Fiscal Decentralization, Macroeconomic Stability and Economic Growth

by

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DEDICATION

Dedicated to my Parents

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ABSTRACT

Over the last three decades, there has been a growing tendency towards fiscal decentralization especially in emerging and developing economies. Recently, the government of Pakistan has taken two major steps towards strengthening the process of fiscal decentralization by signing the 7th National Finance Commission (NFC) award – through which a bulk of resources has been transferred to the provinces – and by passing the 18th Constitutional Amendment – through which a wide range of fiscal responsibilities have been shifted from the center to the provinces. These developments would cause a fundamental shift in the division of powers between the center and the provinces, with the latter would have more autonomy in performing various functions like the provision of public goods and services and macroeconomic management. The proponents of fiscal decentralization suggest that fiscal decentralization can contribute to economic growth directly and indirectly by means of macroeconomic stability. However, the empirical literature on the growth and stability effects of fiscal decentralization remains inconclusive. Given the increasing trend and the inconclusive outcomes of the existing studies, it is important to examine the potential effects of fiscal decentralization in Pakistan within a rigorous macroeconomic framework. In this context, the main objective of this dissertation is to analyze, both theoretically and empirically, the impact of fiscal decentralization on macroeconomic stability and economic growth by looking at the various dimensions of fiscal decentralization and macroeconomic stability.

The dissertation develops a theoretical framework based on the endogenous growth model. This model captures the direct as well as indirect impact of fiscal decentralization on economic growth within a unified framework. The model is then empirically tested using three different measures of fiscal decentralization i.e. revenue decentralization, expenditure decentralization and composite decentralization. The macroeconomic stability index is based on inflation, fiscal discipline and exchange rate management. The Generalized Method of Moment (GMM) is used to empirically estimate the impact of fiscal decentralization on macroeconomic stability and economic growth. The time series data over the period 1972-2010 is used.

The findings show that revenue decentralization has a positive association while expenditure decentralization has a negative relationship with economic growth and macroeconomic stability in Pakistan. The weak institutional and administrative framework at the provincial level is the main reason behind the ineffectiveness of expenditure decentralization. The role of democratic institutions in explaining the effectiveness of expenditure decentralization was examined. The findings show that, when it is complemented with good institutions, expenditure decentralization becomes effective in promoting economic growth and macro-stability. It is also seen that composite decentralization has a positive impact on economic growth and macroeconomic stability. This implies that simultaneous decentralization processes reinforce each other in achieving the growth and macro-stability.

Moreover, the results reveal that fiscal decentralization, especially revenue decentralization, is beneficial for the economy of Pakistan. To achieve long run economic growth and macro-stability, revenue decentralization should be better streamlined by making the provinces rely on their own resources. Expenditure decentralization can be effective if the provinces are made accountable through good institutions. Summing up, if it is implemented with the provision of real fiscal autonomy, adequate accountability and sufficient administrative capacity, fiscal decentralization can play an important role in the development process of the country. This requires the existence of sound institutions that make the provincial as well as central governments accountable and transparent while performing their functions.

CHAPTER 1

Introduction

1.1 The Background

Over the last three decades, there has been a growing tendency towards the process of decentralization especially in emerging and developing economies. Decentralization is a process which involves devolution of power and authority from the federal government to the provincial or local administration. Fiscal decentralization occurs when the fiscal responsibilities for the public spending and revenue generation or collection is devolved from the central level government to the provincial or local level governments.

Under fiscal decentralization the major task of the provincial or local governments is to raise the tax revenues and to decide on how to spend money on various programs within the legal framework. According to Akai and Sakata (2002) fiscal decentralization is defined as the "devolution of authority associated with decision making to a lower level government".

Fiscal decentralization is an effective strategy to promote medium to long term economic growth by increasing the efficiency of the public sector. It boosts economic growth by generating economic efficiency and maintaining macroeconomic stability. This process is expected to promote comprehensive macroeconomic management by streamlining public sector activities and reducing operational and informational costs of the delivery of services. It also increases the competition among the sub-national governments in providing public services leading to higher economic growth.

Fiscal decentralization helps to break the monopoly power at the national level by bringing the decision-making closer to the citizens. By involving them in monitoring government performance and demanding corrective measures, this process strengthens the government's accountability to the citizens. It makes governments responsive and accountable thereby lowering corruption and improving the delivery of public services.

1.2 Motivation of the Study

There is a growing literature that investigates the impact of fiscal decentralization on economic growth. However, the results of these studies are inconclusive. A number of studies have found a positive and significant relationship between fiscal decentralization and economic growth. Yet, various others have found a negative or insignificant association between fiscal decentralization and economic growth.

There are a few studies that have found differing effects of fiscal decentralization on promoting economic growth across developed and developing countries. It is found that there is either no relationship or a negative association for developing economies (Davoodi and Zou, 1998; Woller and Phillips, 1998). Some studies also suggest that a moderate level of fiscal decentralization may be optimal for achieving high and sustainable economic growth (Thiessen, 2003; Eller, 2004; Bodman and Ford, 2006; Campbell, 2008).

The literature suggests that macroeconomic stability is the major channel through which fiscal decentralization influences long-run economic growth (Martinez-Vazquez and McNab, 2003). The literature regarding the macroeconomic stability effects of fiscal decentralization also shows mixed results. Some studies have shown a positive association while others have shown a negative relationship between fiscal decentralization and macroeconomic stability.

Hence, the existing literature is unable to provide a clear conclusion on the direction and significance of the relationship between fiscal decentralization, economic growth and macroeconomic stability. There are at least three possible reasons as to why the studies have failed to come up with conclusive results on the role of fiscal decentralization.

First, the differences in outcome of these studies may be because the different studies employed different measures of fiscal decentralization. The literature indicates that it is difficult to measure precisely the allocation of authority. If ambiguous or inappropriate measures of fiscal decentralization are employed, incorrect judgments can be reached about the growth and stability effects of fiscal decentralization (Ebel and Yilmaz, 2003). Akai and Sakata (2002) argue that studies which find a negative

association between fiscal decentralization and economic growth employ incorrect measures of fiscal decentralization.

Secondly, the existing literature is based mainly on a cross country analysis. Differences in the outcome may arise due to the influence of cultural, institutional, geographical, and economic factors. Thirdly, different countries have different levels of fiscal decentralization, making it difficult to get consistent and robust estimates based on a cross country analysis.

The studies that analyze the role of fiscal decentralization at the country-level are limited since most of them focus on developed countries. The results of these country-level studies are also contradictory. In an analysis of the US during the period 1948-1994, Xie *et al*. (1999) find that fiscal decentralization is detrimental for economic growth in USA while Akai and Sakata (2002), Stansel (2005) and Malik *et al*. (2006) have found opposite results. Even within the context of a single country, there is no consensus in the literature on the precise relationship between fiscal decentralization and economic growth.

Thus there is clearly a need to re-examine the growth and macro-stability effects of fiscal decentralization using appropriate measures of fiscal decentralization, especially at the country level. According to exiting knowledge, there is no particular study that analyzes the role of fiscal decentralization in maintaining the macroeconomic stability at the country level. This dissertation tries to fill the gap in the literature by investigating the growth as well as macro-stability effects of fiscal decentralization at the country level. Moreover, it employs various measures of fiscal decentralization and macroeconomic stability within a coherent macroeconomic framework.

1.3 Pakistan and Decentralization

Recently, the government of Pakistan has taken two major steps towards fiscal decentralization. First is the signing of the 7th National Finance Commission (NFC) award between the federal government and the provincial governments. The second is the passing of the 18th Constitutional Amendment. These developments would cause a fundamental shift in the division of powers between provinces and the center.

Through the 7th NFC award, a bulk of resources has been transferred to provinces. Moreover, the 18th Constitutional amendment has conferred a substantial economic authority upon the provinces. Through these amendments a wide range of responsibilities have been transferred from the federation to the provinces. This give the latter more autonomy in performing various functions such as the provision of health and education facilities, infrastructure development and the maintenance of macroeconomic stability.

Therefore, this thesis asks: What would be the effects of implementing fiscal decentralization in Pakistan? Pakistan is a country with three levels of governance: federal, provincial and local. Each province is of a different size in terms of land area and population. Under such circumstances, can the implementation of fiscal decentralization attain its objective of bringing prosperity to Pakistani people? Can each province, with its particular local receipts, generate and expand the economy? Moreover, what would be the consequences of fiscal decentralization in generating macroeconomic stability in Pakistan?

1.4 Objectives of the Dissertation

The core objective of this dissertation is to investigate the impact of fiscal decentralization on economic growth and macroeconomic stability in Pakistan. More specifically, the major objectives of the dissertation are as follows:

1. *To develop a theoretical framework incorporating the relationships between fiscal decentralization, macroeconomic stability and economic growth.*
2. *Construction of three different indicators of fiscal decentralization:*
   - *Revenue Decentralization*
   - *Expenditure Decentralization*
   - *Composite Decentralization*
3. *Construction of macroeconomic stability index*
4. *Empirically investigate the impact of fiscal decentralization on economic growth in Pakistan*
5. *Empirically examine the association between fiscal decentralization and macroeconomic stability in Pakistan*

1.5 Hypotheses

Based on the existing theoretical literature, the following hypotheses will be tested in this dissertation:

i) *The process of fiscal decentralization promotes economic growth in Pakistan*
ii) *Fiscal decentralization leads to a higher economic growth by maintaining macroeconomic stability in the country*

1.6 Methodology

In order to empirically investigate the growth and macro-stability effects of fiscal decentralization, the 'Generalized Method of Moment' (GMM) estimation technique is employed. The choice of this technique is particularly important because the literature in the field of fiscal decentralization suggests that there is endogeneity in the measures of fiscal decentralization.

1.7 Significance of Study

This study provides policy recommendations which would help the policy makers in formulating better economic policies for long-run economic growth. It also informs the policy makers and practitioners about the strengths and weaknesses of the process of fiscal decentralization in Pakistan. In addition to its relevance to policy makers and practitioners, it also adds to the academic discourse on the impact of fiscal decentralization.

1.8 Organization of the Dissertation

The thesis is divided into 9 chapters. Chapter 1 is the introduction. In chapter 2, the theoretical and empirical literature in the field of fiscal decentralization is explored. In chapter 3, the overall fiscal development in Pakistan is discussed with particular focus on the historical development of the fiscal decentralization process. In chapter 4, three measures of fiscal decentralization are developed along with a macroeconomic instability index for Pakistan. Chapter 5 develops a theoretical framework based on the endogenous growth model. Chapter 6 lays out an econometric model based on the theoretical model explained in chapter 5. Secondly, the empirical methodology used to estimate the direct as well as indirect relationship between fiscal decentralization and economic growth is

discussed. Also, a detailed analysis of the data used for estimation purpose is carried out in this chapter. In chapter 7, an empirical investigation of the direct impact of fiscal decentralization on economic growth is carried out. In chapter 8, the macroeconomic stability effects of fiscal decentralization are analyzed. Chapter 9 concludes the whole discussion and lays out some policy recommendations based on the findings of this dissertation.

CHAPTER 2

Review of Theoretical and Empirical Literature on Fiscal Decentralization

2.1 Introduction

Before we proceed with our study, it is important to have a broad idea of the current developments in the theoretical and empirical literature on fiscal decentralization. The aim of this chapter is thus to review major studies that have been done so far in this field. A large body of literature is available on this subject that theoretically and empirically analyzes the impact of fiscal decentralization on various aspects of the economy. The literature reviewed in this chapter has been chosen for its relevance to the proposed research in this thesis.

The rest of the chapter is divided into three sections. In section 2.2, we highlight the theoretical advancements in the field of fiscal decentralization. A detailed discussion on the advantages and disadvantages of the fiscal decentralization is also presented in this section. In section 2.3, we present the findings of empirical research. This section is further divided into two parts. We review the empirical studies investigating the growth effects of fiscal decentralization in section 2.3.1 and macroeconomic stability effects of fiscal decentralization in section 2.3.2. Section 2.4 concludes the whole discussion.

2.2 Theoretical Advancements in the Area of Fiscal Decentralization

Within the last century there has been, globally, a development of the theory of fiscal decentralization starting with the introduction of the practices of fiscal decentralization. The theoretical arguments put forward by the proponents of fiscal decentralization provide the rationale for implementation of fiscal decentralization process.

