0.04 (-0.71)
No. of observations	254	303	254	176
R ²	0.63	0.58	0.65	0.63

Note: ***, **, and * indicate that variables are significant within the 1%, 5% and 10% levels, respectively. t-statistics in the parentheses.

Initial per capita GDP, population growth, investment and government effectiveness all are robust and significant across all specifications. While the first two variables have negative effect on growth, the latter two have a positive effect. Similarly, the total expenditures have a significant negative relationship with growth. The coefficient ranges from -0.30 to -0.70. However, the total tax revenue has no significant relationship, although it shows a negative correlation. The composition of property tax is positively related to growth and is significant in all specifications. Similarly, the compositions of health, education, and housing and amenities expenditures also have a significant effect on growth. Health and education expenditures have a negative effect, although they are not robust in all specifications. But, housing and amenities expenditures show a significant positive effect on growth.

Furthermore, we check the results using Arellano-Bond's difference GMM which is shown in Table 2.3. This estimation technique is more efficient in the presence of econometric problems like heteroscedasticity, autocorrelation and endogeneity. Investment and government expenditure are suspected to have endogenous effect on growth in our specification. Specification 1 shows the results without the tax compositions. Specifications 2 and 3 show the results with all compositions without and with government effectiveness, respectively. We find that all control variables have expected sign. Government expenditure clearly shows negative correlation with growth, but tax revenue shows a significant positive correlation in specification 1 and remains insignificant in others. Results indicate that composition of property taxes and composition of housing expenditures show positive effect on growth, while composition of education expenditures shows negative effect. However, composition of health expenditures shows no significant effect. Similarly, we find that the inclusion of government effectiveness (in specification 3) removes the significance of expenditure compositions. Overall, the results from GMM are not different from FE regressions, and interpretation remains the same.

Table 2.3: Regression results using GMM

Determinants	Dependent variable: GDP per capita growth		
	Specifications		
	1	2	3
initial_gdp_pc	-0.002*** (-4.18)	-0.002*** (-5.86)	-0.001*** (-3.41)
investment	0.27*** (2.60)	0.36*** (3.89)	0.12 (0.93)
popln_gr	-0.65*** (-3.01)	-0.79*** (-4.74)	-1.24*** (-6.17)
fdi	0.29** (2.32)	0.15 (1.06)	0.25 (1.52)
Inflation	-0.10*** (-3.15)	-0.11** (-3.84)	0.01 (0.33)
trade_open	-0.006 (-0.38)	-0.005 (-0.27)	0.03 (1.10)
Education	0.26*** (2.95)	0.27*** (4.99)	0.15*** (2.15)
labor_force	-0.14 (-1.81)	0.13 (0.99)	-0.20 (-1.10)
exp_totl	-0.55*** (-5.28)	-0.62*** (-5.77)	-0.62* (-5.89)
tax	0.27** (2.02)	-0.05 (-0.43)	-0.03 (-0.18)
comp_tax_income		0.01 (0.22)	-0.04** (-2.26)
comp_tax_payroll		-0.29** (-2.11)	-0.20 (-1.46)
comp_tax_property		0.44** (2.09)	0.45** (2.26)
comp_tax_goods		-0.02 (-0.55)	0.02 (0.37)
comp_tax_international		-0.008 (-0.16)	0.001 (0.06)
comp_exp_gpservice	-0.07 (-0.77)	0.12 (1.15)	0.10 (1.39)
comp_exp_defense	-0.17 (-1.63)	0.07 (-1.15)	-0.01 (-0.09)
comp_exp_posafety	-0.33* (-1.75)	-0.56*** (-3.10)	-0.35 (-1.28)
comp_exp_ecoaffair	-0.04 (-0.57)	0.09 (1.02)	0.07 (0.68)
comp_exp_housing	0.28*** (2.38)	0.34*** (2.88)	0.26 (1.64)
comp_exp_health	-0.03 (-0.17)	0.12 (0.05)	0.03 (-0.17)
comp_exp_edu	-0.24*** (-3.55)	-0.14*** (-3.02)	-0.05 (-0.89)
comp_exp_social	-0.02* (-1.92)	0.01 (0.09)	-0.05 (-0.43)
gov_effectiveness			0.39 (0.15)
No. of observations	166	200	210
AR (1)	0.02	0.01	0.01
AR (2)	0.31	0.13	0.33
Sargan P-value	0.24	0.10	0.65

Note: ***, **, and * indicate that variables are significant within the 1%, 5% and 10% levels, respectively. Values in the brackets are corresponding z-statistics. AR (1) and AR (2) are the Arellano-Bond test for autocorrelation at the first and second orders, respectively. Sargan test is for the over-identifying restrictions, which tests the overall validity of the instrument.

2.5.1 Robustness Check

To check the robustness and thus to explore possible explanations for the results, we test the results in low-and middle-income countries in Table 2.4. Additionally, we run the regressions in non-OPEC and highly taxed countries (tax level more than average).⁵ OPEC countries in general have considerably low level of taxation and we assume that whether this may affect the overall results. We apply both FE and GMM regression techniques. The variable government effectiveness has the data only after 1996 but other data are available from 1991. So, to increase the number of observations, we omit this variable in these sub-samples. We find that the results obtained from the full sample are similar to that of low- and middle-income countries, and non-OPEC countries.

Table 2.4 shows that the share of government expenditures in GDP is found to be negatively correlated with growth as in previous specifications. However, tax revenue does not show any significant relationship with growth. We find that the composition of education expenditure is more robust than health expenditure. Similarly, the composition of payroll and work force tax is robust and negatively correlated with growth in both low- and middle-income and non-OPEC countries. The coefficient of property tax is significantly positive only in non-OPEC countries. But the results are not necessarily robust in the case of highly taxed countries. The effects of other control variables are also in the expected directions. Overall judgment indicates that the direction of the impact of fiscal variables does not change.

⁵ Because of low number of observations in high income as well as OPEC countries, we do not conduct the regression in these groups.

Table 2.4: Regression results in various sample groups

Determinants	Dependent variable: GDP per capita growth					
	Low-and middle- income countries		Non-OPEC countries		Tax>Average (11% of GDP)	
	FE	GMM	FE	GMM	FE	GMM
initial_gdp_pc	-0.003*** (-4.11)	-0.003*** (-4.81)	-0.001*** (-4.16)	-0.002*** (-4.34)	-0.003*** (-4.67)	-0.001*** (-5.33)
investment	0.31*** (4.21)	0.28*** (5.16)	0.26*** (3.02)	0.36** (3.32)	0.32*** (4.97)	0.45*** (4.82)
popln_gr	-0.56*** (-3.33)	-0.65** (-2.33)	-0.98*** (-3.16)	-0.64*** (-3.26)	-0.01 (-0.03)	-1.86*** (-4.53)
fdi	0.13* (1.75)	0.29*** (3.53)	0.13** (2.25)	0.16 (1.18)	0.18** (2.29)	0.28*** (3.95)
Inflation	-0.10** (-2.10)	-0.11*** (-4.92)	-0.10** (-2.10)	-0.12*** (-3.84)	-0.12** (-2.69)	-0.17*** (-9.97)
trade_open	0.01 (0.53)	-0.009 (-0.43)	0.01 (0.53)	-0.02 (-1.22)	-0.03 (-1.46)	-0.03** (-2.07)
education	0.25** (2.81)	0.29*** (3.83)	0.23*** (3.86)	0.33*** (4.50)	0.41*** (4.15)	0.29*** (4.60)
labor_force	-0.19** (-2.31)	-0.01 (-0.08)	-0.12 (-1.13)	0.11 (.86)	0.25 (0.96)	0.24 (0.75)
exp_totl	-0.48*** (-9.31)	-0.53*** (-5.92)	-0.39*** (-6.03)	-0.57*** (-5.28)	-0.73*** (-5.30)	-0.76*** (-8.67)
tax	-0.08 (-0.69)	0.29 (1.62)	-0.22 (-1.59)	0.04 (.26)	0.12 (0.98)	0.44 (1.62)
comp_tax_income	0.02 (0.44)	-0.03 (-0.46)	0.01 (0.16)	0.01 (0.09)	0.04 (0.49)	0.03 (0.23)
comp_tax_payroll	-0.32*** (-3.73)	-0.39** (-2.29)	-0.21** (-2.67)	-0.35** (-2.81)	-0.61 (-1.10)	-1.21 (-1.34)
comp_tax_property	0.19 (1.32)	0.03 (0.15)	0.30** (2.45)	0.54** (2.25)	0.59** (3.01)	0.12 (0.39)
comp_tax_goods	-0.05 (-1.51)	-0.07 (-0.91)	-0.03 (-0.85)	-0.03 (-0.60)	-0.05 (-0.78)	0.07 (0.61)
comp_tax_international	0.02 (0.82)	-0.03 (-0.32)	-0.01 (-0.26)	-0.01 (-0.10)	0.23*** (3.33)	0.54*** (5.34)
comp_exp_gpsservice	-0.05 (-0.82)	-0.08 (-0.89)	0.02 (-0.51)	0.05 (0.54)	-0.19** (-2.96)	-0.24* (-1.83)
comp_exp_defence	-0.20** (-2.26)	-0.17 (-1.25)	-0.10 (-1.09)	0.07 (0.61)	0.22 (-1.47)	-0.39 (-0.60)
comp_posafety	-0.59*** (-3.28)	-0.17 (-1.25)	-0.14 (-0.83)	-0.49** (-2.29)	-0.24 (-0.75)	-0.44 (-1.04)
comp_exp_ecoaffair	-0.07 (-0.83)	-0.05 (-0.67)	-0.01 (-0.22)	-0.01 (-0.09)	-0.29*** (-3.33)	-0.45** (-2.88)
comp_exp_housing	0.18** (2.64)	0.20 (1.11)	0.18** (2.64)	0.23* (1.88)	-0.02 (-0.23)	-0.21 (-1.01)
comp_exp_health	-0.28 (-1.26)	-0.05 (-0.22)	-0.36* (-0.64)	-0.19 (-0.82)	-0.50 (-1.67)	-0.33 (-1.11)
comp_exp_edu	-0.27*** (-3.67)	-0.25*** (-3.01)	-0.11 (-1.17)	-0.22*** (-3.62)	-0.85*** (-5.81)	-0.68*** (-3.33)
comp_exp_social	-0.46** (-2.23)	-0.60** (-1.97)	-0.04 (-0.64)	-0.03 (-0.33)	-0.33 (-3.94)	-0.34** (-2.44)
R ²	0.56		0.65		0.67	
No. of observation	209	166	230	182	127	101
AR (1)		0.02		0.01		0.08
AR (2)		0.13		0.11		0.56
Sargan P-values		0.40		0.13		0.18

Note: ***, **, and * indicate that variables are significant within the 1%, 5% and 10% levels, respectively. Values in the brackets are corresponding t-statistics. AR (1) and AR (2) are the Arellano-Bond test for autocorrelation at the first and second orders, respectively. Sargan test is for the over-identifying restrictions, which tests the overall validity of the instrument.

2.5.2 Explanation of the Results

As we measure fiscal size in terms of the percentage of GDP, government expenditures may not be necessarily unproductive whenever the growth of the expenditure falls below the economic growth rate. This implies that countries with high growth performance, but slower increase in expenditures may experience positive results. In countries performing at an extremely low level, government expenditures may be unable to yield the desired growth due to a lack of necessary investments.

For the countries with a higher size of the government, expenditures are not being productive due to many reasons. First, the majority of Asian economies have low level tax revenue, which is not sufficient for financing the desired investments in productive sectors. Countries that expend more may face a debt- trap, because of low resource mobilization and low productivity. Spending that is financed by deficits may not be productive, because of a low level of government effectiveness and a high level of corruption that plagues developing countries. Second, more public investments may crowd- out the private investment in one hand, and yields diminishing returns on the other hand. Third, the most likely reason for a negative relationship may be the low quality of financial administration, which is more common in developing Asian economies. Poor administration and a low level of commitment reduce the effectiveness of government expenditures. Evidence from previous studies shows that better administration results in higher growth (Gray et al., 2007). Fourth, some countries with higher government expenditure, but low growth are increasing expenditures to achieve comparatively higher growth. This may also result in a negative effect on growth. These results are more or less in line with those found in Devarajan et al. (1996), Barro (1990), and Engen and Skinner (1992).

Regarding taxation, the size of tax revenues in the majority of Asian countries is low. We found no negative a relationship between a higher tax size and growth. The results (not shown here) suggest that until the average level of tax (11.4% of GDP) is reached, it is positively correlated with growth. This implies that a minimum level of tax is needed for normal government functions. Once the average size of tax revenue is crossed, tax becomes neutral with growth. An increase in the tax effort reduces government debt and contributes to the desired level of public spending. Hence, it supports growth rather than creating distortion in the economy. Again, when we look at the composition of tax, payroll and workforce tax

reduces the incentives to invest. This explains the reason for its negative effect on growth. However, property tax does not have any distortionary effect on the incentives to invest. Hence, it shows positive impact on growth. This result is in line with Abdon et al. (2014).

We assume that different types of expenditures have distinct productivities, regardless of whether they are categorized as productive or unproductive. Based on this assumption, health and education expenditures are found to be negatively correlated with growth. This may be due to either poor administrative quality or the misallocation of expenditures. The graphical relationship shows that up to a certain level (average level), health and education expenditures are both negative; after this, both expenditures are positive (Appendix-2E). Thus, countries with very low levels of health and education expenditures are not productive. Another possibility for negative outcome is that health and education expenditures have a cumulative effect and they may not yield the results in the same year that they are incurred. Further, Devarajan et al. (1996) and Ghosh and Gregoriou (2006) argued that capital expenditures in developing countries are unproductive because of the misallocation of expenditures in terms of priorities.

Table 2.5 shows the regression results under different conditions of composition of education expenditure and government effectiveness. Specifications 1 and 2 show the regression results when the composition of education expenditure is limited to different levels of expenditure—above average and below average, respectively. When the composition is below the average level, the coefficient is negative and significant, but for the composition above the average level, the coefficient is positive but not significant. This also implies that a certain minimum level of expenditures is needed to achieve higher growth.

We further examine whether higher government effectiveness improves productivity. For this, we select the set of countries with high government effectiveness and run the regression using fixed effects technique (see Specification 3 and 4). Specification 3 shows the results obtained without introducing government effectiveness and specification 4 shows the results obtained after introducing government effectiveness. Results suggest that health and education expenditures shouldn't be necessarily negatively correlated with growth if the country has high government effectiveness. This means that negative performance of the major components of expenditures can be avoided through an improved quality of governance.

Table 2.5: Effect of composition of education expenditure and government effectiveness on growth

Estimation Method: Fixed Effects				
Dependent variable: Per capita growth				
Determinants	When composition of Education expenditure		Countries with High government effectiveness (GE)	
	More than average (12% of total) (1)	Less than average (2)	Without GE (3)	With GE (4)
initial_gdp_pc	-0.002*** (-3.41)	-0.001*** (-3.06)	-0.002*** (-3.69)	-0.002*** (-5.20)
investment	0.23** (2.72)	0.36** (4.23)	0.25 (1.45)	0.23*** (4.82)
popln_gr	-0.58 (-1.50)	-1.06*** (-6.78)	-0.22 (-0.73)	-0.61 (-0.93)
fdi	0.18*** (2.90)	0.34 (1.13)	0.11 (1.28)	0.18 (0.60)
Inflation	-0.16 (-1.60)	-0.13** (-2.54)	-0.24 (-0.79)	-0.08 (-0.41)
trade_open	0.005 (0.22)	-0.02 (1.22)	-0.02 (-0.89)	-0.01 (-0.53)
education	0.26** (2.61)	0.33*** (4.50)	0.37*** (3.29)	0.22*** (4.95)
labor_force	-0.04 (-2.61)	-0.14 (-90)	-0.23 (-1.01)	0.03 (0.09)
exp_totl	-0.40*** (-3.62)	-0.50*** (-3.47)	-0.78*** (-5.84)	-0.67*** (-3.93)
tax	0.03 (0.13)	0.24 (1.18)	0.15 (0.39)	-0.03 (-0.11)
comp_tax_income	0.02 (1.54)	-0.0004 (-0.12)	0.06 (0.73)	0.02 (0.20)
comp_tax_payroll	-0.14 (-1.46)	-0.26 (-1.34)	-0.30** (-2.33)	-0.10 (-0.66)
comp_tax_property	0.45** (2.43)	0.07 (0.36)	0.55** (2.77)	0.032*** (3.00)
comp_tax_goods	-0.07* (-1.78)	-0.07 (-0.04)	-0.002 (-0.004)	0.05 (0.27)
comp_tax_international	0.04 (1.17)	-0.05 (-0.80)	0.10 (1.33)	0.08 (0.72)
comp_exp_gpsservice	0.17 (1.56)	-0.05 (-0.32)	0.05 (0.35)	0.09 (0.56)
comp_exp_defense	-0.01 (-0.07)	-0.10 (-0.70)	0.12 (0.84)	-0.20 (-1.27)
comp_exp_posafety	-0.28 (-1.44)	-0.33 (-1.60)	-0.24 (-1.40)	-0.77 (-1.63)
comp_exp_ecoaffair	0.09 (0.76)	-0.001 (-0.01)	-0.05 (-0.30)	-0.12 (-0.82)
comp_exp_housing	0.41*** (3.60)	0.31 (1.43)	0.07 (0.31)	0.33 (1.16)
comp_exp_health	-0.35 (-1.38)	0.008 (0.05)	-0.56** (-2.51)	0.52 (1.19)
comp_exp_edu	0.07 (0.35)	-0.34** (-2.23)	-0.20 (-0.67)	0.25 (1.05)
comp_exp_social	-0.01 (-0.11)	-0.01 (-0.04)	-0.08 (-0.55)	0.01 (0.11)
gov_effectiveness				9.07* (1.92)
R ²	0.42	0.70	0.52	0.64
No. of observation	153	101	104	77

Note: ***, **, and * indicate that variables are significant within the 1%, 5% and 10% levels, respectively. Values in the brackets are corresponding t-statistics. AR (1) and AR (2) are the Arellano-Bond test for autocorrelation at the first and second orders, respectively. Sargan test is for the over-identifying restrictions, which tests the overall validity of the instrument.