The theory of fiscal decentralization has experienced two stages of development:

i) First Generation Theory (FGT) of Fiscal Decentralization (FGT) &

ii) Second Generation Theory (SGT) of Fiscal Decentralization

2.2.1 First Generation Theory (FGT) of Fiscal Decentralization

The First Generation Theory (FGT) of fiscal decentralization is based on the premise that fiscal decentralization improves economic performance by increasing

economic efficiency in the provisions of public sector services. The basic idea behind the efficiency argument is that the sub-national governments are more in-tune with local needs. Therefore, local governments provide the mix of goods and services that best reflect the preferences of the individuals residing in the local communities (Oates, 1972). FGT is based on the economic theory of fiscal decentralization and theoretical examination is mainly undertaken by Hayek (1945), Tiebout (1956), Musgrave (1959), Oates (1972) and Brennan and Buchannan (1980).

2.2.1.1 Hayek Approach toward Decentralization

The earlier theoretical discussion on the potential benefits of fiscal decentralization is led by Hayek (1945). Hayek (1945) suggests that a decentralized system is beneficial because sub-national governments have a better understanding of the local conditions and preferences than the national government and therefore, they can make better decisions. As a result, the public goods supplied by the local governments are more likely to reflect the needs and preferences of the communities than those offered by the national government. Hayek (1945) highlights the capacity of local government's decision in delivering necessary services and collecting taxes that match the local needs.

2.2.1.2 Decentralization and Competition: The Tiebout Approach

Decentralization can bring to the public sector some of the allocative benefits that a competitive market brings to the private sector. This view is based on the work of Tiebout (1956) who emphasizes the role of competition within local governments that allows citizens to match their preferences with a particular list of local public goods. Tiebout (1956) argues that citizens "vote with their feet" and choose to resign to jurisdictions that offer the service mix best suited to their preferences.

According to Tiebout, by choosing a particular jurisdiction, the citizens reveal their preferences in terms of public goods supplied as well as of the taxes that they have to pay in order to finance them. Owing to the fact that the citizens can easily move to other jurisdictions, the public officials are more efficient in using the resources and tend to provide goods and services which correspond better to the needs and preferences of the population.

Under this setup, not only are the public services and goods customized to the needs of the population, but the final outcome is also close to the equilibrium point where the marginal benefits obtained by consuming public goods and services and the cost incurred through paying taxes is equal. Hence an efficient and competitive market is attained (Tanzi, 1996).

2.2.1.3 Musgravian Fiscal Framework

The foundation for most of FGT is based on the works of Richard Musgrave (1959) within the framework of welfare economics. He proposes different functional responsibilities for different levels of governments. His analysis shows that public sector has to perform three main functions.

First, the public sector performs the function of stabilization, reducing the business cycle fluctuations for sustainable growth. Sustainable development can be achieved by using fiscal and monetary policies. According to Musgrave in Three Function Framework, the stabilization function is best performed by the national government since macro-stabilization puts a constraint on the feasible degree to which fiscal power can be devolved to the sub-national governments (Oates, 1972).

The local government may be inefficient in performing the stabilization function in three ways. First, the raising of debt at the sub-national level would lead to higher regional costs while the benefits through this stabilization would spill beyond regional borders. As a result, too little stabilization would be provided. Second, the monetization of sub-national debt creates inflationary pressure in the economy. Third, stabilization problems require a national response because of their national scope.

Second, the redistribution functions to equalize the income distribution in the society. Income distribution is necessary for social equalization. To achieve social equalization, governments play an important role in modifying the market-led distribution of goods in a society. For this purpose, governments may adopt progressive taxation and welfare enhancing services for poor people (Vo, 2010).

For two reasons, this function is also best performed by the central government. Firstly, under the assumption of full mobility of economic units, sub-national

government-led redistribution policies result in a non optimal segregation of the citizens; the rich migrate to jurisdictions which offer the lowest redistribution while the poor are grouped into jurisdictions that have the most generous redistribution. Wildasin (1994) proves that a policy of redistribution in a decentralized setup is socially inefficient under the assumption of full factor mobility. The region pursuing a policy of redistribution only internalizes additional costs brought over by the migrants that are provoked by this policy. However, this ignores the positive effect that this migration has on other regions. In order to stop this action, the process of equitable income distribution must be performed by the central government.

Secondly, under the assumption of immobility of the population, Buchanan (1950) argues that a centralized redistribution policy grants the state a different fiscal capacity to provide equal service. Furthermore, a decentralized redistribution policy suffers from the problem of coordination. When regional governments conduct a redistribution policy, they are likely to be influenced by local populations and end up making decisions which are inequitable from the national point of view (Boadway and Flatters, 1982).

Third, the allocation function means the allocation of resources through provision of the public goods. By changing the structure of goods according to the needs of the localities, the scarce resources can be allocated efficiently. According to the "Musgrave Three Function Framework", distribution function is best performed by the local governments.

2.2.1.4 Fiscal Equivalence and Oates's Theorem of Decentralization

Olson (1969) introduces the concept of "fiscal equivalence" for the analysis of benefits derived from the process of fiscal decentralization. The concept of "fiscal equivalence" claims that

> *"... collective goods there is always a unique level of 'boundary' for which a separate government is needed and that there could be matched between those who receive the benefits of having collective of goods in comparison to those who pay for this"* (Olson, 1969)

Olson (1969, 1986) argues that efficient delivery of publically provided goods and services normally involves equalization of the boundaries between the jurisdictions that

are providing public goods and the group of people using these goods. The divergence between the entity that provides public goods and the people using those public goods leads to different kinds of inducement problems. This leads to a higher or lower level of the provision of publically provided goods and services. The notion of "fiscal equivalence" is positively related to the efficiency objectives of the public economics. Efficiency gains, in a multi-level federal system, require the alignment of the costs and benefits of publically provided goods and services (Vo, 2010).

Oates (1972) makes most significant contributions in the field of fiscal decentralization by developing a theoretical framework for the analysis of the benefits of fiscal decentralization. According to Oates, the process of fiscal decentralization can promise an efficient provision of publically provided goods because under a decentralized system local preferences are matched in an efficient manner.

Oates (1972) has implicitly merged the concept of "fiscal equivalence" introduced by Olson (1965) based on the idea of 'perfect correspondence'. Oates (1972) develops the notion of efficiency gains through the provision of publically provided goods under a decentralized setup in his decentralization theorem. Oates's "Theorem of Decentralization" suggests that:

> *"For a public good- the consumption of which is defined over geographical subsets of the total population, and for which the costs of providing each level of output of the good in each jurisdiction are the same for the central or the respective local government- it will always be more efficient (or at least as efficient) for local governments to provide the Pareto-efficient levels of output for their respective jurisdictions than for the central government to provide any specified and uniform level of output across all jurisdictions" (Oates 1972).*

Oates's "Theorem of Decentralization" hypothesizes that economic efficiency can be generated if public goods and services are provided by sub-national governments. This argument is based on the fact that not all public goods and services have similar spatial characteristics. Certain goods and services, such as national defense or internal diplomacy, are valuable for the entire country while some goods and services such as forestry services, state roads are useful only for certain regions or states.

Different communities have different requirement for public goods and services. Under a decentralized framework, if the sub-national level governments provide the exact

required goods and services to the local communities, the gains from the provision of public goods and services can be achieved. Goods and services provided by the national government have a similar effect on every citizen in the country. This can lead to inefficient allocation of resources.

Oates's (1972) "correspondence principle" creates a rationale for the provision of publically goods and services by sub-national governments. This provision permits a fairly accurate correspondence among those who get benefits from the provision of public goods and services and those who pay for it.

The central theme of the 'Theorem of Decentralization' is that sub-national governments, due to their contiguity with the local communities and geography, have better access over the central or national government to information in terms of diversity in preferences as well as the spatial characteristics and the costs.

Due to this advantage, the public goods and services provided by the sub-national governments are more likely to match the preferences and needs of the population than those supplied by the national government. This view is in line with the one presented by Hayek (1945) who pointed out that local governments make better decisions because they have better information than the national government about the local conditions and preferences.

2.2.1.5 Public Choice Perspectives on Fiscal Decentralization and Leviathan Approach

The public choice perspective gives a final touch to the First-Generation Theory (FGT) of fiscal decentralization. According to the public choice perspective, fiscal decentralization creates competition among different jurisdictions for their moveable factors of production. In public choice theory, the decision-makers are always utility maximizers. These public decision-makers have their own objective functions. Under a decentralized framework, sub-national governments have their own objective functions that they maximize (Oates, 2005).

Brennan and Buchanan (1980) formalize the idea of competition among the jurisdictions in the public choice framework by treating the public sector as "Leviathan".

They argue that the main objective of the government is to impose heavy taxes for the generation of revenue, which are then available for spending. In this context, the public sector, whose objective is revenue maximization, always tries to impose taxes that maximize its revenue. Brennan and Buchanan (1980) call this type of a public sector as a monolithic "Leviathan".

Brennan and Buchanan (1980) argue that the process of fiscal decentralization acts as an instrument for restraining the expansionary motives of the public sector. The competition among local governments in a decentralized framework curbs the monopolistic behavior of the public sectors. Their views suggest that the competition among the local governments, under a decentralized framework with moveable households and firms, "can offer the partial or possibly the complete substitutes for the explicit fiscal constraints on the level of taxing power" (Brennan and Buchanan, 1980).

In a somewhat similar way, Besley and Case (1995) suggest that "benchmark competition" permits the voters to make a comparison to the neighboring jurisdictions of taxes paid and the publically provided goods and services received. This competition helps the voters in evaluating the performance of a decentralized government. The voters can easily assess whether local governments are stealing or wasting the economic resources. If the voters perceive that the government always steals some part of the tax revenue then the existence of efficient jurisdictions in the neighborhood put limits on the amount of stolen tax revenue.

Rodden (2003) suggests that if fiscal decentralization involves the provincial and local governments depending more on their own sources of revenue generation, it is certainly contributed to the smaller size of the government. However, under a decentralized framework, the expenditure of provincials or local governments is primarily financed through transfers of resources from the center then it generates opportunities for "raiding the fiscal commons". This ultimately results in the increase in the size of the public budget[1].

[1] The problem of "raiding the fiscal commons" occurs in the presence of Soft Budget Constraints (SBC). SBC allows lower level governments to spend more by assuming that central or federal government will cover their budget deficit.

The above discussion provides new perspectives on the role of the government. The public choice theory through "Leviathan hypothesis" proposes that the process of fiscal decentralization benefits the economy by keeping the size of government small[2]. According to Brennan and Buchanan (1980):

> *"The total government level of the intrusion that are given in the economy and that should be smaller as well as the ceteris paribus, the greater extent for which taxes and the expenditures are basically decentralized, the more level of the homogeneous that have separate units, as the smaller level of jurisdictions, and as the lower level of the net regional rents" (Brennan and Buchanan, 1980, p.185).*

2.2.1.6. Redistribution Effects of Fiscal Decentralization

Redistribution is performed to equalize the income distribution in society. Income distribution is necessary for social equalization. To achieve social equalization, governments play an important role in modifying the market-decided distribution of goods in a society. For this purpose, governments may adopt progressive taxation and welfare enhancing services for poor people (Vo, 2010). The amount of public funds spent by sub-national governments is more welfare enhancing because sub-national governments best match the needs and preferences of their constituents than central government. This increase in welfare through decentralized expenditures is called allocative or consumer efficiency of governments (Martinez-Vazquez and McNab, 2003).

Decentralization can increase allocative efficiency by providing rational consumers with the incentive to reveal their true preference through choosing to live within the community that offers the public goods and services that best match their needs (Tiebout, 1956). By bringing the government closer to the people, decentralization can simultaneously enhance citizen participation as well as transparency and the accountability of political processes while reducing the costs of collective action and

[2] The earlier studies that empirically investigate the "Leviathan" hypothesis do not provide concrete evidence about the role of fiscal decentralization in reducing the size of government (Oates, 1985, 1989; Stein, 1999). However, the recent studies that investigate the role of fiscal decentralization as an instrument for limiting the growth of public sector provide some supportive evidence (see for example: Nelson, 1987; Marlow, 1988; Grossman, 1989; Grossman and West, 1994; Fiva, 2006; Feld *et al*. 2010)

cooperation. This ultimately leads to a higher allocative efficiency (Inman and Rubinfeld 2000; Rodriguez-Pose, *et al*., 2009)[3].