2.6 Conclusion

The growth performance of any country depends on various fiscal parameters supported by administrative quality and other macroeconomic variables. Neither fiscal size nor composition alone is sufficient to analyze the growth pace. The accepted fact is that fiscal size, composition and administrative capacity largely matter on growth. However, the effect of fiscal size and composition depends on the initial fiscal situation and country-specific characteristics. The experiences and performances of countries are comparable and, therefore, beneficial for mutual learning.

The share of government expenditures and tax revenue in GDP is comparatively lower in Asian economies compared with developed countries and other regions of the world. Although the size of government expenditures is not very high, empirical results show that it is negatively related to growth. This is robust regardless of the samples and model specifications. The result does not merely imply that government expenditures retard growth. Rather, it implies that government expenditures are not productive in the Asian region. Having an inappropriate size of expenditures, low government effectiveness, low tax performance and the wrong priorities for expenditures are some of the reasons for slow growth.

The performance of some countries with very low expenditures reveals weak support for low expenditures being positively associated with growth. Similarly, countries with high government effectiveness show no significant negative relationship between government expenditures and per capita GDP growth. Looking at the tax size, we find no significant negative relationship with growth. This runs contrary to the traditional belief that the tax is negatively linked with growth. Majorities of the specifications show positive correlation between the size of tax revenue and per capita GDP growth in Asian economies although the relationship is not significant. The implication of this result is that expanding the tax base can at least strengthen the sources of finance and thus reduce the deficits.

The regression results of the fiscal composition controlled by size show that the pattern of allocating of expenditure and taxation is important for growth. We find that property tax is positively correlated to growth, but the payroll and workforce tax is negatively correlated to it. In terms of expenditures, housing and amenities expenditures are positively linked with growth, but health and education expenditures are negatively linked with growth. It is also

generally expected that health and education expenditures will have a positive effect on growth, but surprisingly, this association is found to be negative. Although the results are not robust, it clearly indicates that some categories of expenditures, such as health and education, are not productive. This is because of a mismatch in the composition and the presence of weak institutions.

The implication of the result has greater importance for the enlargement of tax size. Because the size of tax revenue was found to be low and no negative relationship was found to exist. There is some scope for its expansion to enrich government finance. We also found that a certain level of fiscal size, with improved government effectiveness, results in higher growth. Hence, governments should tighten the rule of law and administration and should maintain a moderate fiscal size and composition. Similarly, care should be taken when readjusting the fiscal composition. In terms of taxation, property tax, which has a very low share composition, is positively associated with growth. Hence, it can be increased to give a positive result. Countries with low levels of expenditures and tax can increase their size to achieve the desired benefit. Furthermore, effective government and optimal fiscal composition increases the productivity of government expenditures.

Appendix 2

Appendix-2A: Variable definition, mean statistics and sources

Symbol	Variables	Mean	Source
gdp_pcgr	Per capita GDP growth annual (percent)	3.16	WDI, World Bank
gdp_pc	GDP per capita (US \$ Constant 2005)	8544	WDI, World Bank
exp_totl	General Government Total Expenditure (% of GDP)	27.2	WDI, World Bank
tax	Tax Revenue (% of GDP)	11.41	GFS, IMF
investment	Total Investment (% of GDP)	26.4	WEO, IMF
popln_gr	Population Growth annual (percent)	2.40	WDI, World Bank
labor_force	Labor force participation rate, total (% of total population ages 15-64)	65.21	WDI, World Bank
fdi	Foreign Direct Investment inflow(% of GDP)	3.30	WDI, World Bank
trade_open	Trade(% of GDP)	94.40	WDI, World Bank
Inflation	Inflation percent (Average Consumer Prices)	7.72	WEO, IMF
gov_effectiveness	Government Effectiveness Index	-0.06	WGI, World Bank
education	School Enrollment Tertiary (% gross)	22.10	WDI, World Bank
<u>Components of Tax:</u>			
comp_tax_income	Taxes on Income, Profits and Capital Gains as a percentage of total tax revenue	37.54	GFS, IMF
comp_tax_payroll	Taxes on Payroll and Workforce as a percentage of total tax revenue	1.02	GFS, IMF
comp_tax_property	Taxes on Property as a percentage of total tax revenue	2.51	GFS, IMF
comp_tax_goods	Taxes on Goods and Services as a percentage of total tax revenue	41.04	GFS, IMF
comp_tax_international	Taxes on International Trade as a percentage of total tax revenue	17.00	GFS, IMF
<u>Components of Expenditure (by function):</u>			
comp_exp_gpsservice	General Public Services as a percentage of total outlay	30.37	GFS, IMF
comp_exp_defense	Defense as a percentage of total outlay	15.08	GFS, IMF
comp_exp_posafety	Public Order and Safety as a percentage of outlay	5.55	GFS, IMF
comp_exp_ecoaffair	Economic Affairs as a percentage of total outlay	18.73	GFS, IMF
comp_exp_housing	Housing and Community Amenities as a percentage of total outlay	4.07	GFS, IMF
comp_exp_health	Health as a percentage of of total outlay	5.30	GFS, IMF
comp_exp_edu	Education as a percentage of total outlay	12.71	GFS, IMF
comp_exp_social	Social Protection as a percentage of total outlay	6.30	GFS, IMF

Appendix-2B: Sampling countries (34)

Division based on income

Low- and middle-income countries (25)	High-income countries (9)
Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Cambodia, Indonesia, Malaysia, Philippines, Laos, Vietnam, Myanmar, Thailand, Mongolia, China, Iraq, Iran, Oman, Jordan, Syria, Lebanon, Yemen	Brunei, Singapore, South Korea, Bahrain, UAE, Saudi Arabia, Kuwait, Qatar, Israel

Division based on revenue performance

Non-OPEC countries (27)	OPEC countries (7)
Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Cambodia, Malaysia, Philippines, Laos, Vietnam, Myanmar, Thailand, Mongolia, China, Israel, Brunei, Singapore, South Korea, Oman, Jordan, Syria, Lebanon, Yemen, Bahrain	Saudi Arabia, Iran, Iraq, Indonesia, Kuwait, Qatar, UAE

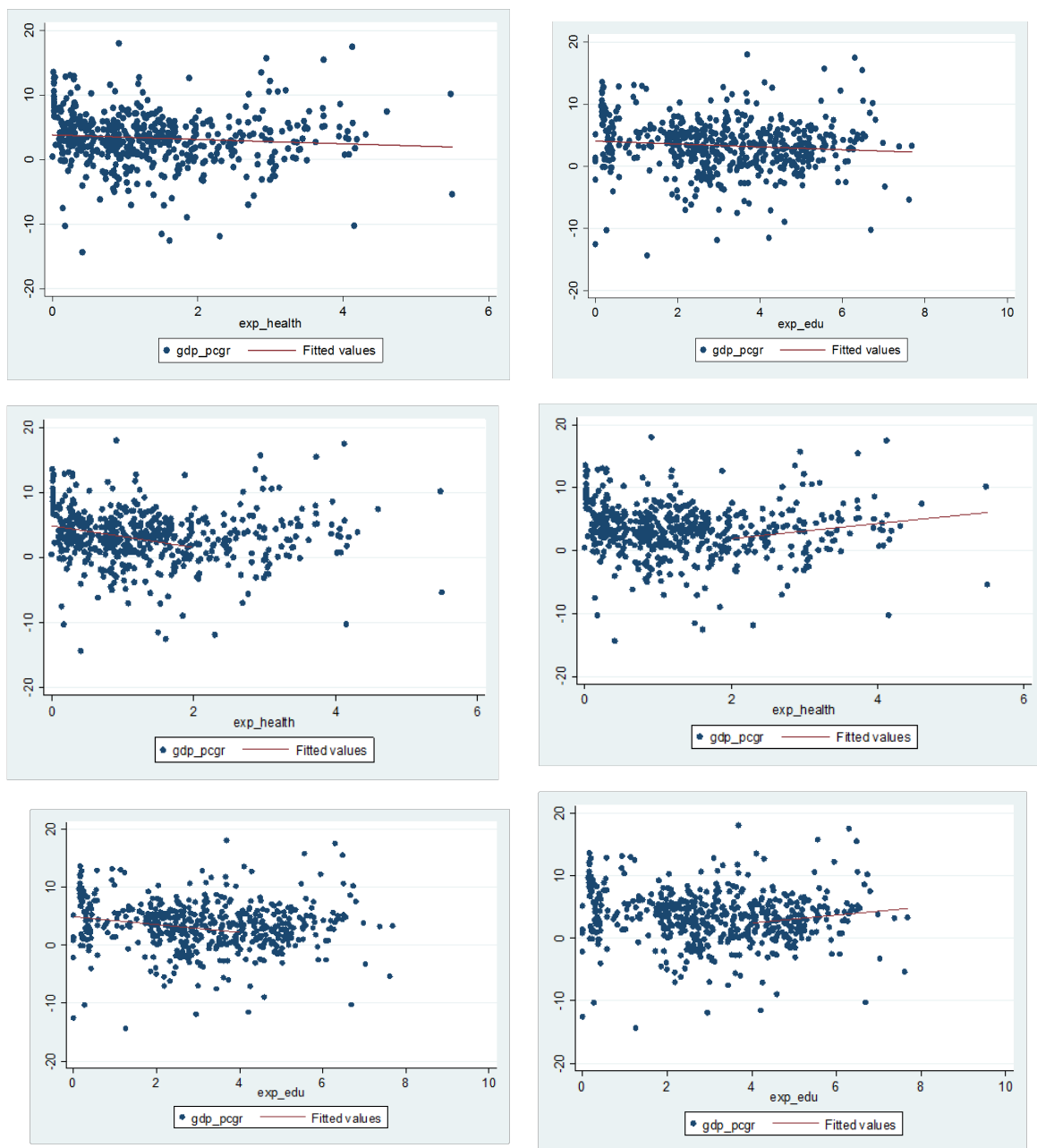
Appendix-2C: Correlation matrix

	lgdp_pc	inv_tot	popln_gr	fdi	infla tion	trade_ open	educa tion	labor_ force	exp_t otl	tax	ge	tax_ income	tax_ payroll	tax_ prope rty
lgdp_pc	1.00													
investment	0.06	1.00												
popln_gr	0.78	0.10	1.00											
fdi	0.04	0.33	0.09	1.00										
inflation	-0.14	0.04	-0.01	-0.05	1.00									
trade_open	0.12	-0.01	0.09	0.32	-0.18	1.00								
education	0.19	-0.01	-0.17	0.25	-0.20	0.32	1.00							
labor_force	0.21	0.32	0.13	-0.17	-0.14	-0.04	-0.17	1.00						
exp_totl	0.29	-0.10	0.17	0.34	-0.13	0.34	0.26	-0.45	1.00					
tax	-0.21	-0.06	-0.31	0.29	-0.11	0.27	0.58	-0.15	0.27	1.00				
ge	0.51	0.02	0.17	0.02	-0.35	0.56	0.57	0.08	0.37	0.31	1.00			
tax_income	0.65	0.15	0.64	0.00	0.07	0.06	-0.07	0.20	0.04	-0.23	0.16	1.00		
tax_payroll	0.19	-0.14	0.11	0.04	-0.16	0.10	-0.05	-0.09	0.30	-0.31	0.24	-0.03	1.00	
tax_property	0.05	-0.06	-0.04	0.19	-0.10	0.00	0.32	-0.20	0.07	0.16	0.02	-0.11	0.12	1.00
tax_goods	-0.49	0.19	-0.46	0.23	-0.10	-0.13	0.20	0.11	-0.21	0.48	-0.16	-0.33	-0.34	0.19
tax_international	0.35	-0.13	0.38	0.03	0.03	-0.01	-0.30	0.03	-0.03	-0.60	-0.14	0.30	0.35	0.17
exp_gpsservice	-0.19	0.03	-0.05	-0.05	0.05	-0.31	-0.20	0.16	-0.36	0.07	-0.19	0.04	-0.33	0.06
exp_defense	0.15	-0.35	-0.04	-0.09	-0.10	-0.13	0.00	-0.46	0.42	-0.19	0.13	-0.12	0.62	0.00
exp_posafety	-0.02	-0.04	0.09	0.12	-0.04	0.19	0.01	-0.12	0.01	-0.02	-0.17	-0.03	-0.12	0.12
exp_ecoaffair	-0.09	0.36	-0.02	0.03	0.12	-0.06	-0.05	0.19	-0.18	-0.16	-0.20	0.01	-0.34	-0.13
exp_housing	-0.05	-0.06	0.01	-0.25	0.22	0.03	-0.23	-0.06	-0.02	-0.39	-0.04	-0.10	0.27	-0.19
exp_health	0.09	0.03	0.13	0.27	-0.11	0.56	0.04	-0.01	0.38	0.20	0.20	0.08	0.10	-0.05
exp_edu	-0.01	-0.04	-0.06	0.05	-0.17	0.56	0.26	0.21	0.04	0.26	0.30	-0.06	0.07	-0.10
exp_social	0.12	-0.05	-0.18	0.15	-0.09	0.12	0.58	-0.21	0.30	0.48	0.29	-0.15	0.00	0.32

	tax_goods	tax_ international	exp_ gpsservice	exp_ defense	exp_ posafety	exp_ ecoaffai	exp_ housing	exp_ health	exp_ edu	exp_ social
tax_goods	1.00									
tax_international	-0.51	1.00								
exp_gpsservice	0.45	-0.29	1.00							
exp_defense	-0.31	0.23	-0.40	1.00						
exp_posafety	-0.05	0.37	-0.49	0.03	1.00					
exp_ecoaffair	0.03	-0.09	-0.28	-0.38	0.21	1.00				
exp_housing	-0.49	0.30	-0.50	0.19	0.13	0.16	1.00			
exp_health	-0.14	0.22	-0.60	0.01	0.49	0.01	0.21	1.00		
exp_edu	-0.16	0.05	-0.54	-0.16	0.38	0.11	0.21	0.62	1.00	
exp_social	0.06	-0.04	-0.44	0.22	0.19	-0.20	-0.12	0.27	0.15	1.00

Note: Components of fiscal variables are the composition measured in terms of percentage of total; ge represents government effectiveness; lgdp_pc represents initial GDP per capita.

Appendix-2D: Non-linear relationship between health and education expenditures and growth



Source: Author's estimation from the data taken from WDI and GFS.

Appendix-2E: A brief review of literature on 'Fiscal Size, Composition and Growth'

Literature	Sampling framework	Result
Arin (2004)	G-7 countries	Both government expenditure and income taxes have negative effect on private investment and growth
Barro (1991)	98 countries	Government consumption expenditure has negative effect on private investment and growth.
Engen and Skinner (1992)	107 countries	Government spending and taxation reduces economic growth
Christie and Rioja (2011)	7 Latin American Countries	For the countries which have already low share of tax revenue, public investment financed by the increase in tax gives a positive result.
Kneller, et al.(1999)	22 OECD countries	Distortionary taxation reduces growth, while non-distortionary taxation does not, and productive government expenditure enhances growth, whilst non-productive expenditure reduces growth.
Berg and Karlsson (2010)	OECD countries	Both taxes and expenditure shows negative effect.
Sala-i-Martin (1997)	Large country groups	No significant relationship exists between government spending and economic growth.
Benos (2009)	14 EU countries	Public expenditure on infrastructure enhances growth, whereas spending on education, health, housing-community amenities, environmental protection, recreation and culture have no significant impact on growth.
Afonso and Furceri (2008), Abdon et al. (2014)	44 developing countries developing Asia	Spending on agriculture and education is linked with higher growth in Asia. Tax on property and expenditure on education are growth inducive.
(Devarajan et al. (1996); Ghosh and Gregoriou (2006)	43 developing countries; 15 developing countries	Current expenditure has positive and capital expenditure has negative impact on growth.
Gemmell et al. (2014)	17 OECD countries, for the period of 1970-2008	Spending on infrastructure and education enhances growth, however, social welfare spending reduces the GDP level.
Afonso and Jalles (2011)	155 countries, 1970-2008	Higher government expenditure retards growth whereas revenue is insignificant, spendings on education and health favor growth, whereas social spending is detrimental to growth.
Abdullah et al.(2009)	13 Asian countries, 1982-2001	Health and education expenditures have positive impact, whereas defense expenditure, and distortionary taxation have negative impact on real per capita GDP.
Ormaechea and Morozumi (2013)	56 countries	Expenditure composition doesn't have a robust effect on growth.