The argument for greater allocative efficiency under a decentralized setup has been debated in previous literature. The basic assumption that the inter-jurisdictional preferences differ substantially, has been challenged. Prud'homme (1995) argues that differences in preferences are not likely to be important for developing and transitional countries but, in fact, local governments can be more efficient than central governments even if all individuals have same preferences or if they lack mobility. Large variation in preferences may not be uncovered by the sub-national governments. Sub-national governments may lack the technical expertise, power and resources to convert local preferences into effective policies (Prud'homme, 1995).

Summing up, there are two broad strands of the First-Generation Theory (FGT) of fiscal decentralization. First, there are studies that are based on Tiebout's model of impure local public goods and the Musgravian framework. The work of Oates would also fall under this category. Second, there are studies that are based on Tiebout's notion of inter-jurisdictional mobility and relate it with the forces that put limits on the size of the public sector. The work of Brennan and Buchanan, based on the public choice theory, falls under this class. According to Vo (2010), the first stream of studies are referred to as the 'core' FGT of fiscal decentralization and the second stream of studies are termed as the 'non-core' FGT of fiscal decentralization. More importantly, the non-core first generation theory complements the core FGT of fiscal decentralization.

2.2.2 Second-Generation Theory (SGT) of Fiscal Decentralization

Over the last couple of decades, a new theory related to fiscal decentralization has emerged called the Second Generation Theory (Oates, 2005). The SGT is an extension of FGT but it assumes that the objectives of the public officials are shaped by the political institutions. The involvement of political institutions causes a deviation from the objective of welfare maximizing of the citizens (Qian and Weingast 1997; Oates, 2005).

[3] Neyapti (2006) empirically shows that fiscal decentralization, especially revenue decentralization, has a positive impact on income distribution—provided that good governance exists.

The SGT also looks at the role of various institutional mechanisms that are used to align the objectives of the citizens and political officials (Weingast, 2009).

The SGT offers a variety of new directions in the field of fiscal federalism. In particular, these theories focus on the positive behavior of the entities under a decentralized framework (Weingast, 2009). The SGT draws on insights from various economic theories like the theory of firms, the theory of contract, the economics of information as well as the theory of principal agent problems (Oates. 2005).

The developments in SGT are based on two main considerations (Oates, 2005). The first consideration, relevant to the area of the public choice theory and the political economy, deals with the political procedures and the behavior of the political representatives. In the FGT of decentralization, the main assumption is that the government officials look for the common goods and maximize the welfare of their communities. While SGT assumes that government officials will possibly not want to look for the common goods and would not proceed to enhance the welfare of their local communities. The agents involved in the political setup can have their own objectives. It is possible that the main objective of the political agents could be to maximize their political gains, which normally tend to constrain their functionality.

This consideration involves the modeling of political institutions in the light of the theory of decentralization, explicitly taking into account the impact of political institutions in explaining the outcome of fiscal decentralization. The role of political institutions in decentralization, as explained by SGT, has a clear link with the theory of public choice which plays an important role in the first generation theory of fiscal decentralization (Vo, 2010).

The second consideration highlights the role of asymmetric information in explaining the outcome of fiscal decentralization. Information plays a critical role in the outcome of political processes. Different political agents have different levels of information. Under asymmetric information, some particular political agents have relatively more information about the preferences of the local communities, their tastes and structure of cost as compared to other political agents. The institutional settings are

relatively different under asymmetric information from the ones under a complete information system.

To analyze the influence of asymmetric information, the issue of fiscal decentralization is investigated using the industrial organization framework and the theory of microeconomic. The proponents of the SGT mainly focus on exploring the issue of the balance between fiscal decentralization and fiscal centralization. The first generation theory mainly supports fiscal decentralization, while the SGT of fiscal decentralization also points out the risks of decentralization by arguing that too much fiscal decentralization may not lead to a desirable outcome (Vo, 2010).

On the basis of these considerations, the SGT of fiscal decentralization combines various fiscal and political institutions in a unified framework. The SGT of fiscal decentralization examines the role of these institutions under asymmetric information. The focus of SGT is to examine the incentive structure of the institutions that shape their objective functions (Oates, 2005).

Thus, under SGT, the implementation of a decentralization system is based on two classic motivations: the incentives structure and the quality of knowledge (Garzarelli, 2005). These motivations provide the basis for economic efficiency generated through fiscal decentralization. The incentive structure is necessary for the sub-national governments in order to avoid migration of the citizens and firms to other jurisdictions. Perfect knowledge of the local preferences as well as the tastes of the communities is essential for efficient provision of public goods (Vo, 2010). The main contribution to SGT emerges from the inclusion of theory of transaction cost, the theory of incomplete information and the theory of incomplete contracts (Garzarelli, 2005).

The new literature on fiscal federalism is divided into two strands. One strand of the literature reconsiders the decentralization theorem from the political economy perspective. The other strand examines the trade-off between the centralized or the decentralized provision of public goods in principal agent models of electoral accountability in the presence of asymmetric information.

2.2.2.1. Decentralization: A Political Economy Perspective

Weingast (1995) introduces the concept of "market-preserving federalism" for the analysis of the political perspective of decentralization. Market-preserving federalism is based on five necessary conditions:

i) There should exist a hierarchy among the different tiers of governments with a well-defined scope of authority (for example between local and central level governments) so each level of government is autonomous in their own jurisdiction.

ii) The sub-national governments must have autonomy in both regulation and provision of public goods and services within their own boundaries.

iii) The existence of a common market. The central government provides a common market that permits the easy mobility of factor and product across the sub-governmental jurisdictions.

iv) Hard budget constraints must be confronted at all levels of the government particularly the lower levels. Also revenue sharing among the governments must be limited.

v) Institutionalization of political authority: The allocation of responsibility and authority has an institutionalized degree of durability so that it cannot be altered by the central government

These conditions explicitly spell out the political assumptions that are implicit in the FGT, providing political foundations for common markets in a decentralized framework.

Seabright (1996) develops a model based on "incomplete contract" for the analysis of fiscal federalism. In this framework, elections are viewed as "incomplete contracts", due to which a certain level of information is not verifiable. The model explains that the political accountability problems in the context of the provision of control rights arise due to incomplete contracts. The basic model accounts for both types of officials, like centrally elected and locally elected. In this model, centralization provides benefits from policy coordination while a decentralized framework promotes accountability. The choice between decentralization and centralization thus depends on

the relative importance of spillover effects of inter-jurisdictional under a decentralized setup versus the losses emerging from the reduced accountability under a centralized framework (Oates, 2005).

Tommasi and Weinschelbaum (2007) examine the tradeoffs between the advantages and disadvantages of decentralized versus centralized provision of public goods and services. The tradeoff is between policy coordination under a centralized system and accountability advantages under a decentralized system. To capture this trade off, they employ a variant of the principal agent model known as the "common agency" model. In this model, the elected members are considered as agents and the citizens are considered as the principals. Moreover, a decentralized system consists of one agent in each jurisdiction and a centralized system consists of a single agent who serves the entire population. Under a centralized setup, the number of agents is very small as compared to number of principals which is very large. On the other hand, in a decentralized setup, there is only one agent in each locality. The higher the number of the principals, the greater will be the coordination problems in contracting between agents and principals. The theorists conclude that a decentralized political system may be optimal when coordination problems among citizens, in controlling the government, are prevalent even when the assumption of different preferences among the localities does not hold. Therefore, the decentralized system may be preferable even when preferences of local communities are perfectly homogenous.

Oates's (1972) "Theorem of Decentralization" is based on two assumptions. First, the government is benevolent at every level, implying that the objective of each level of government is to maximize the welfare of people in its jurisdiction. Second, under a centralized framework, the provisions of publically provided goods and services are uniform across all jurisdictions. Lockwood (2002) and Besley and Coate (2003) re-examine Oates's theorem from a political economy perspective by relaxing both assumptions.

Lockwood (2002) provides a framework for studying the trade-off between centralization and decentralization in a political economy setting. He supposes that it is not necessary that the provision of local public goods under a centralized system is

uniform. Moreover, he also assumes that the levels of the provision of public goods are determined by bargaining between delegates to a legislature. This study focuses on the bargaining process and shows that decentralization welfare dominates centralization even in the presence of spillover effects and identical preferences across regions. The main argument is that inefficiencies of centralization arise essentially because of the outcome of the bargaining process that, in equilibrium, is driven by cost-minimization. This implies that the cheapest provision of public goods has more probability of being implemented than those with the highest surplus i.e. utilities. Therefore, in equilibrium, centralization provides a level of public good below the efficient level.

Similarly Besley and Coate (2003) depart from Oates's "Theorem of Decentralization" by relaxing the assumptions of benevolent governments and the uniformity of public goods. In this study, they focus on the importance of political aggregation mechanisms. Under a decentralized system, public goods will be selected by representatives elected at the local level. On the other hand, under a centralized system, the policy choices are formulated by a legislature consisting of elected representatives from each district. This study shows that centrally determined allocation of public goods lead to various kinds of misallocations.

These two important contributions offer new arguments in favor of a decentralized provision of public goods since these studies show that centralized provision can be welfare-dominated even if the assumptions of the decentralization theorem fail. In fact, when we take into account the political process, the main argument hinges on the inefficient outcome of the centralized decision process rather than on the trade-off between preference matching and externalities (Lockwood, 2006).

Lockwood (2008) reconsiders Oates's (1972) "Theorem of Decentralization" by replacing the assumption of benevolent government with a political economy model like direct democracy where the decision-making process is implemented via majority voting over alternative levels of public good provision while retaining the assumption of policy uniformity. In this case it has been shown that the decentralization theorem can only hold if the preferences of the median voter are equal to the average preferences. Otherwise there could be cases where: (i) the centralized setup can dominate the decentralized

framework in providing a certain level of welfare even if there are no externalities and the regional characteristics are heterogeneous in nature and (ii) decentralization can generate more welfare as compared to centralization even in the presence of positive externalities and homogeneous regional characteristics. Similar outcomes can be generated if the benevolent government is subject to lobbying. This implies that the "Theorem of Decentralization" is not robust in nature.

2.2.3 Arguments against Fiscal Decentralization

The positive impacts of fiscal decentralization have been challenged in previous literature (see for example Prud'homme, 1995; Tanzi, 1996). These critiques are based on the assumptions that underlie the decentralization models and the problems faced by local governments.

The proponents of decentralization claim that local governments have an informational advantage over central government. However, this assumption can be challenged on the grounds that central governments can and do assign government officials to local offices. Apparently there is no compelling reason to believe that the information obtained by these representatives will be less accurate than the ones gathered by the local governments (Tanzi, 1996).

Similarly, it also argues that local governments take into account the needs and preferences of the local population and provide public goods and services accordingly. Tanzi (1996) criticizes this assumption by saying that local populations may not have the power to actually influence the actions of the local officials and this may result in local goods being produced without taking into account their needs and preferences. This is because local democracy is relatively weak and ineffective especially in developing countries.

Prud'homme (1995) also argues that local preferences are complex and manifold. It cannot be expressed in a single vote. The outcomes of local elections generally depend on personal and/or political loyalties and rarely reflect the preferences of the local population. Violation of these assumptions may lead to less than optimal result of fiscal decentralization. However, even if these assumptions are fulfilled, the positive outcomes

predicted by the advocates of decentralization may still not materialize owing to some practical problems that are usually associated with decentralization.

The opponents of decentralization argue that there is a lack of capacity to execute the responsibility for public services at sub-national levels. The sub-national governments are usually less efficient than the national government and this may undermine the benefits of decentralization (Tanzi, 1996). There are problem like low investment in technology and innovation because of the limited capacity, both financially and technically, of the sub-national governments (Prud'homme, 1995). Due to the inefficiency of local bureaucracies, local governments often lack good public expenditure management systems to assist them in their tax and budget choice (Tanzi, 1996).

In the case of decentralization, a gain in economic efficiency is mainly due to inter-jurisdictional competition. However, Cai and Treisman (2004, 2005) argue that the increase in inter-jurisdictional competition may be detrimental to the quality of governance. Inter-jurisdictional competition drives local tax rates below the level necessary to fund the public goods that residents demand. Also, if the competition for capital is intense, businesses are hard to attract without infrastructure. Furthermore, due to decentralization, central bureaucracies are weak or have devolved enforcement powers downward. This results in local officials competing by offering firms covert protection against central taxes and regulations. According to the authors, federalism in this case, is "state corroding" rather than "market-preserving".

Another potential problem usually associated with fiscal decentralization is the raiding of the fiscal commons by the local governments due to the presence of a soft-budget constraint[4]. In the case of a decentralized system, sub-national governments may expect that their fiscal deficits are covered by the central government. This in turn undermines the incentives for the sub-national governments to observe a responsible fiscal behavior. The soft budget constraints have "a multiplicity of sources that are

[4]The idea of soft budget constraint is introduced by Kornai (1979) to analyze the behavior of state owned firms. The SBC is used in a decentralization system to refer to lower level governments that look to a higher level government to recover or bailout their excessive deficits. The term bailout refers to the additional funding that the higher level government provides the lower level governments when it would otherwise be unable to service its obligations. On the other hand, hard budget constraint (HBC) implies that lower level governments have to face the full costs of their expenditure decisions.

associated with the prevailing fiscal institutions, with the existing political structure, the weakness or even absence of various important markets, and more importantly, the historical background of intergovernmental fiscal affairs in the country" (Rodden, *et al*. 2003).

Most of the criticisms against decentralization do not dismiss the idea of decentralization per se, but are rather meant to highlight the need for augmenting the decentralization process with certain types of institutions. According to the critics, only when these institutions are present does decentralization bear the fruits that are promised by its proponents. The benefits of decentralization largely depend on institutional arrangements that govern the design and implementation of decentralization.

2.3 Review of Empirical Studies on Fiscal Decentralization

Given the lack of theoretical consensus on the impact of fiscal decentralization, numerous studies have empirically examined the impact of fiscal decentralization on the stability of macroeconomics and economic growth.

2.3.1 Growth effects of Fiscal Decentralization

There are numerous studies that find a positive and significant relationship between fiscal decentralization and economic growth. Oates (1995) empirically analyses the role of fiscal decentralization in economic growth using a sample of forty three industrialized and developing countries for over 1974-1989. This study finds that the share of central government spending in total spending is 65 percent for the industrialized countries and 89 percent for the developing nations during this period. This implies that industrialized countries have a higher degree of fiscal decentralization than developing ones. This study empirically finds that fiscal decentralization has a positive and statistically significant impact on economic growth.

Yilmaz (1999) analyses the effects of fiscal decentralization on economic growth for two different sets of countries using annual data for the period 1971-1990. This study divides countries into unitary states (seventeen countries) and federal states (thirteen countries). This study finds that fiscal decentralization is more effective in increasing the per capita income in unitary states than in federal states.

Thiessen (2003) analyses the empirical relationship between fiscal decentralization, capital formation, total factor productivity growth and economic growth by using cross-section data over the period 1973-1998 of high income OECD countries. This study finds a U-shaped, nonlinear relationship between fiscal decentralization and economic growth. The relationship between fiscal decentralization and economic growth remains positive up to some degree of fiscal decentralization and then turns negative. These findings suggest that a medium degree of fiscal decentralization is optimal. From policy perspective, a country with a low degree of fiscal decentralization could achieve higher growth through promoting fiscal decentralization.

Iimi (2005) empirically examines the link between fiscal decentralization and economic growth using cross-section data over the period 1997-2001 for 51 countries, including low, middle and high income countries. By employing the instrumental variables estimation procedure, this study finds a positive and statistically significant relationship between fiscal decentralization, measured by the share of local government spending to the total government spending, and per capita GDP growth. This study concludes that fiscal decentralization, especially expenditure decentralization, is beneficial for per capita GDP growth.

Various studies, on the other hand, have found a negative or even no relationship between fiscal decentralization and economic growth. Oates (1972) empirically examines the association between fiscal decentralization and the size of the public sector using cross-section data of 57 countries. In this study, fiscal decentralization is measured by the central government tax revenue as a percent of total tax revenue and the size of public sector is measured by the tax revenue as a fraction of the national income. This study finds a negative and statistically significant relationship between fiscal decentralization and the size of the public sector. This implies that the increasing level of fiscal decentralization is associated with a smaller public sector. Oates (1985) also finds similar results by using a cross-section data of 43 countries.

Davoodi and Zou (1998) investigate the growth effects of fiscal decentralization by using panel dataset for 46 developed and developing nations over the period 1970-1989. This study finds that fiscal decentralization has a negative and statistically

significant impact on economic growth only in developing countries. However, fiscal decentralization has no association with economic growth in developed countries. Davoodi and Zou (1998) offer several explanations for these results. First, fiscal decentralization measures are not properly defined. Through these measures it is not possible to distinguish between capital spending and current spending. The literature highlights the positive growth effects of capital spending and the negative growth effects of current spending. Excessive expenditure on the wrong items by the sub-national government can lead to a lower economic growth. Second, wrong revenue assignment among the different levels of the government may hinder growth. Third, local governments especially in the developing countries may be considered by the central government in their revenue collection and spending decisions. Finally, the local government may not be responsive to the needs of local citizens.

Woller and Phillips (1998) empirically examine the relationship between fiscal decentralization and economic growth for less developed countries over the period 1974-1991. This study finds no statistically significant association between fiscal decentralization and economic growth. These findings re-confirm the results of Davoodi and Zou (1998).

Feld and Dede (2005) analyze the impact of fiscal decentralization on economic growth by using panel dataset for 19 OECD high income countries over the period 1973-1998. This study employs a new dataset for fiscal decentralization that captures the fiscal autonomy of sub-national governments at various degrees. By employing this dataset, the study finds that autonomy in taxes does not reliably affect economic growth while wider participation in joint tax environment seems to hinder economic growth.

Martinez-Vazquez and McNab (2006), using panel dataset for 52 developing and developed countries over the period 1972-1997, examine the relationship between fiscal decentralization and economic growth and find no significant impacts on economic growth. Similarly, Thornton (2007a) reports a statistically insignificant effect in a cross country study on 19 OECD countries. Baskaran and Feld (2009) examine the relationship between fiscal decentralization and economic growth using panel for 23 OECD countries over the period 1975-2001. This study initially finds a negative relation, but shows that

this effect is not robust. This study concludes that fiscal decentralization, when it is limited to the revenues over which sub-national governments have full autonomy, is unrelated to economic growth.

Rodriguez-Pose and Ezcurra (2010) look at the relationship between fiscal decentralization and economic growth for 21 OECD countries over the period 1990-2005. This study finds a negative and statistically significant relationship between fiscal decentralization and economic growth. This study also examines the robustness of results using alternative measures of fiscal decentralization.

The differences in the outcome of empirical studies that are based on cross-country analysis may be due to the differences in economic, cultural, geographical and institutional setup. In order to overcome these difficulties, single country studies have also been conducted. However, the outcome of these studies is still inconclusive: some find a positive and significant association while others find a negative or even no relationship between fiscal decentralization and economic growth.

Xie *et al*. (1999), using time series data for US economy over the period 1948-1994, find that fiscal decentralization has a negative and statistically significant impact on economic growth implying that further decentralization would be detrimental for economic growth in the United States. On the other hand, Akai and Sakata (2002) find a positive and significant association between fiscal decentralization and economic growth for the United States, indicating that fiscal decentralization contributes to economic growth. Stansel (2005) reaches the same conclusion through analyzing the role of fiscal decentralization in the economic growth of metropolitan areas in the United States.

Malik *et al*. (2007) analyze the impact of fiscal decentralization on economic growth for Pakistan using time series data over the period 1972-2005 using the OLS method. This study finds that fiscal decentralization has a positive impact on economic growth. Carrion-i-Silvestre *et al*. (2008), using time series data over the period 1980-1998, analyze the growth effects of fiscal decentralization in Spain. This study finds that decentralization has a positive impact on the economic growth in Spanish economy.

Samimi *et al*. (2010) analyze the relationship between fiscal decentralization and economic growth in Iran using panel data for 28 provinces for the period 2001-2007

using the Fixed Effect technique. This study finds that fiscal decentralization has a positive effect on Iran's economic performance. Nguygen and Anwar (2011) investigate the impact of fiscal decentralization on economic growth using panel dataset for sixty one provinces for the period 1997-2007 for Vietnam. This study, employing the fixed effects estimation technique, finds that economic growth is positively associated with revenue decentralization and negatively linked with expenditure decentralization in Vietnam.

2.3.2 Macroeconomic Stability Effects of Fiscal Decentralization

There are few studies that have analyzed the effects of fiscal decentralization on macroeconomic stability. Most of the studies in this area use the inflation rate as an indicator of macroeconomic stability, showing that fiscal decentralization has a positive impact on macroeconomic stability through price stability.

King and Ma (2001), using cross-section data for 49 countries during the period 1973-1994, analyze the impact of revenue decentralization on macroeconomic stability. This study finds a negative but insignificant relationship between macroeconomic instability, measured as average inflation rate, and revenue decentralization for the whole sample of 42 countries. On the other hand, this study finds a negative but significant relationship between inflation rate and revenue decentralization for developed countries where the average inflation rate is less than 20 percent. This suggests that decentralization is important in achieving price stability especially for developed countries. The theorists also find that the inclusion of decentralization in their model gives central bank independence the right sign i.e. independence of central bank is negatively related with inflation rate.

Neyapti (2004), using panel dataset for developed and developing countries, examines the relationship between revenue decentralization and inflation. This study argues that fiscal decentralization and the central bank reinforce each other in determining the rate of inflation in the economy. This is because only the decentralization of revenue collection responsibilities is not effective as sub-national authorities have very limited tax bases available to them and also have limited capacity to issue debt. The study also argues that the autonomy of sub-national authorities in collection of revenues may be constrained by political considerations. Based on these arguments, the study concludes

that fiscal decentralization on the revenue side leads to lower inflation provided that a monetary sector management exists, but not otherwise. The main argument behind this conclusion is that the cost due to an inflationary monetary policy because of individual action of lower level governments is not fully anticipated by the local authorities even if local accountability prevails. This study thus takes both, local accountability—as a fiscal disciplinary device—and central bank independence—as a proxy for monetary discipline—into account to examine the association between revenue decentralization and inflation rate. The study shows that revenue decentralization has a negative and significant impact on the inflation rate only in low inflation countries after controlling the role of business cycles, openness and government size. This study also finds that the additional effect of the interaction term of revenue decentralization and central bank independence is statistically significant in low inflation countries. So revenue decentralization is effective in controlling the inflation only if it is accompanied by central bank independence and local accountability.

Martinez-Vazquez and McNab (2006) examine the impact of fiscal decentralization on the rate of inflation using panel data for 52 developed and developing nations over the period 19972-1997. This study finds that expenditure decentralization promotes price stability among the developed nations, while expenditure decentralization may undermine the price stability in developing countries. This study concludes that fiscal decentralization may be valuable for high income countries.

A number of studies have shown that fiscal decentralization has a negative or insignificant impact on macroeconomic stability. Treisman (2000) analyzes the impact of decentralization on the average inflation rate of the CPI in panel data for 87 countries for four five year periods in the 1970s and 1980s. This study finds different outcomes for different sets of economies. Moreover, fiscal decentralization is helpful in controlling inflation in a developed region but not in a developing region. Among OECD countries, decentralization is linked with significantly lower average inflation rates during 1970s and 1980s.

Shah (2006), using cross section data for 40 countries for the period 1995-2000, finds that fiscal decentralization has a negative and statistically insignificant impact on

price inflation. Thornton (2007b) conducts a panel regression study of 19 OECD member countries over the period 1980-2000, and finds that if revenue decentralization measures are restricted to only that revenue over which local governments have full autonomy. The impact of decentralization on inflation is negligible. Feltenstein and Iwata (2005) examine the role of fiscal decentralization on economic growth and inflation in China. This study employs the Vector Autoregressive (VAR) model with latent variables for estimation purposes. The analysis of this study shows that fiscal decentralization positively contributes to the growth rate of real out. However, fiscal decentralization has adverse implication for inflation in China.

Neyapti (2010) empirically investigates the impact of fiscal decentralization on the budget deficit using panel data for 16 countries over the period 1980-1998. This study shows that both expenditure and revenue decentralization reduce the budget deficit leading to a stable macroeconomic environment. This study also shows that the benefits of fiscal decentralization in promoting fiscal discipline are also linked with governance and local accountability.

2.4 Conclusion

The theoretical framework mainly argues that fiscal decentralization promotes economic growth and macroeconomic stability. However, the existing empirical literature is unable to precisely determine the linkages between fiscal decentralization and economic growth. The contradictory outcomes provide a room for the further investigation of growth and stability effects of fiscal decentralization.