Chapter 3

Fiscal Policy Effects on Investment and Growth in Asian Economies

3.1 Introduction

In practice, making the right choices in adjusting a fiscal position to achieve a growth target is complicated, especially in countries where revenue lags far behind the expenditure and debt levels persist critically high. The global financial crisis led to a large increase in public debt internationally, which decreases total revenue, and is a significant challenge to reduce (Baldacci et al., 2010). In this situation, the government can adopt macroeconomic adjustments either by reducing public expenditures or by raising tax revenues to maintain fiscal sustainability. However, the adjustment is difficult. Cutting back expenditures hampers public investment, which in turn increases the marginal cost of private investment and reduces output. Similarly, increasing tax revenue may distort private investment, hampering the economic growth. As many low-income countries need to scale up public investments to enhance infrastructure development, there is no alternative to tax finance or debt, however, the effect of each type of finance on investment and growth for the long-run is still under debate and the solution may well be an empirical rather than one derived from established theory.

Fiscal policy exhibits both direct and indirect effects on growth through the investment channel. Government expenditures on productive sectors, arguably health, education and infrastructure directly increase the capacity of the factors of production as well as the foundation to invest, which in turn increases the productivity of private investment and hence the output growth. The source of finance also indirectly affects total investments and growth. If government expenditure is financed by domestic borrowing, it creates high pressure on interest rate and crowds out private investment, thereby decreasing the net investment. When the debt level is already high, the overhang of high debt stock reduces investment by increasing uncertainty (Clements et al., 2003).

Capital formation requires a certain level of investment whatever the fiscal position and the source of finance, which enables higher output growth. However, the rate of investment, social rate of return and quality of investment largely influence the output growth (Anderson,

1990). Although each country has a different fiscal space and policy intervention, achieving higher growth is a common issue for fiscal authorities under the existing framework. Debt financing is difficult for countries which have already high debt levels and tax financing is difficult for nations which have structural deficiency and low government effectiveness. A wise decision about the mode of finance is essential to boost investments and growth, which is more important aspect of fiscal policy.

The majority of the empirical literature on fiscal policy–growth measures either the direct or indirect effects and is incapable of measuring both at the same time. Similarly, fiscal policy has a direct impact on investment, which is also associated with the output growth. The two-way relationship between them has largely been observed even in previous literature. Some expenditures are interrelated to taxation, which causes an endogeneity problem. Hence, while analyzing the relationship between fiscal policy variables and growth, there is a simultaneity problem in estimating a model, which may generate misleading results. Although prior studies rarely address this type of issue, the simultaneity of the variables should be considered to determine the net effect of fiscal variables in a growth regression. Similarly, many previous works are not free of the bias involved in accounting for the government budget constraint (GBS) properly. While a few good studies exist, the empirical results are still inconsistent and studies rarely focus on the Asian region.

In light of these issues, this study tries to analyze the direct and indirect effects of fiscal policy on growth by clarifying whether tax finance or debt finance is suitable in Asian economies. Moreover, within a framework using a simultaneous-equation model it focuses on the investment-channel by which government spending affects growth.

3.2 Literature Review

During the early 1990s, some economists developed endogenous growth models, for instance, Romer (1986), Barro (1990), Glomm and Ravikumar (1997), Mendoza et al. (1997) and others, to explain the channel by which fiscal policy affects the output growth. Thereafter a handful of studies tested the endogenous growth model empirically. However, there is no consensus regarding the effects of individual fiscal components. The results from long-run growth regressions determined that tax–growth relationship is unambiguously negative compared to that for expenditure-growth, while the reverse is true for short-run estimates (Gemmell and Au, 2012).

One of the main channels through which fiscal policy effectively influences growth is via private investment (Hermes and Lensink, 2001). Levine and Renelt (1992) also showed that investment is one of the robust variables to determine per capita growth, while Blomstrom et al. (1993) reported that income growth induces fixed capital formation. Public investments in infrastructure, health, and education crowd in private investment, thereby increasing labor and capital productivity. However, there is a risk of crowding-out if it is financed through distortionary taxation and domestic borrowing, which increases the interest rate in the domestic market (Agénor et al., 2005).

However, the empirical results advocating the notion of crowding-in or crowding-out are not consistent across countries. Public investment complements to private investment in developing countries and the reverse is true for developed countries (Erden and Holcombe, 2005), though this is not true even for the same country. For instance, Bahal et al. (2015) show that before 1980, public investment in India crowded out private investment, but has supported private investment in recent years. Similarly, Miyazaki (2016) analyzed the Japanese prefectural data from 1980 to 2009 and revealed that public investment is not necessarily supportive to private investment especially in rural areas.

The method of finance and fiscal adjustment pattern also affect the level of investment and growth. However, the choice between debt finance and tax finance is extremely complex. Tax finance is preferable when the existing capital stock is below an optimal level, and debt-finance is otherwise (Feldstein, 1984). Relaxing the optimal fiscal policy, given an initial debt stock, maintains a constant Debt-GDP ratio (Aizenman et al., 2007). A country with a higher debt stock faces the crowding-out effect proportionally through the interest rate channel. When productive spending rises, the marginal productivity of capital also rises, increasing the interest rate and resulting in, high payment on debt service. However, the magnitude of the effect depends on the type of financing (Teles and Mussolini, 2014). Kneller et al. (1999) found that productive government spending and non-distortionary taxation have a positive impact on growth.

The empirical results in this stream of literature are quite inconsistent (Kneller et al. 1999). In contrast to the theoretical basis, Mendoza et al. (1997) concluded that there is no practical significance of tax policy change on growth. Clements et al. (2003) showed that reducing debt service improves growth indirectly through public investment channel, while Hermes

and Lensink (2001) emphasized that reform in the composition of tax and expenditures are better ways to achieve expected growth rate rather than reducing the budget deficit. Similarly, Alesina and Ardagna (2009) found that fiscal stimulus provided by tax cuts is more productive than expenditure increase.

Barro (1990), Easterly and Rebelo (1993), Fuente (1997), and Mendoza et al. (1997) illustrated the relationship between fiscal policy, investment and growth. Fuente (1997) and Mendoza et al. (1997) are most comprehensive studies, though they show differing results. The former found a significant negative impact from tax revenue on both investment and growth, while the latter found no significant relationship with growth. Similarly, Easterly and Rebelo (1993) found a positive impact of public investment in transport and communication on growth and inclusive effect for taxation. Likewise, Nazmi and Ramirez (1997) showed a positive relationship between public investment and growth.

The existing literature does not address the simultaneity issue of the fiscal variables. While determining growth, both investment and fiscal variables appear endogenous, creating the simultaneity problem. Fiscal variables are not only controlled by the government authority, but are also determined by the macroeconomic and fiscal situation existing in the economy. More importantly, the inconsistent empirical results indicate that the effect of fiscal policy is empirical rather than theoretical. Hence, this study aims to shed light on such fiscal issues in the Asian economies.

3.3. Methodology

3.3.1 The Basic Model

We use a Cobb-Douglas type production function, with fiscal policy as a government input, as in Barro (1990), who used government consumption expenditure to represent fiscal policy as an input. However, we consider taxation as well to account the government budget constraint (GBC). Berms (1983) emphasized that any model explaining the influence of fiscal policy should deal with at least three variables, and two at a time- expenditure and taxation or expenditure and deficit or taxation and deficit. Fiscal policy can choose only two and leave the third on its own. Hence, we also consider the aspect of deficit financing to consider the impact of fiscal policy.

The output of a country Y is a function of the capital investment K with labor input L in the presence of government fiscal policy. We can express this relationship as follows:

$$Y = AL^\alpha K^\beta G^{1-\alpha-\beta} \quad (1)$$

where A is the factor productivity. G represents the government's input in the form fiscal policy. Taking the logarithm of both sides and differentiating with respect to time, we get the following relationship:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \alpha \frac{\dot{L}}{L} + \beta \frac{\dot{K}}{K} + (1-\alpha-\beta) \frac{\dot{G}}{G} \quad (2)$$

where $\alpha > 0$, $\beta > 0$, and the production process uses constant returns to scale. The expenditure is maintained as the change in government fiscal policy. For instance, the initial public debt level or the target of tax revenue affects the pattern of expenditures. The government finances its public investment at the cost of current expenses by taxation and deficits, given the level of public debt stock. Suppose that the government imposes a certain fraction of GDP as the tax revenue. Then budget constraint can be expressed as:

$$G = \tau Y + D \quad (3)$$

Where τ represents lump-sum tax rate and D the deficit.

In short run, the deficit level is constrained by the current debt stock (D_s) and required level of public spending, however, in the long-run, it is neutralized by taxation, taking on the burden of previous deficits. The cumulative effects of the deficit over the years appear in the accumulation of outstanding debt stock. Hence, while considering the effect of fiscal policy on growth, deficit and debt stock can be used interchangeably. Now, we can express the output growth rate (g_r) as in the following function, using equation (2) and (3). Where we use both human and physical capital and replace the variable 'rate of change in capital' by investment.

$$g_r = f(L, K_H, I, E_G, T, D_s) \quad (4)$$

where L is the labor force participation rate, K_H is human capital (tertiary education), I is total investment, E_G is government consumption expenditure, T is tax revenue and D_s is public debt stock.⁶

According to the accelerator theory of investment, investment (I) is directly proportional to the growth of output.

$$I = \alpha g_r \quad (5a)$$

Similarly, Keynesian theory explains that investment is the function of net interest rate (r).

$$I = f(r) \quad (5b)$$

These two theories provide the basis that investment is well explained by the growth rate and interest rate of the economy. The government provides public capital as an investment that is non-rival and non-excludable. We assume that public investment (I_{pub}) influences the productivity of the private capital. When fiscal policy is supportive, public investment boosts private investment and hence total investment also rises. However, while making public investment, if the private sector becomes distorted due to taxation or high interest rate caused by public borrowing, it may depress private investment, causing total investment to decrease. Hence, total investment (I) in a country is the result of public and private investments:

$$I = (I_{pr} + I_{pub}) \text{ and } I_{pr} = f(I_{pub}) \quad (5c)$$

Where I_{pr} is private investment.

Fiscal policy significantly influences investment through the crowding-in or crowding-out effect and controls both kinds of investment. The government introduces different types of taxes to finance public investment. Productive expenditures financed by non-distortionary taxation crowds in private investment, otherwise there is likely a crowding-out effect on private investment. If a country already has a high debt level, the overhanging debt stock reduces investment by increasing uncertainty (Clements et al., 2003). Similarly, foreign direct investment (FDI), which not only reflects the overall situation of investment environment but also affects the domestic investment through factor market, is also linked with total investment. The investment equation is thus can be written as follows:

⁶ As total investment includes pub investment expenditure, we consider only consumption expenditure in estimating equation (6).

$$I = f(r, g_r, E_G, T, D_s, FDI) \quad (6)$$

While determining expenditure, two factors are principally responsible: the previous level of expenditure and the initial public debt stock. A Higher level of previous consumption expenditure leads to higher expenditures this year, assuming that many political and social forces avoid to decrease the expenditure once raised. In contrast, a higher level of initial debt stock does not incentivize an increase in public expenditure due to resource constraints. Apart from these factors, the level of taxation also determines the expenditure plan. Lower tax revenue restricts the expenditure to a certain level. We assume that fiscal policy is not purely exogenous. Some macroeconomic, demographic and structural variables such as trade openness and the level of development play a vital role in shaping the fiscal policy variables. Wagner's law also says that expenditure increases when the level of development rises. Hence, expenditure function is written as follows:

$$E_G = f(gd_{pc}, T, E_{G(t-1)}, D_{s(t-1)}, T_{open}) \quad (7)$$

where, gd_{pc} represents per capita GDP and T_{open} represents trade openness.

We assume that the expenditure pattern also affects taxation. When consumption expenditure increases, the government has to generate more resources, which automatically encourages the government to raise tax revenue. The overall level of taxation is partially determined by the structure and foundation of the economy and partially by fiscal forces. Based on the previous literature (see Bird et al., 2004; Gupta, 2007; Le et al., 2008), we write the tax function as follows.

$$T = f(gd_{pc}, A_v, faid, pop, inf, T_{open}, D_{s(t-1)}, E_G) \quad (8)$$

where A_v represents agriculture value added, $faid$ represents the net inflow of foreign aid, pop represents percentage of urban population, and inf represents inflation.

Now the equations (4), (6), (7), and (8), within a system, are estimated to find out the channel through which fiscal policy variables affect growth.

3.3.2 Simultaneity Estimation Issue

We have 4 equations in the system, with 4 endogenous and 13 exogenous variables. The order condition to identify the system equations requires that for the total number of equations (M), each equation in the system should exclude at least (M-1) variables

(endogenous and exogenous), or, if the model contains K predetermined variables and the given equation contains (k) predetermined variables, then a model with m endogenous variables should satisfy $K-k \geq m-1$ (Gujarati, 2006). We confirmed that these system equations are identified. We also checked the endogeneity of the variables using the Hausman Specification Test and confirmed that per capita growth rate, investment, expenditure and tax revenue are endogenous variables. We also confirmed the rank condition of the identification. Since the ordinary least squares (OLS) estimation is biased in the presence of a simultaneity problem, we use the two-stage least square method (2SLS) technique.

3.4 Data Analysis

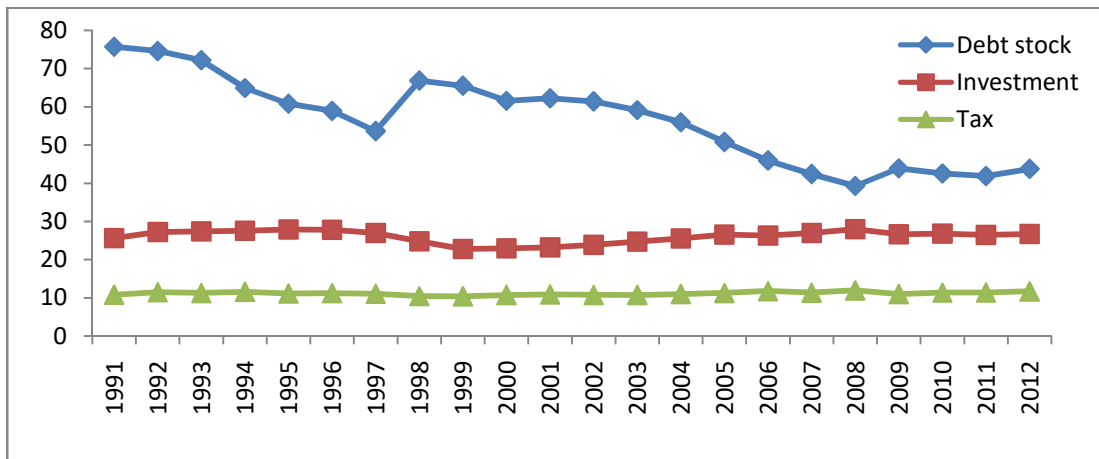
3.4.1 Data

We use annual data from 34 Asian countries (see Appendix-3A) for the period 1991 to 2012. We obtained most data from World Bank Indicator 2014, and data for investment, inflation and deficits are from the World Economic Outlook 2014, International Monetary Fund (IMF). The government effectiveness indicator covers the data from 1996. The data sample focuses on developing countries, especially low- and middle-income countries. Fiscal variables such as government consumption expenditure, tax revenue, debt and deficit are measured in terms of percentage of GDP. The central government debt contains domestic and foreign liabilities such as currency and money deposits, securities other than shares, and loans. The details about the variables are mentioned in (Appendix-2A and 4A).

3.4.2 Graphical Framework

Figure 3.1 shows the trend in public debt, tax revenue and investment as well as their relationships during 1991-2012. The government debt stock fell considerably from 75% to 43% of GDP against a slight increment in tax revenue. However, the total investment is almost constant, at around 25% of GDP. This indicates that a reduction in debt stock does not adversely affect total investment, demonstrating that deficit reduction does not hamper total investment. The tax revenue mobilization obviously plays a vital role in keeping the investment at a constant level.

Figure 3.1: Trend in debt stock and tax revenue against investment (% of GDP)

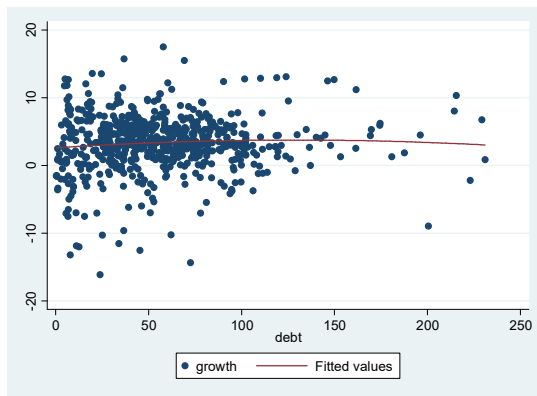


Source: Author's estimation based on the data taken from WDI and WEO, IMF.