CHAPTER 3

Fiscal Decentralization in Pakistan: An Overview

3.1 Introduction

Pakistan is a federal state with four provinces – Punjab, Sindh, Balochistan and Khyber Paktunkhwa. There are three tiers of government in Pakistan, including the federal, provincial and local (comprising district, tehsil and union administrations) levels. For the federal system of the government, the basic framework for the management of public finance, division of financial powers and distribution of revenue between the Federation and the Provinces is laid down in the Constitution.

Under the Constitution of the Islamic Republic of Pakistan 1973, the Federation and the Provinces have, in addition to their exclusive sources of revenue, a divisible pool. This comprises the net proceeds of specified taxes which are shared by all the Constituents and the Federation. Taking into consideration the fiscal and socio-economic realities, the Federal Government meets the additional requirements of the Provinces through special transfers, concessions and measures. These may include grants-in-aid, subsidies, assistance, relief and other federal functions.

Under the Constitution of Pakistan, the federal government has power to levy the most productive taxes. These may include non-agriculture income taxes, import taxes, sales taxes and production or excise duties. The federal government collects the bulk of the resources and then redistributes it among the federal and its constituent parts. This is done to correct the vertical and horizontal fiscal imbalances. Acknowledging the importance and complexity of the revenue-sharing, the Constitution, under Article 160, provides the setting up of an autonomous body after every five years. This is the National Finance Commission (NFC). Its function is to recommend the operation of the divisible pool, borrowing powers, grant-in-aid and such other matters relating to finance as may be referred by the President.

Given this background, the purpose of this chapter is to look at the fiscal decentralization process in Pakistan in a historical context. In section 3.2, a brief review is carried out on the overall macroeconomic situation, particularly in the context of

overall fiscal development. In section 3.3, the process of fiscal decentralization is discussed. The last section concludes the discussion.

3.2. Pakistan's Economy

Pakistan is a developing nation with the world's sixth largest population. Despite a weak economic base at the time of independence, Pakistan's growth performance has been quite impressive over the last six decades. On average the growth rate of GDP is 5.5 percent and per capita income has increased from Rupees (Rs.) 9997 in 1961 to Rs. 34212 in 2010. The economy has witnessed major structural change over the years. The share of agriculture in GDP has gone down from 37.7 percent in 1971-72 to 21.2 percent in 2009-10. The share of the services sector has increased from 39.4 percent to 52.4 percent during same period. The share of the manufacturing sector has also increased gradually from 16.7 percent in 1971-72 to 18.6 percent 2009-10 (GOP, 2011).

However, sharp fluctuations are noted in the growth performance of Pakistan. Pakistan has enjoyed excellent economic growth in the 1960s (6.8 percent) led by a healthy growth of manufacturing (9.9 percent) and agriculture (5 percent). During this period, Pakistan was considered a model capitalist economy. The economic activities witnessed a sharp downturn during the 1970s. The average growth rate fell from 6.8 percent in the 1960s to 4.8 percent in the 1970s. There was a sluggish performance growth of the agriculture (2.4 percent) and manufacturing (5.5 percent) sectors. Per capita income declined during this period (Table 3.1).

TABLE 3.1
Growth Performance

Growth rate	1960s	1970s	1980s	1990s	2000s
GDP	6.8	4.8	6.5	4.6	4.8
Agriculture Sector	5.1	2.4	5.4	4.4	3.2
Manufacturing Sector	9.9	5.5	8.2	4.8	7.0
Services Sector	6.7	6.3	6.7	4.6	5.3
GDP per capita	3.8	2.2	2.4	1.8	3.3

Source: GOP, 2011

The weak performance of the economy during this period has been mainly attributed to the nationalization policies adopted by the government. Apart from this, the main factors responsible for poor performance were regional tension, floods, pest attacks,

and external shocks including a hike in petroleum prices and recession in the world market.

The growth performance was revived during the 1980s. On average, the GDP grew at the rate of 6.5 percent during this period. The agriculture and manufacturing sectors showed a robust growth. The services sector also grew strongly in the 1980s. This was led by ownership of dwellings, transportation, storage and communication and wholesale and retail trade. From the point of view of demand, Din (2007) argues that growth in the 1980s, particularly during the 1983-84 and 1987-88 period, was "fuelled by an upsurge in both private and public consumption expenditure, which grew on average respectively by 5.5 percent and 9.3 percent in real term". During this period, inflation and unemployment rates remained low.

The growth performance during the 1990s was not very encouraging. On average, the real GDP grew at 4.6 percent with a weak performance by all sectors. Throughout the period, inflation remained very high with a high unemployment level (Table 3.2). Besides political instability, many other factors contributed to the weak economic performance. These included deteriorating law and order, economic sanctions in the wake of nuclear testing, persistent drought conditions, and infrastructure bottlenecks such as inadequate power supply with frequent power outages, and a lack of many public facilities at optimal levels. Failure in enhancing revenues consistent with the growing expenditures requirements, stagnation in the exports sector and in overall foreign exchange earnings exacerbated these imbalances and worsened the overall macroeconomic environment (Din, 2007).

The economic performance, improved once again during the 2000s, almost matching the growth performance of the 1980s. Both the manufacturing and services sector showed impressive performance, growing, respectively, at the rate of 7 percent and 5.3 percent. On average the inflation remained below 6 percent, which according to Iqbal and Nawaz (2009) is considered as within the growth-enhancing range. On average, the budget deficit shrank from 6.9 percent during 1990s to 4.6 percent during 2000s (Table 3.2). During 2000-07 Pakistan positioned itself as one of the four fastest growing

economies in the Asian region, with its growth averaging 7.0 percent per year for most of this period.

TABLE 3.2
Key Macroeconomic Indicators

Year	GDP Growth Rate	Inflation rate	Unemployment rate	As % of GDP			
				Investment	Fiscal Deficit	Trade Deficit	M2
1980s	6.5	7.2	1.4	18.7	7.1	8.9	39.2
1990s	4.6	9.7	5.7	18.3	6.9	4.4	43.0
2000-01	2.0	4.4	6.1	17.2	4.3	1.8	36.2
2001-02	3.1	3.5	7.8	16.8	4.3	0.4	39.6
2002-03	4.7	3.1	7.8	16.9	3.7	0.5	42.6
2003-04	7.5	4.6	8.3	16.6	2.3	1.2	44.1
2004-05	9.0	9.3	7.7	19.1	3.3	4.0	45.5
2005-06	5.8	7.9	7.6	22.1	4.3	6.5	44.7
2006-07	6.8	7.8	6.2	22.5	4.4	6.6	46.9
2007-08	3.7	12.0	5.2	22.1	7.6	9.0	45.8
2008-09	1.7	20.8	5.2	19.0	5.2	7.8	40.3
2009-10	3.8	11.7	5.5	16.6	6.3	6.5	39.4

Source: GOP, 2011

During the latter half of 2000, however, Pakistan's macroeconomic environment was adversely affected by the global financial crisis (2007-09). As a result of a low global demand and a slowdown in the foreign direct inflows, the domestic economy suffered with a decline in Pakistan's exports. Despite support from the IMF and other bilateral and multilateral donors, Pakistan's external account remained vulnerable to a host of uncertainties (GOP, 2009).

Consequently, the economy faced a severe economic downturn. The real GDP growth declined from 6.8 percent in 2006-07 to 1.7 percent in 2009-10. The inflation rate increased from 7.8 percent in 2006-07 to 20.8 percent in 2009-10. Other than the impact of the global financial crisis, the weak performance of this period is attributed mainly to the supply-side shocks including power shortage, energy crisis, and an infrastructure bottleneck. A weak institutional framework and deteriorating law and order situation also contributed to the weak economic performance of the country during the last four years.

3.2.1 Overall Fiscal Development

Table 3.3 shows a change in the patterns of expenditure and revenue over the last three decades. From the spending point of view, the expenditure of the government as percentage of the GDP exhibited a trend of decline over the last four decades. The overall government spending fell from 25 percent of GDP in the 1980s to 20.5 percent of GDP in 2010. The total expenditures are divided into current and development expenditures. Throughout the 1980s and 1990s, current expenditures showed an increasing trend, increasing, on average, from 17.6 percent of GDP in 1980s to 19.4 percent of GDP in 1990s. During the 2000s, current expenditures have shown a mixed trend, increasing from 15.3 percent of GDP in 2000-01 to 16.9 percent of GDP in 2009-10.

TABLE 3.3
Overall Fiscal Development in Pakistan as Percent of GDP

Year	Expenditure			Revenue		
	Total	Current	Development	Total	Tax	Non Tax
1980s	24.9	17.6	7.3	17.3	13.8	3.5
1990s	24.1	19.4	4.7	17.1	13.4	3.7
2000-01	17.4	15.3	2.1	13.1	10.5	2.6
2001-02	18.5	15.7	2.8	14.0	10.7	3.3
2002-03	18.8	16.2	2.6	14.8	11.4	3.4
2003-04	16.5	13.7	2.8	14.2	11.0	3.2
2004-05	16.8	13.3	3.5	13.8	10.1	3.7
2005-06	18.4	13.6	4.8	14.1	10.5	3.6
2006-07	20.8	15.8	5.0	14.9	10.2	4.7
2007-08	22.2	18.1	4.4	14.6	10.6	4.4
2008-09	19.9	16.0	3.8	14.5	9.5	5.1
2009-10	20.5	16.9	3.5	14.2	10.2	3.9

Source: GOP, 2011

The development expenditures decreased on average from 7.3 percent of GDP in 1980s to 4.7 percent of GDP in 1990s. During 2001-2010, they increased from 2 percent in 2000-01 to 3.5 percent of GDP in 2009-10 (Table 3.3). During the last 30 years, the decline in the current expenditures (0.7 percentage point) and development expenditures (3.8 percentage points) is similar to the total expenditures (4.5 percentage point of GDP).

From the point of view of revenues, the total revenue to GDP ratio either remained stagnant or showed a secular decline over the last forty years. During the same period, the total revenue remained within the range of 17 percent of GDP to 14 percent of

GDP. The tax to GDP ratio has remained low throughout Pakistan's history, putting pressure on public finance. Tax revenue decreased consistently from 14 percent of GDP in 1980-89 to 10 percent of GDP in 2009-10, while non-tax revenue remained within the range of 3 percent of GDP to 5 percent of GDP during same period (Table 3.3). The decline in total revenue (3 percentage point of GDP) is shared by tax revenue (3.5 percentage point of GDP) and non-tax revenue (-0.5 percentage points) during the last 30 years.

3.3 Fiscal Decentralization: An Historical Perspective

The need for fiscal decentralization arose due to the mismatch between expenditure requirements and the revenue generation capacity. This mismatch necessitates the intergovernmental transfer among the federation and provinces which is a vital part of the decentralization process. The horizontal as well as vertical mismatch between revenue and expenditure requires a legislative arrangement on financial transfers at different levels of the government.

In both developed and developing countries, the difference between revenue generation and actual expenditure across national and sub-national governments is commonly observed. Cross-country data on revenue and expenditure show that there is a huge mismatch between the revenue generation capacity of the national government and the sub-national governments. A similar mismatch is observed between national and sub-national government from the point of view of expenditures (Table 3.4).

TABLE 3.4
National vs. Sub-National Revenue and Expenditure Shares: International Comparison

Country	**Revenue Share**		**Expenditure Share**	
	National	Sub-National	National	Sub-National
Australia	69	31	54	46
Brazil	69	31	54	46
Canada	44	56	37	63
India	66	34	45	55
South Korea	95	05	50	50
Pakistan	92	08	72	28

Source: Watt (2005)

In the case of Pakistan, as shown in Table 3.4, there is a serious imbalance in the sub-national expenditures and revenue generation. The statistics indicate that the revenue generation capacity of the provincial governments is nearly 13 percent of the total revenue. On the other hand, the expenditure needs of the provincial governments are approximately 28 percent of the total expenditure.

At a federal and provincial level, the imbalances between expenditure obligations and revenue lead to large amounts of financial resources transferred from the federal to provincial level. Such transfers and sharing of resources is embedded within the constitution and supported by a series of legislative rules and regulations. Inter-governmental transfers typically include revenue shares, grants, straight transfers, loans, and provincial revenues collected by the federal government and transferred to the provinces after deducting collection charges (e.g. royalties on gas and crude oil).

The intergovernmental transfer varies from country to country. Cross-country statistics reveal that the need for intergovernmental transfers is generally higher in a federation as compared to a unitary system. For example, in unitary states like Sweden only 15 percent of the resources are transferred whereas in federations like Australia about 45 percent resources are transferred (Table 3.5).

TABLE 3.5
The Federal Transfers as Percent of Total Revenue (State and Local)

Country	Total Transfers	Conditional Transfers
Mature Federations		
Australia	45.3	21.3
United States	29.6	29.6
Germany	43.8	9.8
Canada	19.8	15.8
Switzerland	24.8	17
Transitional Federations		
Pakistan	85.1	-
Spain	72.8	41.9
South Africa	96.1	11.0
Brazil	30.0	7.5
India	46.0	18.7
Mature Unitary Systems		
Japan	37.2	16.2
Sweden	15.8	4.4

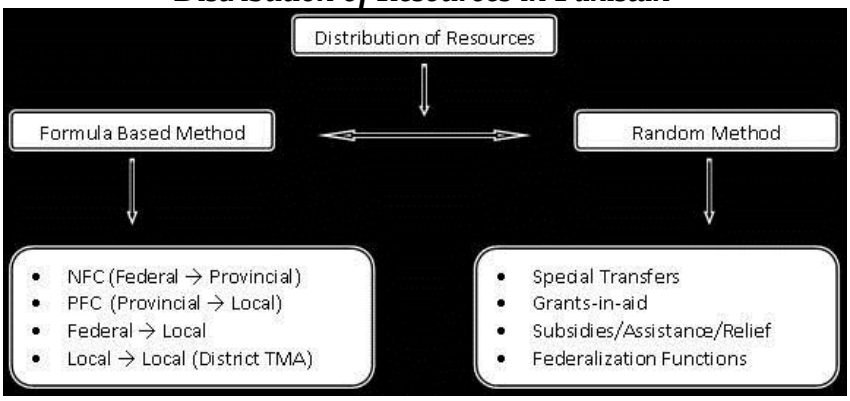
Source: Watt (2005)

Similarly, in mature federations like Canada, the United States and Switzerland the sub-national governments are less dependent on the financial transfers as compared to transitional or new federations like Pakistan, India and South Africa (Table 3.5).

Various institutional arrangements are used for the distribution of resources among the federation and the provinces. These mainly include the central agency, the intergovernmental forum, the independent agency and the national legislature. The federal government is directly responsible for undertaking decisions regarding transfers to the sub-national government. Countries like China, Italy, the Netherlands and Japan are relying upon the central agency for resource distribution. The intergovernmental forums are used to design the criteria for distribution of resources among the various tiers of the government. Countries like Germany, Indonesia and Nigeria use the intergovernmental forum for revenue distribution. Countries like South Africa and India make use of an independent agency in addition to intergovernmental forum. An independent agency is created by the central government to make recommendations to the government or the legislature on resource transfers to the constituent units. Typically, this kind of an agency has an advisory position (PIDE, 2012).

There is a well-defined mechanism for the distribution of resources from the federation to the provinces in Pakistan. Figure 3.1 provides an overview of the basic mechanisms for the distribution of resources in Pakistan.

FIGURE 3.1
Distribution of Resources in Pakistan



In general, the resources are transferred through a formula based method and a random method. In a formula base method, resources are transferred from the federal to the provincial level through the National Finance Commission (NFC), and from the

provinces to the local level through the Provincial Finance Commission (PFC). In a random method, the resources are transferred on the basis of special transfers, grant-in-aid, subsidies, assistance and relief and for special federation functions.

3.3.1 National Finance Commission (NFC) Awards: History

The National Finance Commission (NFC) is an autonomous body established under the Constitution of Pakistan for the re-distribution of resources from the federation to the provinces. The resources are collected by the federal government and distributed among the provinces according to their needs. The process of revenue-sharing started right from the inception of Pakistan. Since independence, the Niemeyer award, the Raisman award, the One Unit Formula and seven NFC awards based on the 1973 Constitutions for revenue sharing have been announced.

After independence in 1947, the Niemeyer Award was implemented for revenue-sharing between the federal and the provinces which was established under the 1935 Act of India. Under the Niemeyer award, income tax was a federal subject and 50 percent of total collection was redistributed to the provinces. Sales tax was implemented and collected by the provincial governments (GOP, 1991).

The formulation of the first formal award for revenue-sharing was started in December 1947. It was subsequently implemented in April 1952 under the supervision of Sir Jeremy Raisman. Under the Raisman award 50 percent of sales tax was allocated to the federal government to manage the financial crisis arising due to partition. Provinces were allocated 50 percent of the income tax, out of which 45 percent was allocated to East Pakistan while the rest was divided among the provinces of West Pakistan (GOP, 1991).

After 1955, the four provinces of West Pakistan were combined into one unit and the entire country was divided into two parts i.e. West Pakistan and East Pakistan. Revenue sharing under one unit took place through the 1961 and 1965 awards. Under the 1961 award, the divisible resources, which consist of 70 percent of sales and other taxes, were distributed between East Pakistan (54 percent) and West Pakistan (46 percent).

The 1964 award was announced by the National Finance Commission under the 1962 Constitution of Pakistan. In this award, the divisible pool was extended with the incorporation of excise duty and export duty apart from sales taxes. The divisible pool was distributed among the center and provinces with the ratio of 35 and 65 respectively but the share of East and West Pakistan remained the same (GOP, 1991).

In 1970, a committee was set up under the federal finance minister that gave recommendations for resource sharing between the center and provinces. The divisible pool was redefined. According to the recommendations of this committee, the share of the federal government was 20 percent in the divisible pool while the share of the provincial governments was 80 percent. However, like the previous award, 30 percent of the sales tax collection was allocated to the provinces based on the total collection from each province.

In the 1973 Constitution of Pakistan, legislative measures were taken to design an acceptable resource allocation mechanism. According to this constitution, it is compulsory upon the federal government to formulate the National Finance Commission (NFC) with every interval of five years. The prime objective of this commission was to recommend a revenue sharing mechanism. Based on this Constitution, the following NFCs were established:

1) In 1974, the first NFC was established under the 1973 Constitution. The divisible pool was reshuffled which consisted upon income tax, sale tax and export duty. The vertical distribution formula remained the same as per previous awards.

2) In 1979, the second National Finance Commission (NFC) was established by the military government. In this award, the divisible pool remained the same as it was in the 1st NFC. However, the provincial shares were revised.

3) The third NFC was constituted in 1985. This award was unable to propose any new criteria for resource sharing and ended with the same mechanism as was in the previous award.

4) In 1990, the fourth National Finance Commission (NFC) was established by the newly elected democratic government. The commission's recommendations were

finalized in April 1991. It was considered a milestone achievement because this award came after 16 years. In this award, the divisible pool was expanded by including more taxes.

5) The fifth NFC award, established in 1997, involved the inclusion of further taxes in the divisible pool, consisting of income tax, sales tax, wealth tax, custom duties, export duties, excise duties, capital value tax and all other taxes that were levied or collected by the federal government.

6) The sixth award was constituted by the military government in 2000. However, this award failed to provide any formula for resource sharing.

7) After the failure of the sixth NFC, the seventh NFC was established in 2006. Again, this commission was unable to settle the deadlock between federal and provincial governments. Under the Article 160(6) of the Constitution of 1973, the President announced an acceptable revenue sharing formula.

8) The NFC Award of 2009 is considered a major achievement of the democratic government. After a gap of twelve years, a consensus has been achieved between the federal and provincial governments over the resource distribution criteria.

The historical evolution of the NFC shows that the intergovernmental resource transfer through the NFC remains an issue. In many cases, the NFCs failed to provide an acceptable formula for resource sharing. However, some achievements have been made under democratic governments. After 18th Amendment and the successful completion of the 7th NFC award, more fiscal autonomy has been delegated to the provinces.

3.3.1.1 Divisible Pool

The divisible pool consists of those taxes which are collected by the federal government and distributed between the center and provinces with pre-defined ratios. The composition of the pool has changed periodically since 1972.

Table 3.6 gives an overview of the divisible pool since 1990. It is noted that over time, more taxes are included in the divisible pool. Hence the size of the divisible pool has increased. In the 1990 NFC, various new taxes, like excise duties, were included in the divisible pool. In the 1996 NFC, the divisible pool was further expanded by including

all federal taxes. In the 2006 award, although no new tax was included in the divisible pool, the share of the provinces in the divisible pool was increased. Similarly, in 2009, the share of the provinces was further expanded (Table 3.6).

TABLE 3.6
Historical Evolution of the Divisible Pool in Last Four Awards

	Divisible Pool	Shared Revenue Sources in NFC			
		1990	**1996**	**2006**	**2009**
A.	Income Tax				
	Personal	80%	37.5%	45%-50%	56%-57 ½%
	Corporate	80%	37.5%	45%-50%	56%-57 ½%
	Wealth Tax	-	87.5%	45%-50%	56%-57 ½%
B.	Sales Tax	80%	37.5%	45%-50%[e]	56%-57½%
C.	Excise Duties				
	Tea	-	37.5	45%-50%	56%-57 ½%
	Tobacco	80%	37.5%	45%-50%	56%-57 ½%
	Sugar	80%	37.5%	45%-50%	56%-57 ½%
	Betel nut	-	37.5%	45%-50%	56%-57 ½%
	All excise duties (Excluding GST)	-	37.5%	45%-50%	56%-57 ½%
D.	Export Duties				
	Cotton	80%	37.5%	45%-50%	-
	Jute	-	-	45%-50%	-
F.	Estate and Succession Duties	-	-	-	-
G.	Capital Value Tax on Immoveable Properties	-	37.5%	45%-50%	devolved to provinces

3.3.1.2 Criteria for Divisible Pool

Before the criteria of the revenue distribution in Pakistan are discussed, it would be useful to review the designs of revenue distribution followed in other countries. There are four commonly used criterion of revenue distribution. These include i) unconditional transfers, ii) need based, iii) fiscal capacity, and iv) grants. In Canada the equalization transfers are unconditional and are given to only those provinces whose revenue raising capacity is below the national average. The Indian system essentially involves the distribution of funds on the basis of the estimated expenditure needs and to an extent accounting for the potential of the sub-national government to generate revenues from their own sources i.e. fiscal capacity. In United States, unlike other federal countries there is no form of general revenue sharing. However grant programs exist for state and local governments. The different forms in which grants are provided include project, categorical and block grants (PIDE, 2012).

The amount of resources transferred from the central government to the lower level government is determined on the basis of a formula. Indicators like percentage of population, poverty, demographics, fiscal effort and population density are typically used to determine fiscal needs and capacities. The criteria for horizontal distribution are the most debated topic in the field of fiscal decentralization. One of the root causes in the failure of various NFC awards is the lack of a consensus in formulating the criteria for horizontal resources distribution. In Pakistan, since independence to 2009, the only criterion for resource distribution was the population.

In the 7th NFC award, a new criterion was designed for the first time for resource distribution among the provinces. In this award, four different indicators are used to define the share of each province in the total share. These include i) population, ii) backwardness/poverty, iii) revenue generation/collection capacity and iv) inverse population density (IPD) (Table 3.7).

TABLE 3.7
Sharing Criterion in Various NFC Awards

Award	Sharing Criteria (Weight)
NFC 1990	Population (100%)
NFC 1996	Population (100%)
NFC 2006	Population (100%)
NFC 2009	Population (82%), Poverty (10.3%), Revenue (5%), IPD (2.7%)

In this formula, once again the population has the major share of 82 percent of the total while poverty/backwardness has a 10.3 percent share, revenue generation/collection has a 5 percent share and inverse population density (IPD) has a 2.7 percent share.

The share of each province in the divisible pool has also changed over time (Table 3.8). The share of Punjab was 57.87 in the 1990 NFC award based on its population, whereas there was a minor decrease in 2006. However, after the 7th NFC award in 2009, the share of Punjab has gone down to 51.74 percent, mainly due to a change in the distribution formula. The share of Sindh was 23.29 percent in 1990 on the basis of its population .The share has increased to 24.55 percent in 2009 with the new formula. The share of KPK was 13.54 in 1990 and increased to 14.62 in 2009. Similarly the share of Balochistan was 5.3 percent in 1990 and now it is 9.09 percent on the basis of the revised formula.