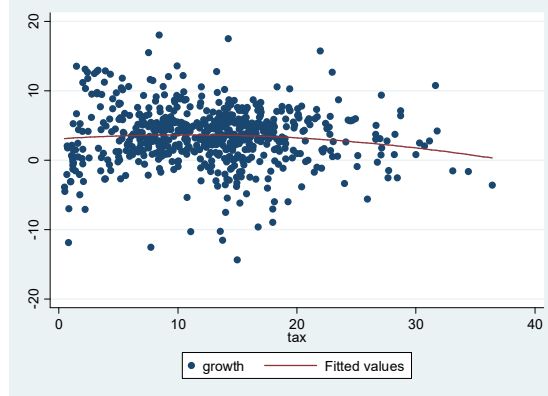
When we compare public investment with private investment, we find that average private investment exceeds public investment. The average private investment in Asian countries has been increasing over the period while public investment shows decreasing trend. The relationship between them seems to be in opposite direction. Their trends have been shown in Appendix-3B.

Figure 3.2 (a, b, c and d) shows the relationship between fiscal variables and growth. The relationship between tax revenue and growth and the debt stock and growth tend to show an inverted U-shape, while government expenditure clearly has a negative relationship with growth. Investment has a clear positive relationship with growth, implying that both tax and debt, are harmful after crossing certain levels. Figure 3.2 (e, f) shows the relationship between fiscal variables and investment. The fifth graph (e) shows that tax revenue and investment has a positive relationship for a low tax-GDP ratio, but when the tax revenue tentatively crosses a certain level, around 20% of GDP, it has a negative effect on total investment, demonstrating the crowding-out effect on investment at a higher tax level. The sixth graph (e) shows a negative relationship between debt stock and investment level, however, this may not true for every level of debt finance. While debt stock is low tentatively less than 30% of GDP, it shows a positive relationship (not illustrated here). The similarity between these types of financing is that both tend to a threshold effect. However, investment has a clear positive relationship with growth.

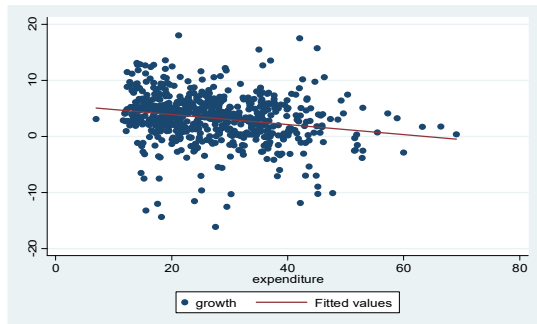
Figure 3.2: Relationship between fiscal variables, investment on growth



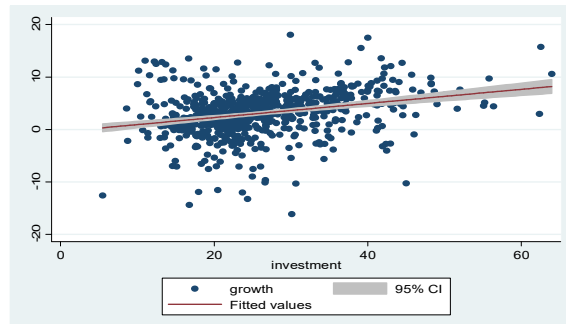
(a) Debt-Growth relation



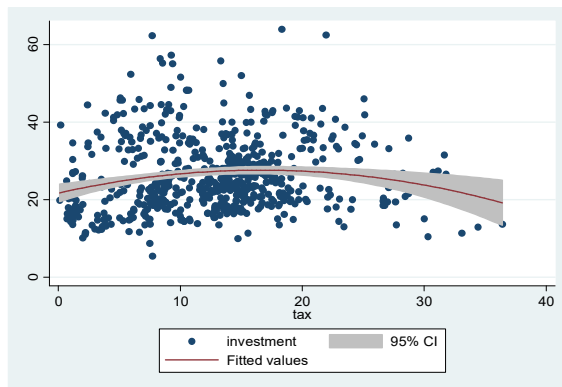
(b) Tax-Growth relation



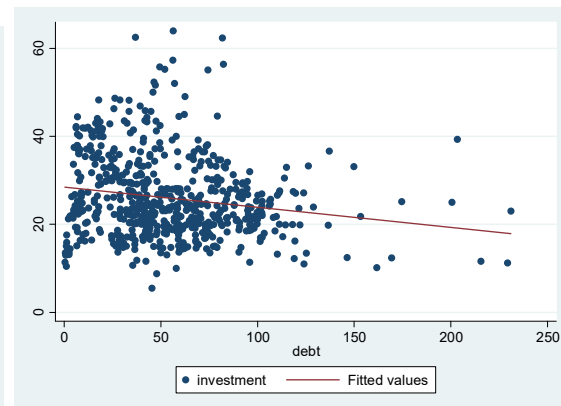
(c) Expenditure-Growth relation



(d) Investment-Growth relation



(e) Tax-Investment relation



(d) Debt-Investment relation

Source: Author's estimation based on the data taken from WDI and GFS.

It is wise to determine the suitable type of financing. Both have negative effects after a certain level. Because most Asian countries already have high debt levels, debt finance will be more harmful than tax revenue. The size of tax revenue in terms of GDP is still low, which indicates that financing through taxation up to some level will have positive effects on growth.

3.5 Empirical Results and Discussion

Table 3.1 shows the estimation results using 2SLS method. There are four dependent variables: per capita growth, total investment, public consumption expenditure, and tax revenue. All dependent variables were explained within the system in a simultaneous equation framework. Column 1 presents the regression results for growth, which indicates that government consumption expenditure and investment are two significant explanatory variables. The coefficient on consumption expenditure is significantly negative, with a value -0.14. In contrast, total investment has a positive effect on growth, with a higher coefficient of 0.50. The result implies that capital formation in the economy through investment directly affects growth, while an increase in consumption expenditure retards growth because it has no direct role in the production process. This result is in line with Barro (1991). Other important fiscal variables- tax and debt stock do not show any significant relationship, although both are negatively associated with growth. The labor force participation rate has a significantly negative coefficient, implying that a higher rate of labor force participation has a negative effect on growth. Tertiary education also seems to be insignificant.

The intensity of the impact of the variables depends on the composition and source of finance. When the government uses the expenditures productively to enhance qualitative investment, it has positive results; otherwise, expenditures in non-productive sectors have negative results. The Keynesian school argues that government consumption increases the aggregate demand for goods and services in the economy, which in turn increases the net productivity in the economy. However, the results do not support this conclusion. The majority of the empirical literature agrees, finding that the source of finance, whether from tax or debt, also matters. However, the results in this study show no significant direct effect, though both show negative correlations.

Table 3.1: Regression results using 2SLS

Determinants	Estimation Method: 2SLS			
	Dependent variables			
	(1) Per capita growth	(2) Investment	(3) Expenditure	(4) Tax
Per capita growth		1.47*** (5.47)		
GDP per capita			0.00001 (0.57)	-0.0006*** (-6.73)
Investment	0.50*** (5.49)			
Debt	-0.006 (-0.31)	-0.05*** (-2.59)		
Expenditure	-0.14** (-2.11)	0.18* (2.55)		-0.35*** (-6.14)
Tax	-0.11 (-1.06)	0.29* (1.88)	0.06* (1.83)	
Labor force	-0.04* (-1.90)			
Tertiary education	-0.004 (-0.16)			
Interest rate		-0.01 (-0.17)		
FDI		-0.05 (-0.26)		
Initial debt			-0.004 (-1.31)	0.03*** (3.87)
Urban population				0.08*** (3.73)
Trade openness			-0.003 (-0.98)	0.05*** (10.99)
Inflation				-0.02 (-0.64)
Share of agriculture				-0.08 (-1.64)
Initial expenditure			0.94*** (49.76)	
Foreign aid				-0.13 (-0.80)
R ²	0.10	0.38	0.95	0.61
No. of observation	216	216	216	216

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. t-statistics in parentheses.

Column 2 in Table 3.1 shows the effects of fiscal policy on investment. Tax revenue has a positive effect on investment, while debt stock has a negative impact. The strength of the coefficient on tax revenue is higher than that on debt stock. A country's total investment is the sum of private and public investment. The net total investment may decrease when the cost of productive private investment compensates for the net increase in public investment. The question of how it is possible to raise the investment by taxation rather than deficit finance then arises. However, the case is different in Asian countries. Most of these countries have a low level of tax revenue mobilization and imposing a higher tax may not exceed the optimum level. Instead, governments can create an investment opportunity through taxation to mobilize scattered and unutilized capital. In debt finance, long-run taxation must bear the burden of the present deficit. Furthermore, accumulating deficits from previous periods creates a huge debt stock for later periods and creates uncertainty, which may reduce investment. This notion is in line with Clements et al. (2003). Since almost all countries already have high levels of public debt, using debt for further investment is costly and may slow down in overall investments.

The results show a positive relationship between growth in per capita income and investment. When per capita income in a country grows rapidly, investment also increases because investors believe that they will receive a high rate of return. There is a similar relationship between government consumption expenditure and investment. Normally, government consumption expenditure has no role in investment. However, this kind of expenditure may help promote the administration of some investment expenditures. As in Keynesian thought, government expenditure may increase the aggregate demand in the economy, which may attract some private sector actors that engage in production. However, this is a slim possibility because the results show that consumption expenditure has a negative effect on growth. The FDI and interest rate variables are both insignificant. Total investment is not elastic with the change in interest rate. Other factors may have a greater role.

Column 3 shows the regression results for government consumption expenditure. Expenditure is highly correlated with the previous years' expenditure. This has a significantly positive coefficient, with a higher value (0.94). The results show that the level of per capita income is not a significant means to increase public expenditure, which runs counter to Wagner's law. We also expected that the initial level of debt stock reduces public expenditure; however, this is not significant, although they are positively correlated. The

results show a positive and significant coefficient on tax revenue. Higher tax revenue obviously induces higher government consumption expenditure. Trade openness was not significant.

Column 5 shows the regression results for tax revenue. The results strongly support the hypothesis that a higher level of initial debt stock forces governments to raise high tax revenue to reduce the debt stock. Similarly, the coefficient on consumption expenditure is negative and significant. This is because when the government uses taxation in non-productive sectors, people show no interest in paying taxes. The variables trade openness and urban population are associated with higher tax revenue, while agrarian economies are not.

Alternatively, we replace the variable public debt by deficit and show the results in Table 3.2. In fact, debt is the stock variable while the deficit is a flow variable. An increase in the deficit increases the debt stock and influences the fiscal situation in the future. The growth equation shows that government consumption expenditure has a negative effect on growth, while investment shows a positive effect. Deficits and tax revenue are not significant, although they show negative correlation with growth. In the investment equation, deficit and tax are not significant. However, the direction of the impact is same as for debt stock. This implies that debt stock accumulation has a higher negative effect on growth and investment than the deficit. The expenditure and tax revenue equations have almost the same effect as shown in Table 3.1. The results from these regression specifications do not change the overall conclusions.

Table 3.2: 2SLS Regression results showing the effect of deficit-finance

Determinants	Estimation Method: 2SLS			
	Dependent variables			
	(1) Per capita growth	(2) Investment	(3) Expenditure	(4) Tax
Per capita growth		1.59*** (6.24)		
GDP per capita			0.00002 (0.57)	-0.0006*** (-7.25)
Investment	0.42*** (5.66)			
Deficit	-0.006 (-0.31)	-0.008 (-0.06)		
Expenditure	-0.13** (-2.09)	0.13 (1.35)		-0.31*** (-5.29)
Tax	-0.11 (-1.06)	0.13 (0.97)	0.06* (1.68)	
Labor force	-0.04* (-1.35)			
Tertiary education	0.007 (0.34)			
Interest rate		-0.03 (-0.43)		
FDI		0.08 (0.66)		
Initial debt			-0.004 (-1.18)	0.03*** (3.75)
Urban population				0.07*** (3.83)
Trade openness			-0.003 (-0.96)	0.06*** (11.65)
Inflation				-0.01 (-0.41)
Share of agriculture				-0.07 (-1.58)
Initial expenditure			0.97*** (49.43)	
Foreign aid				-0.12 (-0.81)
R ²	0.28	0.33	0.95	0.64
No. of observation	208	208	208	208

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. t-statistics in parentheses.

We now slightly modify the investment equation to see the effect of public investment on private investment and growth. There are two perceptions of the effect of public investment. One view suggests that public investment enhances private investment, boosting infrastructure as well as the capacity of the factors of production. On the other hand, transferring resources from the private sector to public sector for public investment reduces

growth due to the government's non-productive expenditures. Our results from the 2SLS estimation in Table 3.3 prove the second point of view.

Table 3.3: Effect of public investment on private investment

Determinants	(1) Per capita growth	(2) Private Investment	(3) Expenditure	(4) Tax
Per capita growth		1.15*** (3.83)		
GDP per capita			0.0005** (2.04)	-0.0009*** (-6.34)
Private investment	0.16*** (3.50)			
Deficit	-0.21** (-6.01)	-0.23 (-1.20)		
Expenditure	-0.02 (-0.47)	0.13 (1.35)		0.06 (0.85)
Tax	-0.29** (-2.30)	0.37** (2.38)	0.72*** (3.73)	
Public investment	0.21** (2.37)	-0.40** (-2.05)		
Labor force	-0.02 (-1.10)			
Tertiary education	0.03 (1.16)			
Interest rate		-0.06 (-0.62)		
Initial Debt			-0.02* (-1.79)	0.02** (2.04)
Urban population				0.02 (1.25)
Trade openness			-0.05*** (-3.62)	0.05*** (10.50)
Inflation				-0.07 (-1.32)
Share of agriculture				-0.10** (-2.68)
Initial expenditure			0.49*** (9.24)	
Foreign aid				-0.13 (-1.07)
R ²	0.34	0.13	0.75	0.73
No. of observation	138	138	138	138

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. t-statistics in parentheses.

Column 1 of Table 3.3 shows the regression results for per capita growth. We decomposed investment into public and private investment, keeping the other variables same as in the previous model. Both investment types have a positive impact on growth. In the fiscal policy variables, deficit and tax both have a significant negative impact on growth. The coefficient on tax is slightly higher than that on deficit. Consumption expenditure also has a negative effect; however, it is not significant. This result implies that a larger government harms growth.

Column 2 in Table 2.3 shows the regression results for private investment. The effect of public investment on private investment is negative and significant. The coefficient is considerably larger (0.40). A one-percentage point increase in public investment decreases the private investment by 0.4 percentage points. An increase in public investment creates more favorable environment for private investors. However, the government should ultimately finance its investment through taxation in long-run, which reduces private investors' incentives. In this case, when the disincentive outweighs the private sector's benefits, there will be a net reduction in private investment.

Furthermore, we aim to determine the effects of fiscal instruments on private investment. Tax revenue has a positive impact on growth, with a significant coefficient. While the variable deficit is negatively correlated with private investment, the coefficient is not significant. The reason for the positive effect of taxation on private investment may be the low burden of taxation in Asian countries. The disincentive for private sector investment is not significant at low levels of taxation. Additionally, people are ready to pay some taxes as they think that government needs some sources to handle the government activities, which does not allow to fall the disincentives to invest. Instead, domestic borrowing on the one hand transfers resources from private sector to the public sector; on the other hand, it raises the interest rate, which in turn hampers private investment.

Columns 3 and 4 show the regression results for consumption expenditure and tax revenue, respectively. The results support the hypothesis that higher initial debt stock reduces the current expenditure and forces an increase in taxation. The impact of the other variables is in the expected directions. The results also show that the level of tax revenue determines the level of expenditure.

Now consider the two equations, growth and private investment, individually to compare with the results from the simultaneous equations. We also check the results in low-and middle- income countries and non-oil producing countries (non-OPEC) to check robustness.⁷ Table 3.4 shows the regression results for the growth equation estimated through fixed effects. Government expenditures on consumption and deficit are both negatively correlated with growth. Tax revenue does not show any conclusive results. Both the public and private investments have significantly positive relationships with growth. The overall result does not differ from the previous results. Similarly, Table 3.5 shows the regression results on private investment. Public investment is negatively associated with private investment. Tax revenue shows a similar positive association with private investment, while deficit has a negative association. The coefficients are slightly different from those in the previous model, though the overall conclusion is the same.

Table 3.4: Regression results for the single growth equation

Determinants	Estimation Method: Fixed Effects		
	Dependent variable: Per capita growth		
	Whole Sample	Low- and middle-income countries	Non-OPEC countries
Public investment	0.06* (1.91)	0.29** (4.89)	0.04 (1.17)
Private investment	0.17*** (3.13)		0.16*** (3.00)
Expenditure	-0.36** (-2.13)	-0.30 (-1.20)	-0.38** (-2.23)
Tax	0.06 (0.65)	-0.35** (-3.14)	0.07 (0.71)
Deficit	-0.22*** (-2.73)	-0.27** (-2.71)	-0.23*** (-2.59)
Labor force	-0.10 (-0.62)	-0.08 (-0.38)	-0.15 (-0.87)
Tertiary education	0.05 (1.61)	-0.08 (-0.02)	0.05 (1.60)
R ²	0.24	0.34	0.25
No. of observation	213	213	200

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. t-statistics in parentheses

⁷Private investment in the regression of low-and middle-income countries have been omitted to reduce the multicollinearity problem. However, the direction of impact of each variable is same while including private investment.

Table 3.5: Regression results for the single private investment equation

Determinants	Estimation Method: Fixed Effects		
	Dependent variable: Private Investment		
	Whole Sample	Low- and middle income countries	Non-OPEC countries
Public investment	-0.14** (-2.47)	-0.73** (-19.70)	-0.16** (-2.40)
Per capita growth	0.18 (1.61)		0.18 (1.60)
Expenditure	-0.01 (-0.05)	-0.08 (-0.69)	-0.004 (-0.02)
Tax	1.03*** (5.88)	0.52*** (5.12)	1.04*** (0.86)
Deficit	-0.25** (-2.21)	-0.27*** (-4.39)	-0.24*** (-2.13)
Interest	0.04 (0.64)	0.01 (0.26)	0.05 (0.80)
R ²	0.29	0.76	0.29
No. of observation	202	202	196

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. t-statistics in parentheses

The deficit may not currently have a significant impact, but hampers growth in the future by raising the level of debt stock. The debt overhang limits the fiscal space, which may reduce the productivity of investments and push up the cost of investment. On the other hand, when the debt level rises, governments should fill the fiscal gap through taxation. In this situation, tax revenue has to maintain the required investment levels as well as pay the previous debt stock. Hence, it may create an extra burden on taxpayers, and reduce incomes and incentives to invest. Gradually increasing tax revenue may help to increase the fiscal space, reducing the debt level. A tax burden up to a certain level supports growth because it generates constant source of finance and boosts private investment.

3.6 Conclusion

This research analyzes the direct and indirect effects of fiscal variables using simultaneous equations for 34 Asian countries. The direct effects of tax finance and debt finance on growth are negative but not significant; however, expenditure shows a significantly negative effect. While we observe an indirect effect through the investment channel, it clearly shows that debt finance has a negative effect on growth, whereas tax finance has a positive effect. Furthermore, public investment is not supportive to private investment.

The average debt stock in Asian countries has dropped significantly over the past 2 decades. However, investment is almost constant, at around 25% of GDP. Even external debt shows a negative effect on investment and growth as well. This implies that financing public investments for higher growth through debt finance may not be a better solution because it creates an extra burden for the coming decades. Instead of debt finance, tax finance seems to be a good idea for developing countries. Although the direct relationship between tax revenue and growth is not conclusive, the indirect effect through the investment channel is clear.

The results show a negative association between public consumption expenditure and growth, but investment shows a clearly positive correlation with growth. Thus, if the government makes expenditures targeting capital formation or for enhancing the productivity of the private sector, it may have a positive result. Otherwise, it does not. The negative effect of public expenditure also depends on the fiscal condition. For the countries with low expenditure level but higher tax revenue level, the expenditure may not show negative results. The regression results estimated through the single equation framework also show a similar output as in 2SLS framework.

The findings have important implications for fiscal policy reform. Debt finance may not support productive investment and higher growth. Instead, countries with low levels of tax revenue have space to increase tax revenue to scale up investment, which ultimately leads to higher growth. Public expenditure should be kept as low as possible because the government sector does not have productivity to match that in the private sector. However, the government's role in providing special public capital is crucial for creating investment opportunities. Mobilizing unutilized capital, either by taxation or boosting the private sector through any means would be a great step toward productive investment and sustainable growth.

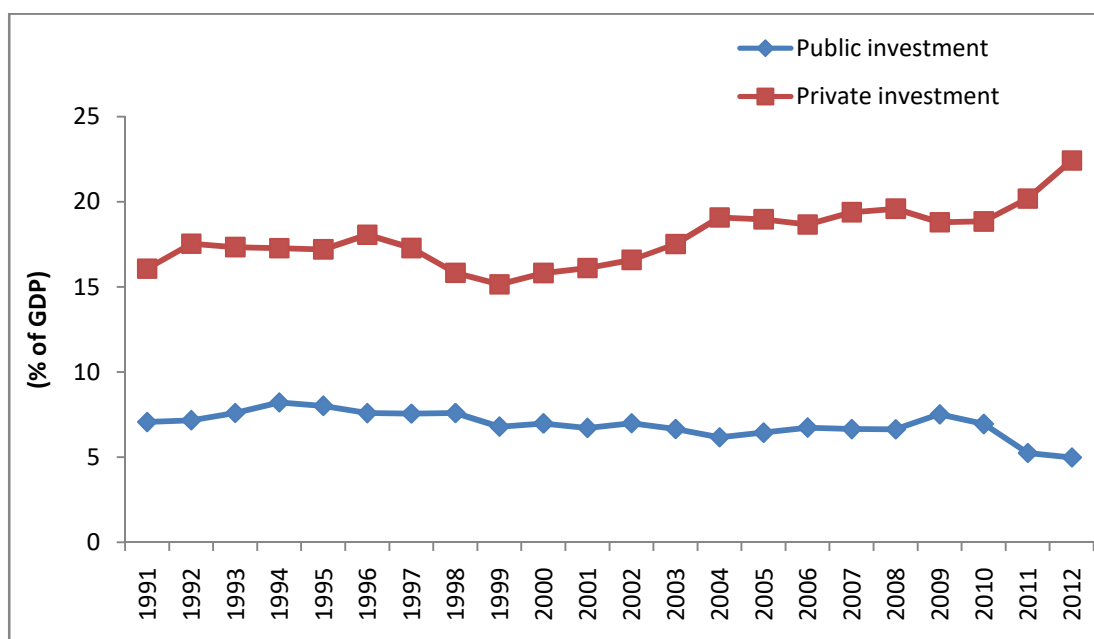
Appendix 3

Appendix-3A: Sample countries

Division based on income

Low- and middle-income countries (25)	High-income countries (9)
Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Cambodia, Indonesia, Malaysia, Philippines, Laos, Vietnam, Myanmar, Thailand, Mongolia, China, Iraq, Iran, Oman, Jordan, Syria, Lebanon, Yemen	Brunei, Singapore, South Korea, Bahrain, UAE, Saudi Arabia, Kuwait, Qatar, Israel

Appendix-3B: Trends of public investment and private investment in 34 Asian Countries in 1991-2012



Source: WDI, World Bank.

Chapter 4

Evaluating Tax Effort Performance in Asian Economies

4.1 Introduction

One of the most challenging fiscal issues facing developing countries is how to raise tax revenue to meet the growing demands of public spending. Maintaining a high level of taxation is also considered to be one of the prerequisites to advance a country from "developing to developed". Despite the considerable effort on improving the internal revenue mobilization, many developing countries, especially the Asian countries, fail to do so. Some of the resource-rich countries in Asia are able to generate much more revenue through the use of natural resources, however, such resources are highly volatile and lead to fiscal instability which hinders scheduled investment and the setting up of a sound fiscal framework (Colliar et al., 2009). Kaldor (1963) also highlights the importance of tax revenue in the development of a country, arguing that a certain level of tax revenue to GDP is needed to maintain fiscal sustainability. Hence, higher tax revenue is highly desired in low-income countries to smooth growth and improve the stability of the economy.

Compared to the rest of the world, tax-GDP ratio of the Asian countries is found to be low, although there is a large variation in tax policy-practices among the economies within the Asian region (Martinez-Vazquez, 2011). The composition and structure of the taxation are also quite different from those of the developed countries, and those in the Organization for Economic-Cooperation and Development (OECD). The distinct features of the taxation in Asia include a higher indirect tax compared to direct tax; a lower share of value added tax (VAT); and a higher share of customs duty. There has been no significant improvement on tax revenue collection in the Asian region in recent years. Past experience in this regard reveals that a considerable amount of revenue can be raised in many developing countries in the presence of strong political will within the established methods and existing framework (Bird, 2004; Cottarelli, 2011). However, it's really challenging for the low-income countries to raise tax revenue due to poor administrative quality, the existence of a more informal economy and unstable political setup (Tanzi and Zee, 2000). It has not been clear why some countries, especially Arab countries and the least developed countries in Asia, still have a problem of raising tax revenue despite the high pressure for public spending.

The taxable foundation as well as capacity of the countries across the region varies widely. Understanding such characteristics of the economy is crucial prior to tax policy reform. Most previous studies have ignored the role of non-tax revenue in assessing the tax effort and some of the issues are still unclear; for instance, why do some countries still have a low level of tax revenue? Is it possible to increase tax revenue under the existing structure of the economy? What are the major factors that lead to a low level of tax revenue?

Hence, this research aims to explain the cause of the low level of taxation as well as the variation in tax revenue across Asian countries by estimating tax revenue through its structural, demographic and institutional factors. We also calculate the tax effort index based on actual and potential revenue, and explain their significance in the economy.

4.2 Literature Review-Determinants of Tax Effort Performance

A number of previous studies have recognized that structural variables such as per capita income, trade openness and the share of agriculture in GDP play a lead role in determining the level of tax revenue (Gupta, 2007; Fenochietto and Pessino, 2013; Piancastelli, 2001). Many other studies setup extensions of the regression model by including some of the structural and macroeconomic variables such as urban population, inflation, foreign aid, natural resource revenue, size of the shadow economy, political stability and regulatory quality. However, the effect and significance of these variables vary largely across the countries, study period and the techniques of estimation.

Stotsky and Mariam (1997) showed with the evidence from Sub-Saharan Africa that only share of agriculture and share of mining in GDP have significant negative impact on tax collection. But Mahdavi (2008) revealed from the same region that size of international trade, the percentage of the urban population, adult literacy rate, and per capita income are associated with higher tax-GDP ratio. Ansari (1982) also highlighted the demographic factor as an important determinant of tax revenue. Similarly, Lotz and Morss (1970) concluded that tax revenue in developing countries largely depends on the availability of tax base, but persists no significant implication to demand for government services. However, Teera and Hudson (2004) argued that the success of tax effort depends on mainly the tax potential, general level of development, target to reach the expenditure desire and administrative and political situation.

Contrary to the conventional practices in explaining tax effort, economists recently have emphasized the role of institutional quality. Administrative capacity such as better bureaucracy quality or less corruption and attention to taxation policy governed by political will play a crucial role to boost up the tax effort (Le et al. 2008; Le et al., 2012). Bird et al. (2004) also argued that poor countries do not get the desired output toward revenue mobilization unless they improve administrative capacity, rule of law and reduction on corruption level. Bahl and Bird (2008) also expressed similar views with regard to the role of institution. A brief summary of literature review has been shown in Appendix-2D.

While documenting the previous literature, the role of foreign aid is found to be contradictory. Gupta (2007) showed that foreign aid enhances tax revenue generation, while Feger and Asafu-Adjaye (2014) showed a contradictory result from the sample of sub-Saharan Africa. Similarly, beyond our general perception, Crivelli and Gupta (2014); Fenochoietto, and Pessino (2013) showed that natural resource revenue is harmful to tax effort efficiency.

In summary, tax effort depends upon the characteristics of the country, including the tax administration regime, structure of economy and structure of tax base. We object to the previous findings, arguing that the excessive dependence on non-tax revenue lessens the commitment of the government toward generating tax revenue. To the best of our knowledge so far, no intensive studies have been performed focusing on Asian countries. Hence, the need of this study has been strongly realized.

4.3 The Basic Model

In general, the conventional practices for measuring the tax effort consist of regression analysis using a ratio of tax revenue to GDP as a dependent variable and structural variables such as GDP per capita, the share of agriculture in GDP and trade openness as the explanatory variables. However, modern literature incorporates both structural and institutional variables (e.g. Bird et al., 2004; Gupta, 2007). Institutional variable indicates the overall situation of the country comprising political stability, corruption level, and government efficiency. Based on the previous empirical model and theoretical literature, we specify the regression model as follows.

$$y_{it} = \alpha + \beta X_{it} + \lambda Y_{it} + u_i + \varepsilon_{it} \dots\dots\dots (1)$$

where,

y_{it} = Total tax revenue as a percentage of GDP relating to the country i at time t

β and λ are the vector of the coefficients of the vectors X_{it} and Y_{it} , respectively. X_{it}

represents as follows.

X_{it} = (Proxy for structural and macroeconomic variables: gdp_pc_{it} , trade_open_{it} , $\text{agriculture_va}_{it}$, urban_pop_{it} , inflation_{it} , faid_{it} , natural_res_{it})

Y_{it} = (Proxy for institutional variables: $\text{gov_effectiveness}_{it}$ / $\text{Polit_stibility}_{it}$)

u_i = Country specific error term

ε_{it} = Sample-wide error term

The variable GDP per capita (gdp_pc) is taken as a proxy for the capacity to pay and is expected to have a positive impact on tax revenue. The proxy for trade openness (trade_open) is the total volume of import and export of goods which is directly associated with the tax revenue. Similarly, it is expected that if the economy is predominated by agriculture, it is much more difficult to collect the taxes due to more informal activities associated with this sector. The proxy for the share of agriculture in GDP is value added in agriculture (agriculture_va). It is also expected that urbanization helps to increase the tax revenue. A higher level of urbanization reflects an advancement of the society, which in turn helps the regulator organize the tax collection. The proxy for urbanization is share of urban population (urban_pop).

There are two different views regarding the impact of foreign aid (faid). One view suggests that the inflow of foreign aid improves the socioeconomic development of the poor people and hence increases the capacity to pay. However, another view suggests that receiving of foreign aid increases the dependency and will have less effort by the government to collect the tax revenue. To proxy for the general macroeconomic situation of the country, inflation is taken as another explanatory variable which is expected to have a negative impact on tax revenue collection, as it reduces the tendency of consumption and investment. Use of natural resources (natural_res) is generally expected to have a positive impact on tax revenue collection because it increases the tax base. Hence, it is also taken as a regressor in the model.

It is commonly argued that the efficiency in tax collection depends not only on the demand side factors, but also on the nature and skill of the governments. An efficient government characterized by less corruption, stable politics, and strict rule of law can enhance the tax revenue. As a proxy for institutional factor, government effectiveness (gov_effectiveness) is taken as a regressor.

Following the concept of tax effort by Lotz and Morss (1967); Bahl (1971); Stotsky and Mariam (1997) and Le, Moreno-Dodson and Rojchaichaninthorn (2008), we also analyze the tax effort performance on the basis of tax effort index. This is obtained as follows.

$$\text{Tax Effort Index} = \frac{\text{Actual tax revenue}}{\text{Potential tax revenue}} \dots\dots\dots (2)$$

Potential tax revenue is the estimated tax revenue obtained by the regression as modelled in equation (1). The overall situation of tax revenue in comparison to their own capacity is analyzed through the tax effort index. Tax effort index having value 1 indicates that the country is utilizing its full potential so as to maintain the average standard as performed by all economies. Tax Effort Index lower than 1 indicates that country is not utilizing its full capacity so as to meet the global standards (standards of sample economies). When it is a value greater than 1, it means that the country is performing better than the average global standards.

We use fixed effects (FE) as a baseline regression to estimate this model. Since our data consists of a relatively short period and we also assume that time invariant fixed factors affect each country's economy, fixed effects regression is applied. To avoid the econometric problems like heteroscedasticity and autocorrelation, we report the p-value associated with robust standard error. We also check the results from generalized method of moments (GMM) to assess the robustness. The benefit of GMM estimate is that it is more efficient than others if the data suffer from autocorrelation and heteroscedascity and it also avoids the possible endogeneity problem which may appear in the regression.