TABLE 3.8
The Share of Each Province in the Divisible Pool (percent)

Province	NFC - 1990	NFC - 1996	NFC - 2006	NFC – 2009
Punjab	57.87	57.37	57.37	51.74
	(57.87)	(57.87)	(57.36)	(57.36)
Sindh	23.29	23.29	23.71	24.55
	(23.29)	(23.29)	(23.71)	(23.71)
KPK	13.54	13.54	13.82	14.62
	(13.54)	(13.54)	(13.82)	(13.82)
Balochistan	5.30	5.30	5.11	9.09
	(5.30)	(5.30)	(5.11)	(5.11)
TOTAL	100.00	100.0	100.0	100.0

Note: Population shares are reported in parenthesis based on Census conducted before the NFC Award

3.4 Conclusion

The above analysis shows that efforts are being made to promote the process of fiscal decentralization by transferring more resources to the provincial governments. With more resources and autonomy, the provincial governments have a greater role in the provision of basic services to the local jurisdictions like health, education and infrastructure facilities. The provision of basic social and economic facilities by the provincial government is the main theme of fiscal decentralization. It posits that the provincial governments can provide these facilities in a better way by knowing the preferences of the local communities.

CHAPTER 4

Fiscal Decentralization Measures and Macroeconomic Stability Index

4.1 Introduction

To empirically examine the role of fiscal decentralization, it is necessary to develop measures of fiscal decentralization and macroeconomic stability. The objective of this chapter is to develop three different measures of fiscal decentralization along with macroeconomic instability index for Pakistan.

The organization of the chapter is as follow: In section 4.2 the literature on fiscal decentralization measure is discussed. In section 4.2.1 multidimensionality of fiscal decentralization measure is explored. In section 4.3, three different measures of fiscal decentralization are constructed for Pakistan.

In section 4.4, the relevant literature on macroeconomic stability is reviewed. In this section, definitional concepts, components of macroeconomic stability and there expected contribution to the growth are discussed. In section 4.4.1, a discussion is carried out on various macroeconomic stability indices developed in existing studies and finally the procedure for the construction of Macroeconomic Instability Index (MII) for Pakistan is set out.

4.2 Fiscal Decentralization Measures

There are two widely used measures of fiscal decentralization, namely the revenue decentralization and the expenditure decentralization based on 'Budget Data'. Revenue decentralization (RD) is measured as a ratio of the sub-national government revenue to the total government revenue (national plus sub-national). Expenditure decentralization (ED) is measured as a ratio of sub-national government expenditures to the total government expenditures (national plus sub-national).

Oates (1972) defines expenditure centralization as the share of the central government spending in the total public spending and revenue centralization as the share of central government revenue in the total revenue. Davoodi and Zou (1998) measure fiscal decentralization as the expenditure/revenue of the sub-national government as a fraction of total government expenditure/revenue.

Woller and Phillips (1998) re-define fiscal decentralization measures after making few adjustments. First, in measuring revenue decentralization, they subtract the grant-in-aid given to sub-national government from the total revenue and treat it as an expense to avoid double counting. Second, in measuring expenditure decentralization, they exclude social security and defence spending from the total public spending as these are considered to be the main part of non-decentralized government spending. After these adjustments, Woller and Phillips (1998) measure fiscal decentralization in the following four ways:

i) The ratio of sub-national government revenues to the total government revenues
ii) The ratio of sub-national government revenues less grant-in-aids to the total government revenues
iii) The ratio of sub-national government spending to the total public spending
iv) The ratio of sub-national government spending to the total public spending less spending on defence and social security

Various empirical studies have used these measures to quantify the impact of fiscal decentralization[5]. However, the accuracy and the reliability of these measures have been long debated in the literature. The data for measures are taken from the Government Finance Statistics (GFS) publish by the International Monetary Fund (IMF).

According to Ebel and Yilmaz (2003), there are three main concerns with the GFS data. First, it is not possible to measure the autonomy of local spending as these expenditures are reported at the level of governments that receive these amounts. Therefore, the local spending by the central government is added in the sub-national spending. Second, there is no information regarding the sources of revenues of the sub-national government; whether these are collected through shared taxes, own taxes or piggybacked taxes. Third, the data do not distinguish between the different types of intergovernmental transfer; whether these are conditional or distributed through any

[5] See for example (Oates, 1995; Zhang and Zou, 1998; Xie *et al*. 1998; Yilmaz, 1999; Lin and Liu 2000; Thiessen, 2003; Akai and Sakata, 2002; Eller, 2004; Iimi, 2005; Feltensteina and Iwata, 2005; Cantarero and Gonzalez, 2009; Neyapti, 2010).

criteria. Therefore, the GFS data ignore the degree of fiscal autonomy that considerably overestimates the degree of fiscal decentralization (Stegarescu, 2005).

Stegarescu (2005) highlights that based on these traditional measures, it is difficult to exactly determine whether these indicators exhibit the actual assignment of functions and resources to the various levels of government or simply show the relative size of sub-national government's activities. Stegarescu (2005) further argues that the GFS data only report revenue and expenditure at the level of government which ultimately receives and utilizes, irrespective of their discretion upon it. The GFS data fail to capture the other dimensions of decentralization including the legislative and regulatory activities involve in the process of fiscal decentralization. Therefore, these indicators do not accurately measures the degree of fiscal decentralization. Stegarescu (2005) proposes six different measures of revenue decentralization and tax autonomy using survey data "Taxing Powers of State and Local Government" in OECD countries in 1999. These measures take into account the tax-raising capacity of the sub-national government.

Akai and Sakata (2002) criticize standard measures on two counts. First, due to intergovernmental grants, the level of authority allocated to the sub-national government may be over evaluated from the expenditure side and under evaluated from the revenue side. Therefore, these measures are misleading. Second, even if expenditure or revenue shares are small, the level of fiscal decentralization depends on the autonomy of sub-national government in resource generation. These measures do not capture the autonomy of sub-national government. For accurate measurement, autonomy of local governments should be the part of fiscal decentralization measures.

According to Martinez-Vazquez and McNab (2003), these measures are defined on the basis of a single dimension of fiscal decentralization—expenditures going through the sub-national budgets or revenue generated by the sub-national governments. Fiscal decentralization, however, is a multidimensional phenomenon and it requires multidimensional measures to portrait the true picture of decentralization.

4.2.1 Fiscal Decentralization Measures and Multidimensionality

To deal with the multidimensionality, various studies have tried to combine the revenue and expenditure assignments of the governments. Akai and Sakata (2002) construct fiscal decentralization measure by combining both the expenditure and the revenue shares of the sub-national governments. These two measures, separately, are considered as two extreme cases relating to the allocation of authority. This study drives the following composite indicator:

$$PRI = \frac{PI + RI}{2} \dots\dots\dots\dots (4.1)$$

Where (PRI) represents 'Production-Revenue Indicator' that combines both the revenue and the expenditure shares. 'Production Indicator'(PI) is defined as the ratio of the sub-national government expenditure to the total government expenditure and 'Revenue Indicator' (RI) is defined as the ratio sub-national government revenue to the total government revenue excluding the grants. 'Production-Revenue Indicator' (PRI) is the average of 'Production Indicator' (PI) and 'Revenue Indicator' (RI).

Halder (2007) develops a composite measure of fiscal decentralization which involves expenditure and grants. This study emphasizes the role of grants given by the central government to the sub-national authorities. It is fact that most of the expenditures by the sub-national levels of governments are financed through grants from the central government. In such a case, the role of authorities of sub-national government in allocation of expenditures in different sectors becomes limited and decisions are mainly govern by the central authorities. The grants provided by the central government are more likely to be tied for specific projects. The inclusion of grants in fiscal decentralization measure takes into account the fiscal autonomy of the sub-national governments in decision making process. Therefore, this measure is probably more efficient in measuring the degree of fiscal decentralization than the previous measures. This measure only considers those expenditures that are financed by the sub-national levels governments. In traditional measures, a smaller share of the sub-national revenue/expenditures in the total revenue/expenditures is taken as an indication of a centralized government. But this may not be true when autonomy of decision making is considered.

Halder (2007) defines the composite measure as a ratio of the sub-national government's self-financed expenditures to the central government expenditures on its own projects. Grants received by sub-national government are subtracted from there expenditures. To ensure the accuracy, the grants given to the other forms of government are also subtracted from the total national expenditure. This ensures that that only those expenditures are included those are used in their own projects rather than on intergovernmental grants. It can be written as follow:

$$CR = \frac{TSE - GRS}{TNE - GGN} \dots\dots\dots\dots\dots (4.2)$$

Where (CR) represents 'Composite Ratio', (TSE) represents total sub-national government expenditure, (GRS) represents grants received by the sub-national government, (TNE) represents total national government expenditure and (GGN) represents grant given by the national government.

Vo (2008) develops two new indices of fiscal decentralization by incorporating the effects of unconditional grants and borrowings by sub-national governments on sub-national fiscal autonomy i.e. i) the Fundamental Index of Fiscal Decentralization (FDI) and ii) the enhanced Index of Fiscal Decentralization $(eFDI)$.

***The Fundamental Index of Fiscal Decentralization (FDI)*:** The fundamental index of fiscal decentralization (FDI) incorporates two concepts: (i) the fiscal autonomy—the extent to which sub-national expenditure is funded by own-source revenue—defined as (OSR/E), where (OSR) is sub-national own-source revenue, E is sub-national expenditure; and (ii) fiscal importance—the extent to which total public sector expenditures are undertaken by sub-national government—defined as (E/TE), where (TE) is the total public sector expenditure. The index of fiscal decentralization is the geometric mean of these two concepts:

$$FDI = \sqrt{\left(\frac{OSR}{E}\right) \times \left(\frac{E}{TE}\right)} \dots\dots\dots\dots\dots\dots (4.3)$$

***The Enhanced Index of Fiscal Decentralization* $(eFDI)$:** The enhanced index of fiscal decentralization $(eFDI)$ takes into account the effects of sub-national fiscal

autonomy of the fiscal transfer i.e. unconditional grants, to sub-national governments. It relates to the fundamental index of fiscal decentralization (FDI) via a term involving transfers:

$$k = \frac{T^U - T^C}{E} \times \frac{T^U}{T} \dots\dots\dots\dots\dots\dots (4.4)$$

Where T^U, T^C and T are unconditional, conditional and total fiscal transfers to sub-national government from the national government, respectively. The enhanced index of fiscal decentralization is then defined as:

$$eFDI = \sqrt{\left(\frac{OSR}{E} + k\right) \times \left(\frac{E}{TE}\right)} \dots\dots\dots\dots (4.5)$$

Martinez-Vazquez and Timofeev (2010) also develop a composite indicator to capture the multidimensionality of fiscal decentralization. Unlike the composite indicators developed in various studies, Martinez-Vazquez and Timofeev (2010) improve it in many ways. The 'Production-Revenue Indicator' developed by Akai and Sakata (2002), is based on the average of revenue decentralization and expenditure decentralization. However, this tends to underestimate the combined effect of revenue decentralization and expenditure decentralization. Halder's (2007) composite indicator emphasizes the role of fiscal autonomy of sub-national government, while ignoring the other dimensions of decentralization. Vo (2008) attempts to capture the interaction of the local revenue autonomy with the local share of the public expenditures, however, the particular choice of the functional form results in a cancellation of the expenditure component resulting in a measure essentially equivalent to the revenue ratio.

The 'Composite Ratio', developed by Martinez-Vazquez and Timofeev (2010), essentially combines the information contained in expenditure and revenue ratios. The 'Composite Ratio' can be expressed as follow:

$$CR = \frac{RR}{1 - ER} \dots\dots\dots\dots\dots (4.6)$$

Where CR, RR and ER are the 'Composite Ratio', 'Revenue Ratio' and 'Expenditure Ratio' respectively. In this measure, revenue decentralization and

expenditure decentralization reinforce each other. For same level of revenue decentralization, the 'Composite Ratio' is larger if the level of expenditure decentralization is higher and vice versa.

4.3 Construction of Fiscal Decentralization Measures for Pakistan

Based on existing literature and availability of the data, three measures of fiscal decentralization are constructed for Pakistan.