4.4 Data Analysis

4.4.1 Data

We use annual data of 34 Asian countries for the period 1991-2012. Most of the data are taken from World Bank Indicator (WDI) – 2013. Inflation dataset is taken from World

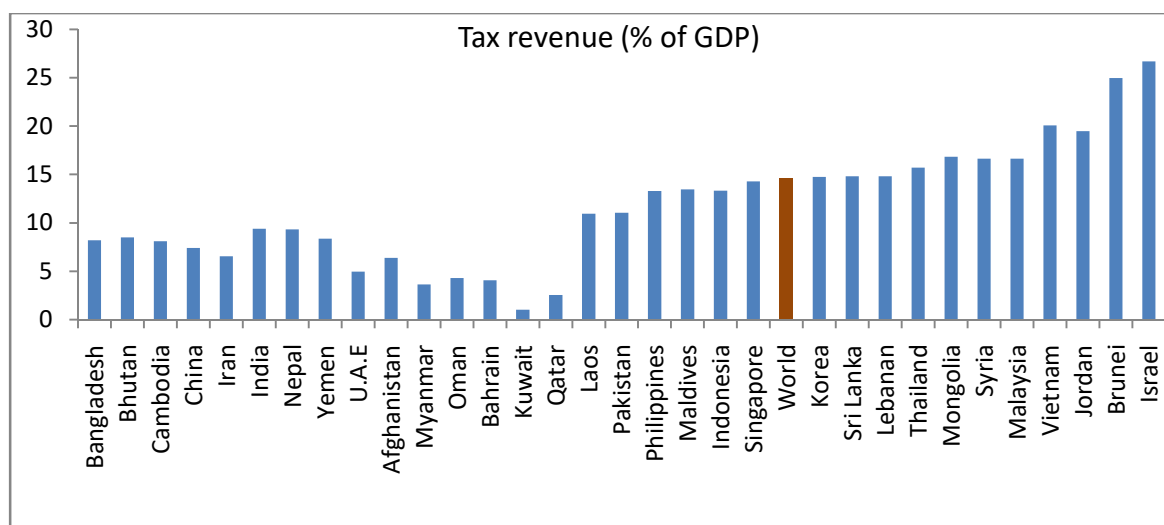
Economic Outlook (2014), International Monetary Fund (IMF). Various categories of tax revenue are taken from Government Finance Statistics (GFS), IMF. We use central government data for the tax revenue and its components. The detail about the symbol and description of variables are shown in Appendix-4A. Sample countries contain almost all the developing countries of Asia. The detail about the sample countries is shown in Appendix-4B. Tax revenue has been measured as a percentage of total tax revenue in real Gross Domestic Product (GDP). Government effectiveness and political stability have the scores ranging between -2.5 to +2.5.⁸ These data are taken from World Governance Indicator (WGI) of the World Bank and available only from 1996. Low score indicates the poor government effectiveness or political stability and higher score reflects a higher level of government effectiveness or political stability. The correlation matrix between the variables which are used in regression equation are Appendix-4C, showing that no multicollinearity problem.

4.4.2 Performance of tax revenue

During the period 1991-2012, the average tax-GDP ratio of 34 Asian countries is found to be 11.41 percent, which is less than the world average (14.58 percent). As of Figure 4.1, nearly one-third of the countries has a quite low tax revenue, comprising less than 10 percent of GDP, and more than half of the sample countries show less than 15 percent. Kuwait has the lowest tax effort followed by Myanmar, Bahrain, and Oman, respectively. Only three countries show the tax effort of more than 20 percent of GDP, among them Israel ranks the highest. Looking at the trend, we do not find any significant increment in the tax-GDP ratio from the period 1991-2000 to 2001-2012. It shows the improvement of only 1 percentage point. Some countries have lost their capacity in recent years, although they had a considerable tax revenue performance in the past. Countries such as Israel, Sri Lanka, Malaysia and Indonesia belong to this category. Countries such as Bahrain and Oman already had low tax effort and are still losing their tax efficiency. Countries such as Afghanistan, Bhutan, China, Laos, and Mongolia show an improved performance, although they still have an unsatisfactory level of tax effort. Certain countries comprising Maldives, Singapore, Jordan, and Yemen have almost constant performance during the period.

⁸Government effectiveness is the index formed on the basis of a number of surveys comprising the large number of respondents by Daniel Kaufmann, Aart Kraay and Massimo Mastruzzi to measure the perception of the quality of public services, the quality of civil services and the degree of its independence from the political forces, the quality of public policy formulation, credibility of the government's commitment and the level of implementation accordingly.

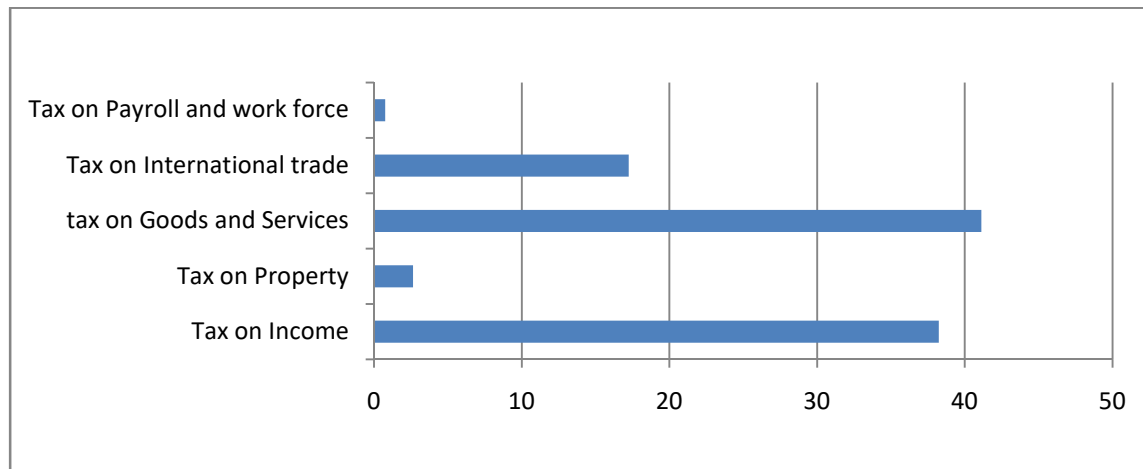
Figure 4.1: Status of average tax performance in 34 Asian Countries from 1991-2012



Source: Author's calculation based on the data taken from GFS, IMF

Figure 4.2 shows that the average share of taxes on goods and services to GDP account for the highest proportion among all. In contrast, payroll and work force taxes have the smallest proportion. Interestingly, property taxes show no significant contribution to the total tax revenue. Composition of direct versus indirect taxes in the Asian region is also different from the world. The ratio between direct (income, payroll and workforce, and property taxes) to indirect taxes (taxes on goods and services, and international trade) is found to be 0.70. From 1991 to 2012, there has been a drastic increase in taxes on goods and services, but decrease in taxes on international trade. This is pretty low compared to world average ($1 <$) and OECD average ($2 <$) (Martinez-Vazquez, 2011). More interestingly, the share of income tax in direct tax is found to be 0.91 which is higher than that of developed countries. It implies that taxes on property are lower than other regions in the world. Income tax is the most harmful tax among other kinds of taxes as it negatively affects the economic decision of the firm and household, whereas immovable property tax has a minimal negative impact on the economy (OECD, 2010). These scenarios indicate the better scope for the improvement in property taxes.

Figure 4.2: Composition of tax revenue in Asian countries from 1991-2012 (% of Total)

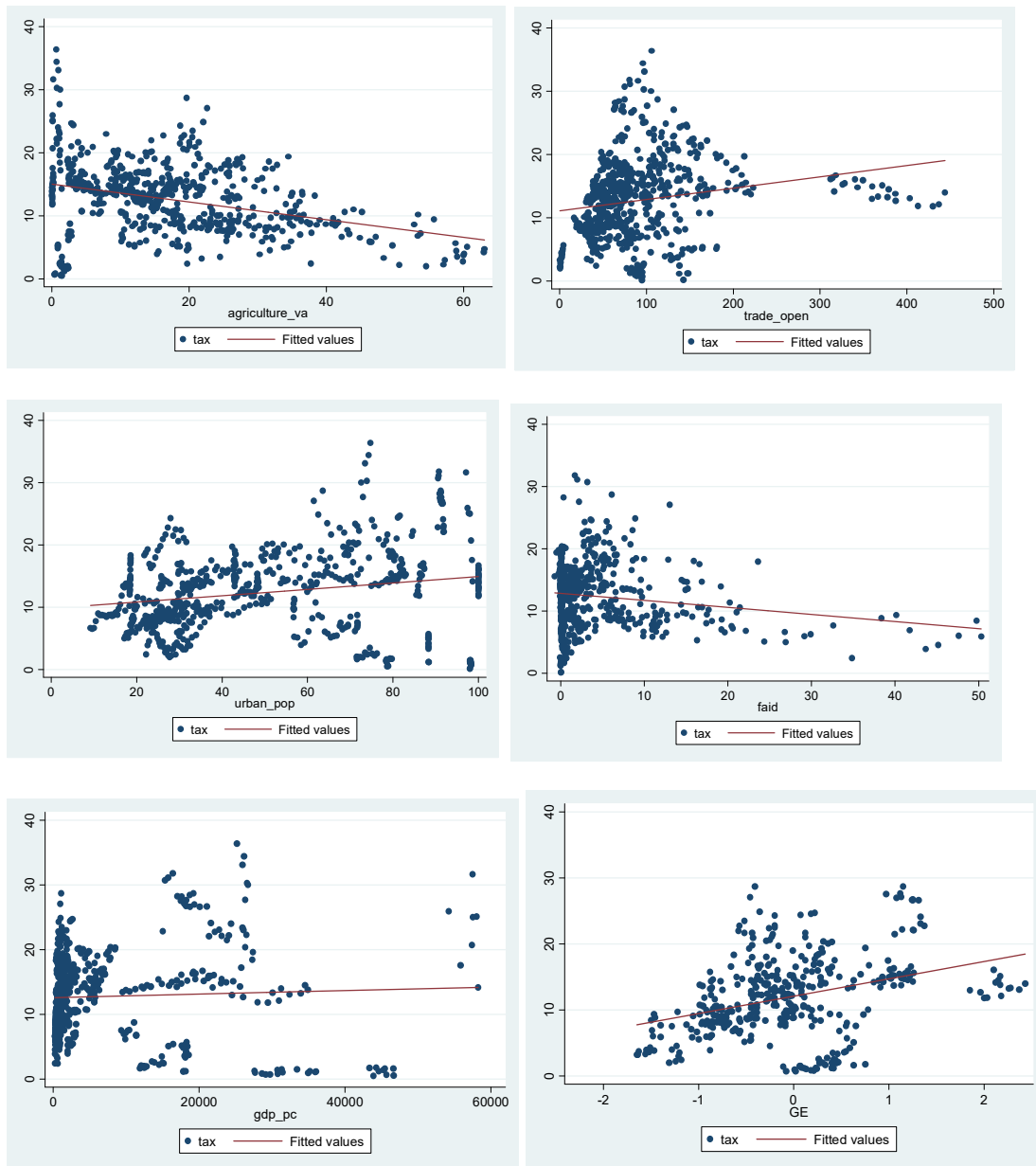


Source Author's calculation based on the data taken from GFS, IMF.

4.4.3 Correlation between Tax Revenue and Its Determinants

Before getting final empirical results, we just try to explore the relationship graphically between the tax-GDP ratio and its important determinants. Two way scatter-line plots as shown in figure 4.3 indicate that impact of all independent variables are in expected directions except GDP per capita. Trade openness, percentage of urban population, and government effectiveness (here denoted as GE), independently, are positively correlated with tax-GDP ratio, whereas the share of agriculture in GDP and foreign aid are negatively correlated. Although the correlation between foreign aid and tax-GDP ratio is debatable, as someone argues that it may have a positive correlation, negative correlation is also equally justifiable from the viewpoint of dependency hypothesis. Surprisingly, the exact relationship for GDP per capita is unclear. Since the effect of natural resource revenue is supposed to be conditional assuming that it plays a dual role, correlation is not shown here.

Figure 4.3: Relationship between tax revenue and its major explanatory variables



Source: Author's estimation based on the data taken from WDI and GFS.

4.5 Empirical Results and Discussion

Table 4.1 shows the regression results estimated through fixed effects with different specifications.⁹ Regressors include the structural variables as well as institutional variables. Specification 1 includes only four major independent variables: trade openness (trade_open), the share of agriculture in GDP (agriculture_va), percentage of urban population (urban_pop), foreign aid (faid) and inflation. We add political stability (polit_stability) and government effectiveness (gov_effectiveness) in specifications 2 and 3, respectively and observe that political stability is not significant, although it is positively correlated with tax revenue. From specification 4 to 7, we add another variable- GDP per capita (gdp_pc) with different specifications to check whether omission of this regressor matters in the final result. Political stability (in specification 2) and government effectiveness (in specifications 3, 5 and 7) are included as institutional indicators. Before reaching the final model (specification 7), we can ensure that the effect of each variable is consistent regardless of the model specifications. We checked the results including other institutional variables such as corruption, regulatory quality, but we did not find these variables significant. Hence we only use government effectiveness, which is almost significant across various specifications.

The results of the final model as shown in Table 4.1 reveal that trade openness, the share of agriculture in GDP, urban population, foreign aid and government effectiveness are the significant explanatory variables of tax revenue. However, inflation and GDP per capita are not robustly significant and natural resource in rent also does not show any significant relationship. The finding clearly indicates that trade openness, the level of urbanization and government effectiveness are associated with higher tax revenue, whereas foreign aid and share of agriculture in GDP are negatively associated.

⁹All regressions are preformed with country and time dummy including constant term. The robust standard errors have been reported to avoid the problem of heteroscedasticity and autocorrelation.

Table 4.1: Fixed Effects regression result

Estimation Method: Two way Fixed Effects							
Dependent variable: tax-GDP ratio							
Specifications							
	1	2	3	4	5	6	7
gdp_pc				-0.0002 (-0.59)	-0.0006* (-1.93)	-0.0004 (-1.37)	-0.0006* (-1.80)
trade_open	0.04*** (3.37)	0.03*** (3.21)	0.03*** (3.81)	0.04*** (3.40)	0.03*** (3.58)	0.04*** (3.13)	0.03*** (3.70)
agriculture_va	-0.16* (-1.99)	-0.17*** (-2.73)	-0.18*** (-2.68)	-0.16* (-1.81)	-0.18** (-2.61)	-0.15** (-2.04)	-0.16** (-2.50)
urban_pop		0.14** (1.99)	0.14* (2.04)		0.16** (2.36)	0.17 (1.41)	0.17** (2.79)
faid	-0.21** (-2.48)	-0.18** (-2.47)	-0.21* (-1.89)	-0.21** (-2.17)	-0.20* (-1.82)	-0.17 (-1.66)	-0.20* (-1.82)
inflation	-0.04*** (-3.16)	-0.02 (-1.00)	-0.02 (-1.47)	-0.04*** (-3.03)	-0.02 (-1.41)	-0.03** (-2.69)	-0.02 (-1.38)
natural_res				-0.02 (-0.52)		-0.02 (-0.78)	-0.01 (-0.37)
gov_effectiveness			1.84* (1.74)		2.25* (1.74)		2.27* (1.75)
polit_stability		0.27 (0.69)					
R ²	0.30	0.31	0.32	0.30	0.33	0.33	0.33
No of obs.	440	266	266	432	263	432	263

Note: ***, ** and * indicate that variables are significant within 1%, 5% and 10% level, respectively and the t-statistics in parentheses.

The effects of foreign aid and share of agriculture in GDP seem to be stronger to reduce the tax efficiency. The coefficients are -0.20 and -0.16, respectively in the final model. The increase of foreign aid by one percentage point in its Gross National Product (GNI) decreases Tax-GDP ratio by 0.20. Similarly, one percentage point increase in the share of agriculture in GDP causes a 0.16 percentage point reduction in tax-GDP ratio. With regard to the positive factor, higher government effectiveness and increase in urban population support for the rise tax revenue. The effects of these variables are also stronger than others.

The significant negative coefficient of the share of agriculture in GDP can be explained for a number of reasons. First, the agriculture dominant economy is characterized by several products and activities in which imposing tax is difficult. Secondly, for developing countries more families are relying on the subsistence level of farming with limited income, which in turn restricts the tax revenue. Thirdly, the existence of large non-monetized sector and non-tradable goods in the agriculture economy lowers the tax collection. The lesson from this result is that countries should focus on export based farming and policy should be oriented toward modernization and industrialization of agriculture.

Trade openness is found to have a significant positive relationship with tax revenue, although the coefficient is not so high (0.03) in the final specification and almost similar in others. It means that a one percentage point increase in trade-GDP ratio causes 0.10 percentage point rise in the tax revenue. When the flow of goods in international trade increases, it obviously raises the tax revenue due to the transaction of taxable products. In addition, international trade helps to enhance the productive capacity of the producer through competition within the international markets. It may raise the question that whether the tax revenue from international trade is a sustainable source in the context where many countries are more dependent on imports than exports. Unless the country makes policy reform in the structure of the economy, it is difficult to avoid the import tax. However, the increase in competition amongst international markets and trade liberalization policy in the long-run enhance productive capacity in the domestic market. The experiences of some countries reveal that trade tax reduction can be compensated by other measures (Keen and Mansour, 2009). This result of trade openness is in line with most of the previous studies.

Although the role of foreign aid has been debated, our results conclude that foreign aid has a significantly negative effect on tax revenue. Indeed, foreign aid increases the dependency on others and lowers the tendency to target the optimum level of taxation. The government does not boost up its own skill and effort internally in collecting the tax revenue as long as foreign aid continues to inflow in kind from donor agencies. This result is in line with the research by Feger and Asafu-Adjaye (2014) who argue that foreign aid has a reduced domestic revenue mobilization in sub-Saharan Africa.

One of our major objectives is to identify whether government effectiveness is supportive for tax revenue performance. The positive and significant coefficient of government effectiveness indicates that it is a strong determinant of tax effort performance. Effective government can monitor tax compliance strictly by avoiding the tax evasion. Bird (2004) and Le et al. (2012) also highlight the importance of strict administration in collecting tax revenue. With regard to the urban population, it is found to be positively correlated with tax revenue, suggesting that we cannot underestimate the role of urbanization on tax revenue collection, despite the fact that many previous studies do not care about its role in explaining the performance of tax revenue. Similarly, inflation and utilization of natural resource are not robustly significant, but in general, the former is negatively related with tax effort while the latter is positively related.

Surprisingly, the coefficient of GDP per capita is found to be negative and not robustly significant. GDP per capita is the proxy for the level of development, and it is generally expected that the higher level of development relates to the higher tax effort performance, implying that paying capacity of the tax payers rises as per capita income rises. However, this result is not completely odd; a similar finding by Teera and Hudson (2004) and Tanzi (1992) explains that per capita income has lost its importance after 1985 due to the huge debt crisis faced by the countries. The negative result indicates that not the payable capacity only matters, but what matters is the paying system characterized by the culture of taxation. The overall result of GDP per capita signifies that it is not an important explanatory variable of tax-GDP ratio.

4.5.1 Robustness Check

We, further, check the robustness in different country groups by applying the same techniques as in previous specifications. The countries have been categorized into high-income; low- and middle-income on the basis of World Bank's classification.¹⁰ However, due to the highly unbalanced nature of the data, we couldn't run a meaningful regression in the case of high-income countries. Similarly, we separate the countries into another two groups based on the natural resources: oil based and non-oil based economies.¹¹ High oil producing countries, in general, are characterized by a low tax revenue, and the performance is quite poor compared to other countries.

The fixed effects regression results from these groups of countries are shown in table 4.2. Trade openness and foreign aid are robustly significant in all groups, with the same sign as seen in the full sample. The share of agriculture in GDP and the percentage of urban population are significant both in low- and middle- income countries and non-oil based economies, however, these variables are not significant in high oil producing countries. Oil producing countries, especially high income countries, are characterized by the high level of urbanization and low share agriculture in the economy. The further increase in urban

¹⁰Classification is done as of World Bank, 2015. Low income countries are defined as those with a GNI per capita of \$1,045 or less in 2013; middle-income economies are those with a GNI per capita of more than \$1,045 but less than \$12,746; high-income economies are those with a GNI per capita of \$12,746 or more. Lower-middle-income and upper-middle-income economies are separated at a GNI per capita of \$4,125.

¹¹ Especially the members of Organization of the Petroleum Exporting Countries (OPEC)- Saudi Arabia, United Arab Emirates, Qatar, Kuwait, Iraq, Iran and Indonesia are placed in the group of high oil producing countries. We also observed that Bahrain is one of the top oil exporting countries and hence we add Bahrain in this group to increase the number of observation.

population in such countries cannot raise the tax revenue as they have already high level of urban population. Similarly, if the country has a considerably lower level of agriculture, further increase in agriculture's share of the economy does not necessarily depress the tax revenue. Interesting result in high oil producing countries is that the excessive use of natural resource is not supportive to the high tax performance, although it provides a good source of revenue.

Table 4.2: Regression results from different groups of countries

Determinants	Estimation Method: Fixed Effects		
	Dependent variable: tax-GDP ratio		
	Low- and middle-income	Non-oil based economies	High oil producing countries
gdp_pc	-0.0006 (-1.64)	-0.0005 (-1.32)	-0.001 (-3.79)
trade_open	0.03*** (3.72)	0.03*** (3.65)	0.05*** (2.71)
agriculture_va	-0.16** (-2.45)	-0.18*** (-2.97)	0.30 (1.71)
urban_pop	0.17*** (2.72)	0.14** (2.00)	-0.37 (5.17)
faid	-0.20* (-1.83)	-0.21*** (-2.84)	-0.08*** (-3.14)
inflation	-0.02 (-1.38)	-0.01 (-1.10)	-0.01 (-0.97)
natural_res	-0.01 (-0.34)	0.01 (0.37)	-0.14*** (-3.46)
gov_effectiveness	2.29* (1.74)	1.8** (2.03)	0.54 (0.19)
R ²	0.34	0.33	
Hansen-J statistics			1.93
P-value			0.16
No of obs.	254	260	51

Note: ***, ** and * indicate that variables are significant within 1%, 5% and 10% level, respectively and the t-statistics in parentheses.

Table 4.3 shows the regression results using the generalized method of moments (GMM). In a study by Abdullah et al. (2009), GDP per capita is also explained by tax revenue, indicating an endogeneity problem. In such a case, GMM gives the more appropriate result than other techniques of estimation. We find that the share of agriculture in GDP, trade openness, foreign aid and urban population are robustly significant in all groups of countries. The coefficients are slightly different than the fixed effects estimation, however, results are comparable with the fixed effects. The government effectiveness is also significant in the full sample and low- and middle- income countries, but not significant in non-oil based economies. The variable- natural resources in rent is only significant in high oil producing countries, showing the negative effect on tax revenue. In overall, findings from GMM are

almost same as that of fixed effects estimations and hence validate the consistency of the results.

Table 4.3: Panel regression result using Generalized Method of Moments

Determinants	Estimation Method: GMM		
	Dependent variable: tax-GDP ratio		
	Full country sample	Low- and middle-income	Non-OPEC countries
gdp_pc	-0.002*** (-6.26)	-0.002*** (-5.98)	-0.002*** (-3.79)
trade_open	0.05*** (8.34)	0.06*** (11.51)	0.05*** (8.22)
agriculture_va	-0.13*** (-3.47)	-0.13*** (-3.62)	-0.07* (-1.86)
urban_pop	0.11*** (4.26)	0.08*** (4.12)	0.12*** (4.23)
faid	-0.22** (-2.06)	-0.08** (-2.88)	-0.09*** (-3.03)
inflation	0.006 (2.41)	-0.02 (-0.50)	0.01 (0.41)
natural_res	0.04 (1.19)	0.04 (1.38)	0.08* (1.85)
gov_effectiveness	1.29* (1.79)	1.25* (1.70)	1.14 (1.20)
R ²			
Hansen-J statistics	2.36	2.58	1.30
P-value	0.30	0.11	0.25
No of obs.	249	240	246

Note: ***, ** and * indicate that variables are significant within 1%, 5% and 10% level, respectively and the t/z-statistics in parentheses. The Hansen - J test is used for the over-identifying restrictions, which tests the overall validity of the instruments.

The inconclusive result, with regard to the natural resource revenue, obtained from the above regression motivates us to broaden the framework of research. Some resource rich countries have high natural resource revenue resulting in higher revenue, but the tax revenue performance is very poor which is beyond our general perception. Hence, we apply alternative ideas by restricting the regression with non-tax revenue. The observation shows that more than one third of the Asian countries have non-tax revenue higher than the tax revenue (see Appendix-4E). Tax revenue and non-tax revenues, in general, may have the same objective of revenue maximization. However, the nature and influence of them are quite different in the economy. Tax revenue is a more sustainable source, whereas non-tax revenue is not and dependence on non-tax revenue indirectly affects the performance of tax revenue. The effect of natural resource revenue on tax revenue also depends on whether the economy is tax revenue dominant or non-tax revenue dominant. Table 4.4 explains that if the country has non-tax revenue more than tax revenue, natural resource shows a negative

relationship with tax revenue, whereas it does not show any significant relationship when tax revenue is greater than non-tax revenue. Hence, we conclude that excessive use of natural resources in rent has a negative effect on raising tax revenue. This finding is quite unique if we observe the previous literature. Similarly, to check the direct effect of non-tax revenue (non-tax) on taxation, we replace the variable natural resource in rent by non-tax revenue, with the exclusion and inclusion of the variable foreign aid, it clearly shows negative relation toward tax revenue.

Table 4.4: Effect of non-tax revenue on tax effort

Determinants	Estimation method: Fixed Effects			
	Dependent variable: tax-GDP ratio			
	Tax revenue < Non-tax revenue	Tax revenue > Non-tax revenue	Full sample	Full sample
gdp_pc	-0.0001 (0.35)	-0.003** (-2.21)	-0.0001 (1.39)	-0.0005 (-1.56)
trade_open	0.0004 (0.03)	0.02 (1.69)	0.01* (1.74)	0.03*** (4.53)
agriculture_va	-0.22* (-1.87)	-0.03 (1.42)	-0.27* (-2.60)	-0.17** (-2.17)
urban_pop	0.23** (2.48)	0.21** (2.12)	0.19** (2.60)	0.15* (1.88)
faid	0.08 (0.76)	-0.28** (-2.99)		-0.17 (-1.66)
inflation	-0.04** (-2.20)	-0.04 (-0.10)	-0.03 (-1.34)	-0.04 (-1.39)
natural_res	-0.06** (-2.95)	-0.09 (1.25)		
gov_effectiveness	3.05* (1.99)	3.31* (1.78)	1.09 (1.68)	2.29 (1.55)
non-tax			-0.18** (2.60)	-0.22** (-2.21)
R ²	0.54	0.33	0.36	0.42
No of obs.	81	181	303	259

Note: ***, ** and * indicate that variables are significant within 1%, 5% and 10% level, respectively and the t-statistics in parentheses.

4.6 Tax Effort Index

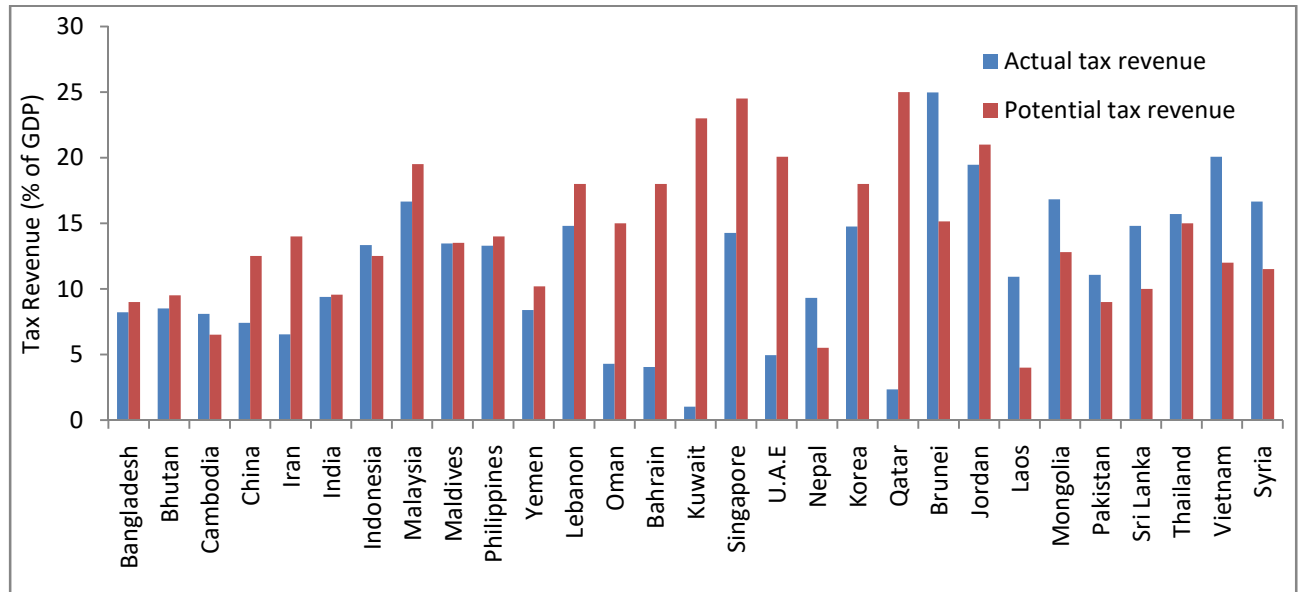
The "Tax Effort Index" measures overall performance of the country in generating the tax revenue. We consider two factors while calculating this index: actual tax collection and predicted tax revenue. Based on the regression model of equation 1, potential tax revenue has been calculated. Specification 7 (the final model) of "Table 4.1" is the basis for creating potential tax revenue.¹² However, we take average considering the other specifications from Table 4.1. Fixed effects regression technique has been used for estimating the potential tax revenue and hence the "Tax Effort Index".

Table 4.5 shows tax effort indexes of the countries. It is the ratio of actual tax revenue to the potential tax revenue. The result shows that 19 countries have tax effort index less than 1. It means they are not able to raise tax revenue so as to meet their tax potential. However, 10 countries have higher performance than the standards of sample countries. Laos shows the highest tax effort index while Kuwait reveals the lowest among all. The gap between actual and potential tax revenue has been shown in figure 4.4.

The higher gap between the two revenues implies that there is deficiency in either tax foundation or the base of the taxation. For instance, if a country is characterized by the low level of urban population, less trade openness and poor government effectiveness, there is no reason to think of higher tax potential. This is due to having a weak foundation of taxation. Such a country should think of promoting the foundation of taxation. Typical examples of these countries are Nepal and Laos. Conversely, if the countries have a higher tax foundation, but lower tax performance, such countries should think of increasing tax base as well as restructuring the tax structure. High-income countries such as Kuwait, Qatar, and U.A.E fall in this category. Similarly, if the gap is very low, increase in government effectiveness can improve the tax performance.

¹²To get the precise result as well as maximize the number of countries, average value has been noted from the regression specifications 4 to 7. We observed that there is no considerable difference between the predicted tax revenues obtained from each specification of Table 1.

Figure 4.4: Estimation of actual versus potential tax revenue



Source: Author's calculation.

Table 4.5: Tax Effort Index by countries

Country	Tax Effort Index	Country	Tax Effort Index
Bangladesh	0.91	Bahrain	0.22
Thailand	0.98	Qatar	0.12
South Korea	0.81	Bhutan	0.89
Lebanon	0.82	U.A.E	0.24
China	0.59	Cambodia	1.24
Iran	0.46	Nepal	1.69
India	0.98	Sri Lanka	1.48
Jordan	0.92	Vietnam	1.67
Singapore	0.58	Indonesia	1.06
Kuwait	0.04	Laos	2.73
Malaysia	0.85	Pakistan	1.22
Maldives	0.99	Mongolia	1.31
Yemen	0.82	Syria	1.44
Philippines	0.94	Brunei	1.64
Oman	0.28		

Source: Author's calculation.

Like Le et al. (2012), we classify the countries into four groups as shown in table 4.6. This classification is based on the benchmark of median tax collection (13.5 % of GDP) and tax

effort index. First category of countries is "low tax collection (less than 13.5%) and low tax effort (less than 1)". The highest number of countries (13 countries) belongs to this group. The second category of countries is "low tax collection and high tax effort (more than 1)". Only 4 countries lie in this group. Similarly, the third category of countries is "high tax collection and low tax effort" which also contains 6 countries. The fourth category of countries is "high tax collection and high tax effort". This group also contains 6 countries. The details about the countries are shown in Table 4.6.

Each group of countries has more or less similar characteristics in terms of explanatory variables. High tax potential implies that there is dominancy of the variables which affect the tax revenue positively. Our observation from the data set of all countries confirms that the countries which are more open for international trade, less agrarian, less dependent on foreign aid and more populated in urban area have high tax potential. The increase in government effectiveness increases the actual tax collection. For instance, Group II countries are characterized by a lower level of trade openness, highly agrarian and lower government effectiveness and hence there exists a lower tax potential. On the other hand, Group III countries have favorable economic structures than others, but actual tax revenue is lower than their capacity.

Table 4.6: Tax Effort Classification

Group I		Group II	
Low tax collection and low tax effort		Low tax collection and high tax effort	
Bangladesh	Iran	Laos	
Philippines	Bahrain	Nepal	
Maldives	China	Pakistan	
Yemen	India	Cambodia	
UAE	Kuwait		
Oman	Bhutan		
Qatar			
Group III		Group IV	
High tax collection and low tax effort		High tax collection and high tax effort	
Malaysia		Mongolia	
Lebanon		Sri Lanka	
Singapore		Brunei	
South Korea		Vietnam	
Jordan		Indonesia	
Thailand		Syria	

Source: Author's estimation.

4.7 Analyzing the Criteria for Tax Effort

Based on the above results we focus on the following two different situations to evaluate the tax performance in the Asian economies.

1. Low Tax Effort Index
2. Tax Effort Index far from the value 1.

At first, let's discuss on situation 1. Low tax effort index implies that country's tax performance is less than the tax potential. If we consider each nation performs equally and has the same level of tax potential, tax effort index becomes 1. At this situation, actual tax revenue equals potential tax revenue. But this does not happen; tax effort varies largely as per the institutional capacity and macroeconomic system existing in the countries. If a country has good foundation for tax base such as higher percentage of urban population, higher tax paying capacity and more trade open economy, but cannot generate more tax revenue as much as its potential, then this type of country shows a low tax effort index. For instance, Singapore, South Korea, Jordan, Kuwait and UAE have low tax effort. They can increase their tax effort by some fiscal policy measures. The act of tax policy reform is not so critical in this situation. There is another category of countries which has low tax potential and low tax collection but still tax potential exceeds slightly the actual tax collection. For instance, Bangladesh and Bhutan belong to this category. In such countries raising tax effort is a little bit complicated because, they have to raise both the tax capacity and actual tax collection. Some countries may have the reverse case where both quantities are smaller but tax potential remains less than the actual collection. In this case, these countries should increase tax potential by strengthening the foundation of taxation.

Now let's have discussion on situation 2. When actual tax revenue exceeds or lags far behind tax potential, tax effort index diverts from 1. When a country holds higher tax potential and performs higher tax collection than the tax capacity, there is no problem in the economy unless taxation creates distortion. We prefer the countries to have a higher tax effort. But some countries show the situation where actual tax collection is far less than their tax potential. Countries such as Brunei, Qatar, Kuwait and Bahrain are the examples to this. In these countries, government can increase tax revenue by strengthening the institutional efficiency as well as base structure of taxation. Since there is no need of increasing their tax potential, tax reform in such economies may not create extra distortions in the economy.

4.8 Conclusion

We analyzed the factors that characterize the tax revenue performance in 34 Asian countries, using data from 1991 to 2012. The majority of Asian countries clearly show a lower tax effort performance. We found that the structure of the economy, as well as government effectiveness, largely determines tax effort performance. Trade openness, the level of urbanization, the share of agriculture, and foreign aid are the major structural determinants of the tax revenue. The share of agriculture and foreign aid are inversely proportional to the tax-GDP ratio, whereas trade openness and the level of urbanization are directly associated. Additionally, we observed that government effectiveness can significantly increase the tax effort performance.

The main contribution of this research is its exploration of the role of non-tax revenue on tax efficiency. Excessive dependence on foreign aid and natural resource revenues lower the tax effort efficiency in Asian countries. Interestingly, GDP per capita had no supportive effect on tax effort performance in recent years. Most of the Asian countries are characterized by their high debt crisis, weak contribution of income taxes, and low government effectiveness. These factors may have an important role in the insignificance of GDP per capita to be insignificant.

It is concluded that excessive dependence on non-tax revenues, especially the natural resource revenues and foreign aid, is the major factor which plays a great role in hampering tax revenue collection. Oil producing countries raise considerably higher amount of revenues from natural resources, however, they generate significantly lower amounts of tax revenue. While observing the structure of tax and non-tax revenues, these countries seemed to be overwhelmingly dependent on non-tax revenue. This indicates that there may be either an absence of available tax base or the governments are not working effectively. For non-OPEC countries, particularly countries which are more dependent on tax revenue than non-tax revenue, rent from natural resources is not associated with low tax revenue. Most of these countries have low tax efficiency. One of the main reasons behind the low tax efficiency is the high dependency on foreign aid. Unless the government improves its working efficiency, and increases its commitment, an improvement on tax performance will not be forthcoming.

This research suggests that reform in tax policy in the majority of Asian countries is feasible under the existing framework by improving administrative and government efficiency. As many Asian countries show low tax effort performance, but have higher capacity, expanding

the tax base or strengthening institutional quality can enhance the level of tax collection without causing any adverse effect to economic activity. The countries with a low capacity as well as low tax performance should focus on improving both the tax foundation and institutional quality rather than increasing the tax rate. Similarly, as the results show a negative impact of foreign aid on tax collection, governments should reduce their dependency on foreign aid as well as other non-tax revenues by strengthening tax compliance. An effective government with strong political will can raise the tax effort performance.

Appendix 4

Appendix-4A: Variable description, source and mean statistics

Variables	Symbol	Mean	Number of Observation	Source
Tax Revenue (% of GDP)	tax	11.41	648	GFS, IMF, ADB
GDP Per Capita (US \$ Constant 2005)	gdp_pc	8544.4	676	WDI, World Bank
Total Volume of Trade(% of GDP)	trade_open	94.41	690	WDI, World Bank
Agriculture, Value Added (% of GDP)	agriculture_va	16.81	599	WDI, World Bank
Inflation (Average Consumer Prices)	inflation	7.72	719	WEO, IMF
Net ODA Received (% of GNI)	faid	4.47	551	WDI, World Bank
Total Natural Resources Rents (% of GDP)	natural_res	15.42	694	WDI, World Bank
Urban Population (% of total)	urban_pop	53.50	748	WDI, World Bank
Government Effectiveness (Index - 2.5 to +2.5)	gov_effectiveness	-0.06	420	WGI, World Bank
Political Stability (Index-2.5 to +2.5)	polit_stability	-0.52	420	WGI, World Bank
Taxes on Income, Profits and Capital Gains as percent of GDP	tax_income	4.37	556	GFS, IMF
Taxes on Payroll and Work Force as percent of GDP	tax_payroll	0.10	556	GFS, IMF
Taxes on Property as percent of GDP	tax_property	0.31	555	GFS, IMF
Taxes on Goods and Services as percent of GDP	tax_goods	4.68	556	GFS, IMF
Taxes on International Trade	tax_international	2.07	556	GFS, IMF

Appendix-4B: Sample countries

Division based on income

Low- and middle-income countries (25)	High-income countries (9)
Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Cambodia, Indonesia, Malaysia, Philippines, Laos, Vietnam, Myanmar, Thailand, Mongolia, China, Iraq, Iran, Oman, Jordan, Syria, Lebanon, Yemen	Brunei, Singapore, South Korea, Bahrain, UAE, Saudi Arabia, Kuwait, Qatar, Israel

Division based on revenue performance

Non-OPEC countries (27)	OPEC countries (7)
Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Cambodia, Malaysia, Philippines, Laos, Vietnam, Myanmar, Thailand, Mongolia, China, Israel, Brunei, Singapore, South Korea, Oman, Jordan, Syria, Lebanon, Yemen, Bahrain	Saudi Arabia, Iran, Iraq, Indonesia, Kuwait, Qatar, UAE.

Appendix-4C: Correlation matrix

	gdp_pc	trade_open	agriculture_va	urban_pop	faid	natural_res	inflation	gov_effectiveness
gdp_pc	1.00							
trade_open	0.20	1.00						
agriculture_va	-0.61	-0.32	1.00					
urban_pop	0.67	0.32	-0.68	1.00				
faid	-0.28	-0.02	0.47	-0.26	1.00			
natural_res	0.57	-0.008	-0.24	0.45	-0.13	1.00		
inflation	-0.23	-0.10	0.32	-0.15	0.18	0.05	1.00	
gov_effectiveness	0.46	0.46	-0.60	0.49	-0.45	0.09	-0.27	1.00

Source: Author's estimation.

Appendix-4D: A Brief of Literature Review

Studies	Sample Countries	Significant Determinants
Stotsky and Mariam (1997)	Sub-Saharan Africa	Agriculture and share of mining in GDP
Mahdavi (2008)	43 developing countries	International trade, urban population, adult literacy rate, and per capita income- positive factors; aid inflow, population density, the degree of monetization, and inflation- negative factors
Le et al. (2008)	101 countries	Trade openness, share of agricultural sector in GDP and institutional quality
Piancastelli (2001)	75 countries	Per capita income, trade openness and share of agricultural sector in GDP
Fenochietto and Pessino (2013)	96 countries	Per capita income, trade openness, share of agricultural sector, education, income distribution
Gupta (2007)	large country panel	Per capita GDP, foreign aid, share of agriculture in GDP, trade openness, corruption
Bird et al. (2004)	110 developing countries	Share of agriculture sector in GDP, institutional quality
Feger and Asafu-Adjaye (2014)	Sub-Saharan Africa	Past history of colonial policy
Crivelli and Gupta (2014)	35 resource rich countries	Resource revenue is negatively associated with non-resource revenue.

Appendix-4E: Average tax revenue versus non-tax revenue in Asian countries (1991-2012)

Country	Tax revenue (% of GDP)	Non-tax revenue (% of GDP)	Country	Tax revenue (% of GDP)	Non-tax revenue (% of GDP)
Afghanistan	6.37	12.96	Bangladesh	8.21	2.87
Myanmar	3.64	6.59	Cambodia	8.09	3.80
Bhutan	8.50	27.59	India	9.39	8.90
Yemen	8.38	18.52	Indonesia	13.33	4.30
China	7.40	8.37	Jordan	19.47	11.92
Iran	6.54	16.75	Laos	10.93	4.20
Oman	4.28	39.04	Malaysia	16.65	9.50
Bahrain	4.05	21.49	Mongolia	16.82	12.12
Kuwait	1.01	59.33	Nepal	9.32	4.22
Maldives	13.47	13.59	Pakistan	11.06	4.35
Qatar	2.30	23.65	Philippines	13.29	1.73
UAE	4.95	24.9	Sri Lanka	14.81	2.55
Israel	26.68	15.84	Thailand	15.69	2.12
Brunei	24.96	18.67	Vietnam	20.07	3.59
South Korea	14.74	6.46	Lebanon	14.80	5.25
Singapore	14.27	11.91	Syria	16.65	8.60

Sources: Source: Author's calculation based on the data taken from GFS, IMF.

Chapter 5

Conclusions, Limitations and Further Research

5.1 Conclusions

This study examines the dataset of 34 Asian countries from 1991-2012 to analyze fiscal policy effort and growth achievement. Three independent but interrelated topics, for which each topic is awarded its own chapter, try to investigate different aspects of fiscal policy such as size and compositional effects of government expenditure and taxation on growth, growth channel of fiscal policy and fiscal effort performance. The first two topics seek a solution to the research questions- Are fiscal instruments under the existing fiscal framework functioning productively? While the third topic seeks to understand how government can strengthen its financing side. Descriptive as well as various panel regression estimation techniques such as FE, GMM and 2SLS have been applied to analyze the fiscal policy effort.

The findings of this research indicate that the higher sizes of government spending depress growth. It is difficult to find a significant relationship between tax revenue and growth, but the results clearly show that tax revenue plays a supportive role for investment, while debt finance does not show any supportive role to total investment. Furthermore, results indicate that trade openness, urbanization and government effectiveness enhance tax effort while a more agrarian economy and excessive dependence on non-tax revenue hinder tax revenue mobilization.

The size of government expenditures and taxes measured in terms of percentage of GDP is comparatively lower in Asian economies compared with developed countries and other regions of the world. Average government expenditure and tax revenue during the period in 34 Asian countries are 27.2 and 11.4 percent, respectively. This huge gap is maintained by non-tax revenue and deficits. The average debt stock has been going down from 75 to 43 percent over the period. This reduction is mainly due to expenditure cuts rather than tax increments. Taxes over the period are almost constant, and it is a great challenge to increase this. Only seven countries have average growth rate more than 5 percent. China, Vietnam, Cambodia, Myanmar and Afghanistan are the high growth performers and UAE, Kuwait and Brunei are the worst performers, with a negative average growth rate over the period. The structure and composition of taxation are different than in developed countries; direct taxes

are lower than the indirect taxes. Taxes on international trade have been declining significantly over the period, while taxes on goods and services are sharply increasing. The contribution of property taxes is very low. While on the expenditure side, there is no significant change in composition of government spending except defense expenditures, which show a significant reduction over the period.

The results show that the direct effect of the share of total government expenditures as well as consumption expenditure in GDP is negative on growth. Regarding the composition of expenditures, housing and amenities expenditures are positively linked with growth, but health and education expenditures are negatively linked with growth, although the results are not robust. While in the tax composition, property taxes show positive results. It is also generally expected that health and education expenditures have a positive effect on growth, but surprisingly, this association is found to be negative. But when the regression is allowed only for the sample with the composition of education expenditures more than average, it does not show any negative result. Similarly, the introduction of government effectiveness causes the change in the sign of the coefficients of health and education expenditures from negative to positive. This implies that the so called productive expenditures as mentioned in the previous literature are not necessarily positive toward growth in short run; fiscal composition constrained by size principally matter for growth. However, in general, other macroeconomic variables such as the initial fiscal situation of the country and government effectiveness restrict the growth performance of any country.

The mode of finance is equally important in determining the level of investment and output growth. Deficit in present time causes a huge debt stock in the future, which in turn creates uncertainty in public investment. On the other hand, excessive taxation also creates an extra burden to private investors. The empirical results from the data set of Asian countries reveal a negative impact of debt stock on investment while taxes show a positive result. Since investment is positively associated with growth, taxation indicates an indirect positive link with growth. Raising tax-GDP ratio can at least help in reducing current debt stock and provide a sustainable source of financing.

But the problem in Asian countries is low level of taxation. There has been no significant improvement on tax revenue mobilization over the period. The findings indicate that the share of agriculture in GDP and the foreign aid are inversely proportional to the tax-GDP

ratio, whereas trade openness, the level of urbanization and government effectiveness are directly associated. Unless the government operates with high efficiency along with the strong commitment, an improvement on tax performance is much more difficult.

Furthermore, this research explores the role of non-tax revenue on tax efficiency. Excessive dependence over non-tax revenue such as foreign aid and natural resource revenues lowers the tax effort efficiency in Asian countries. Some countries in the Arab world, especially OPEC countries, raise large amount of revenues from natural resources, but collect very low level of tax revenue. These countries are overwhelmingly dependent on non-tax revenue. It indicates that there may be either the taxation does not have available tax base to tax enough or the governments are not working tactfully. The findings also indicate that many Asian countries have higher tax potential, with lower tax effort index (<1). For such countries, tax-GDP ratio can be raised by increasing government efficiency. Only a few countries have low tax potential, which implies that structure of the tax base is weak and government policy should be oriented to enhance the foundation of taxation.

The growth performance of a country largely depends on the initial fiscal situation and institutional characteristics. However, the growth performances and fiscal experiences of the countries are comparable, and therefore, are beneficial to each other for mutual learning.

5.2 Policy Implications

The implications of the results have great importance for fiscal policy reform, especially in controlling the size of expenditure and taxation. As increased public spending depresses growth, government expenditures should be kept as low as possible unless government efficiency is increased. However, the government's role in providing special public capital is crucial for creating investment opportunities. Similarly, as the size of tax revenue has been considerably low in the Asian region, and this has no negative relationship with growth, there is some scope for its expansion to strengthen revenue sources. This helps the economy in two ways. First, it reduces the gap between public expenditures and revenues. As a result, deficits go down and this helps to reduce the existing debt stock. Secondly, as the empirical results show that taxes support investment, this indirectly helps output growth through investment channels.

Research indicates that there is a positive effect of government effectiveness on growth, an increase in efficiency of the government in terms of administrative capacity and rule of law

can enhance output growth. Unless the government efficiency is accompanied with a strong commitment, an improvement on tax performance is much more difficult. Even the negative impact of some types of expenditures can be avoided by increasing the productive capacity of the economy. Another important finding of this research is the positive effect of property taxes on growth. The contribution of these taxes on total taxes is significantly low. Hence, some effort on imposing property taxes can raise tax revenue.

This research indicates that tax policy reform in the majority of Asian countries is possible under their existing framework if we strengthen the quality of the institutions, such as government efficiency. Many Asian countries show low tax effort, and have a higher tax potential, level of tax collection can be raised by expanding the tax base and tightening the rule of law without distorting economic activities. The countries with a capacity lower than the actual tax revenue should focus on improving tax foundations rather than increasing the tax rate. Similarly, as the results show a negative relationship between foreign aid and level of tax collection, the government should lower dependency on foreign aid by strengthening tax compliance as well as institutional will. Government can enhance the share of tax revenue in the economy by introducing a strict tax administrative regime as well as by reducing dependency on non-tax revenues.

5.3 Limitations and Future Research Area

This research has some pitfalls in terms data and field coverage. Firstly, the data for low income countries as well as western countries of Asia are highly unbalanced. Some countries report only a few years data and even the data availability for different relevant variables are asymmetric. Even slight changes in time factors or sample groups may produce inaccurate results. It is also obvious that the reliability of the data from low income countries may be low compared to high income countries due to weak institutional capacity. Hence, the reliability of the results also falls within this limitation.

Secondly, countries are not in the same phase of fiscal operations. Some are in transition while some are still in a preliminary phase, and some are matured. Separate and meaningful analysis as per the objective framework of the research is almost impossible due to the small number of observations available in the data set. Hence, generalization from the results may be far from true for those countries whose initial fiscal conditions are far different from others.

Thirdly, this research only considers the tax effort and growth aspect of fiscal policy, ignoring some important aspects such as economic stability, equitable income distribution, full employment, and optimum allocation of resources. The objective of fiscal policy is not only to attain the growth target, but also to emphasize other perspectives. Hence, some supply side factors may have an impact on exercising fiscal policy.

Based on the findings and other relevant issues of fiscal policy, this research suggests some issues that need to be analyzed in further research. These issues include a case study of some successful countries, non-linearity of taxation, long-term fiscal sustainability, interaction of monetary and fiscal policy, prospects of property taxation and crowding-in or crowding-out: a detailed analysis.

As developing countries in Asia need more public investment to advance the development activities, but face a low level of tax-GDP ratio, long-term sustainability remains a serious issue in the path of economic development. The research also tends to indicate an inverted U-shape relationship between taxes and growth. Similarly, the positive impact of property taxation on growth that we observed in the result provides some indication for future prospects on its improvement. When consolidating the fiscal policy, the effect of monetary policy and its consequence on private sector involvement needs careful assessment. Future detailed studies regarding these issues will be of benefit to future policy makers.

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