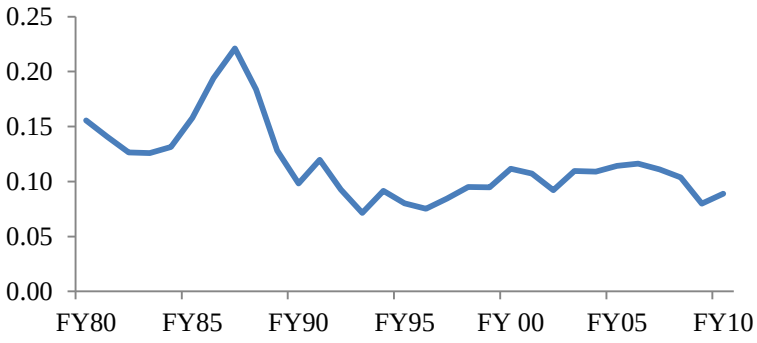
4.3.1 REVENUE DECENTRALIZATION (RD)

The revenue decentralization (RD) is measured as the ratio of provincial governments revenue to the total government revenue (federal plus provincial)

$$RD = \frac{PR}{PR + FR} \ldots\ldots\ldots (4.7)$$

Where RD, PR and FR are the 'Revenue Decentralization', 'Provincial Revenue' and 'Federal Revenue' respectively. Figure 4.1 shows the trend in revenue decentralization in Pakistan. The share of provincial government revenue in total government revenue ranges from 10 to 25 percent. The share of provincial governments' revenue is 15 percent in total government revenue in 1980, thereafter showing an increasing trend to reach at 23 percent in 1987. After this period, there is decreasing trend in revenue decentralization and provincial revenue share in total government revenue reaches at 10 percent in 2010.

FIGURE 4.1
Revenue Decentralization in Pakistan



Source: Author's own calculation

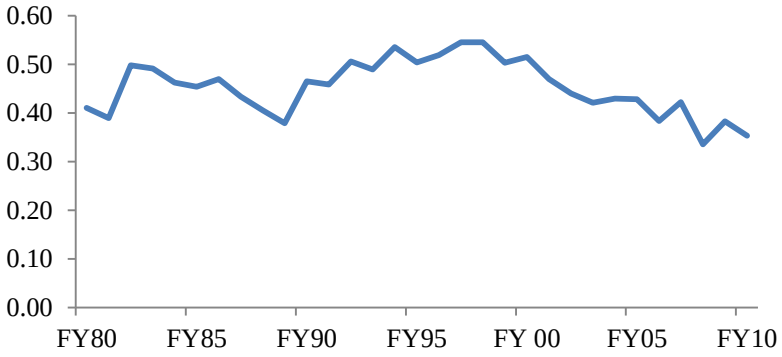
4.3.2 EXPENDITURE DECENTRALIZATION (ED)

The expenditure decentralization (ED) is defined as the ratio of provincial government expenditures to the total government expenditures (federal plus provincials) less the defence expenditures and interest payments on debt. These expenditures are mainly considered to be the part of non-decentralized government expenditures.

$$ED = \frac{PE}{PE + FE - (DE + IE)} \ldots\ldots\ldots (4.8)$$

Where ED, PE and FE are the 'Expenditure Decentralization', 'Provincial Expenditure' and 'Federal Expenditure' respectively. While DE and IE are defence expenditure and interest payments respectively. Figure 4.2 represents the historical trend in expenditure decentralization. The share of provincial government expenditure in total government expenditure ranges from 30 to 60 percent during the last three decades. After reaching 50 percent in 1982, the share of provincial government expenditure shows a decreasing trend reaching 39 percent in 1989. For most part of 1990s, expenditure decentralization shows an increasing trend. However, after 1998 once again, provincial shares in total expenditure shows a decreasing trend, declining from 55 percent in 1998 to 35 percent in 2010.

FIGURE 4.2
Expenditure Decentralization in Pakistan



Source: Author's own calculation

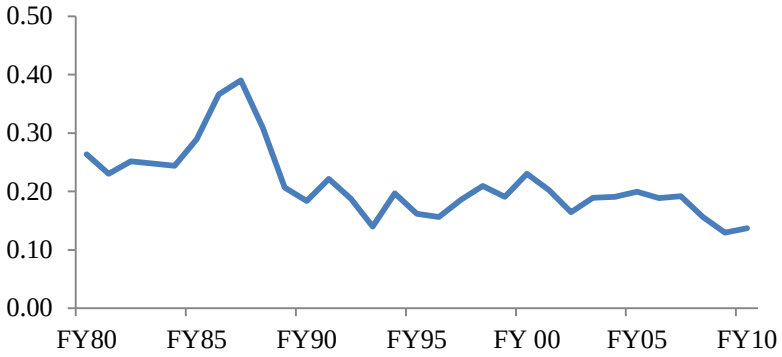
4.3.2 COMPOSITE DECENTRALIZATION (CD)

The composite decentralization is measured using both the revenue decentralization and the expenditures decentralization.

$$CD = \frac{RD}{1 - ED} \ldots\ldots\ldots (4.9)$$

Where CD, RD and ED are the 'Composite Decentralization', 'Revenue Decentralization' and 'Expenditure Decentralization' respectively. Figure 4.3 shows the composite of revenue and expenditure decentralization in Pakistan. The trend shows that the 'Composite Decentralization' ranges from 13 to 40 percent.

FIGURE 4.3
Composite Decentralization in Pakistan



Source: Author's own calculation

4.4 Macroeconomic Stability

It is generally believed that macroeconomic stability leads to high and sustainable economic growth (Fischer, 1993; Bleaney, 1996; Sirimaneetham and Temple, 2009). While macro-instability is associated with slow growth or even collapse of output (Easterly, 2001). The macro-stability contributes to economic growth in many ways. For example, macroeconomic stability makes capital inflows more effective, thus enhancing economic growth (World Bank, 1990). The macro-stability is essential for the growth of private business, as it strengthens the overall competitiveness of an economy (WEF, 2011). It enhances the confidence of investors, thus providing incentives for greater investment. Hence, a stable macroeconomic environment is indispensable for high growth. There is no precise definition of macroeconomic stability. However, the World Bank (1990) defines macroeconomic framework to be stable:

> *"when inflation is low and predictable, real interest rates are appropriate, fiscal policy is stable and sustainable, the real exchange rate is competitive and predictable, and the balance of payments situation is perceived as viable".*

Conversely, macroeconomic instability is characterized by high inflation, overvalued currency, unstable real exchange rate, rising balance of payment deficit, fiscal deficit or instability in debt. Macroeconomic instability decreases the predictability of domestic macroeconomic environment and makes the key economic variables volatile or unsustainable in their behavior. Unpredictability of macroeconomic environment impedes the efficient resource allocation, investment and growth (Montiel and Serven, 2006).

In earlier studies, inflation is mainly used as a proxy for macroeconomic stability. However, the concept of macroeconomic stability has undergone many changes and for proper measurement, it involves multiple dimensions (Ocampo, 2005). In order to develop a comprehensive index for macroeconomic stability, previous researchers have combined several macroeconomic indicators. This approach has two advantages. First, from statistical point of view it reduces the measurement error and decreases the outlier problem. Second, form economic perspective, it accurately reflects the quality of the macroeconomic decision process (Sirimaneetham and Temple, 2009).

The literature identifies various policy variables that determine the macroeconomic stability. According to World Bank (1990) definition, macroeconomic stability of the economy is determined by inflation, fiscal discipline and exchange rate management with balanced external sector. Fischer (1993) also argues that high inflation, large budget deficits, and distorted foreign exchange market are associated with macroeconomic instability. Montiel and Serven (2006) argue that volatility in fiscal and monetary policy causes the macroeconomic instability. Sirimaneetham and Temple (2009) suggest that macroeconomic stability can be measured by inflation, fiscal discipline and exchange rate management.

There are some arguments explaining why the macroeconomic instability, which manifests itself in high inflation, large budget deficit and distorted exchange rate, is detrimental for economic growth.

The growth is negatively related with high inflation due to reduction in investment and productivity (Fischer, 1993). Inflation may harm the productivity of inputs, by distorting prices and impacting the efficient allocation of resources (Smyth, 1994). Smyth (1995) finds that inflation significantly reduces the growth of total factor

productivity hence output growth. Randel *et al*. (2004) suggest that noninflationary monetary policy is essential for savings and for capital accumulation. This study argues that high inflation increases the risk premium and hampers the functioning of financial markets through discouraging savings and investment.

Fiscal discipline is necessary for economic growth. It boosts the confidence of investors thus helps in capital accumulation and productivity improvement. The large budget deficit leads to a slowdown in economic growth by reducing capital accumulation and productivity (Fischer, 1993; Randel *et. al*., 2004). Easterly and Rebelo (1993) show that budget deficit has a negative impact on economic growth.

Fischer (1993) argues that exchange rate variability is detrimental for economic growth. The policy failure in the exchange rate management causes distortions in the composition of growth by impacting the price of tradable versus non tradable goods. The sharp fluctuation in the exchange rate may lead to a fall in investment by increasing uncertainties (Byrne and Davis, 2003). Exchange rate variability may also cause a high degree of dollarization hence result in a loss of seignorage revenue (Agenor, 2000).

4.4.1 Construction of Macroeconomic Instability Index (*MII*) For Pakistan

Burnside and Dollar (2000) construct macroeconomic stability index based on three indicators: inflation, budget surplus, and trade openness, using regression coefficients as weights for these variables. Ismihan (2003) develops a macroeconomic instability index for Turkey using four indicators including inflation, public deficit to GNP ratio, external debt to GNP ratio and change in exchange rate (exchange rate variability). The macroeconomic instability index is constructed using two steps Human Development Index (HDI) methodology of UNDP. In the first step four normalized indices are developed and in the second step the composite index is constructed by taking the simple average of the four sub-indices obtained in the first step.

Sirimaneetham and Temple (2009) develop macroeconomic stability index based on inflation, fiscal discipline measured through budget surplus, and exchange rate management measured through black market premium, currency overvaluation or real exchange rate distortion, and the variability in exchange rate distortion. The stability index is constructed by using the Principal Component Methodology.

In the case of Pakistan, Javid and Qayyum (2011) develop a stability index using inflation, budget deficit and trade openness as policy variables by applying Principal Component Methodology. The choice of indicator is similar to Burnside and Dollar (2000) index but differs in construction methodology.

We construct a new Macroeconomic Instability Index (MII) for Pakistan which is more comprehensive than the earlier indices in terms of both the scope as well as the methodology. It is based on inflation, fiscal discipline and exchange rate management. Inflation is measured as annual percent change of average consumer price index. Data for inflation is based on 2000=100. High inflation leads to more unstable macroeconomic environment and vice versa. Contribution of inflation in MII is positive. Fiscal discipline is measured as budget deficit expressed as percent of GDP. Budget deficit has a positive contribution in macroeconomic instability index. Persistently high budget deficit leads to high instability and vice versa. Exchange rate management is measured through change in exchange rate or exchange rate variability which is proxied by the percentage change in (year-average) US$ rate. Exchange rate variability captures instability in exchange rate management. Higher the variability in exchange rate means higher the level of instability which leads to higher the values of MII and vice versa. Low values of MII represent more stable macroeconomic environment and high values represent more unstable macroeconomic environment.

MII is constructed in the following two steps:

Step 1: All indicators used in the construction of the index are not in the same units and more importantly these have different ranges, i.e. these have different minimums and maximums values. Therefore, it seems not sensible to sum their values or to take their average in order to obtain a composite index. In order to circumvent these problems, individual series are normalized in the range of 0 and 1. So individual indices are constructed for every indicator based on the following general formula:

$$I_t = \frac{(X_t - X_{min})}{(X_{max} - X_{min})} \dots\dots\dots (4.10)$$

Where I_t refers to the index value of variable X, in year t, X_t refers to the actual value of indicator X in year t, and X_{man} (X_{min}) refers to the maximum (minimum)

value of indicator X over the whole period under consideration (1972-2010). All sub-indices have common ranges, i.e. $I \in [0,1]$

Step 2: We assign weights to all sub-indices by applying the Principal Component Methodology. Based on these weights, MII is constructed which is also bounded between 0 and 1 i.e. $MII \in [0,1]$.

$$. \ MII = \sum_{i=1}^{3} \omega_i I_i \ \ldots\ldots\ldots (4.11)$$

Where ω is the weight of sub-indices. It can also be written as follow:

$$MII = \frac{\omega_1 * INF + \omega_2 * BD + \omega_3 * ERV}{3} \ldots\ldots (4.12)$$

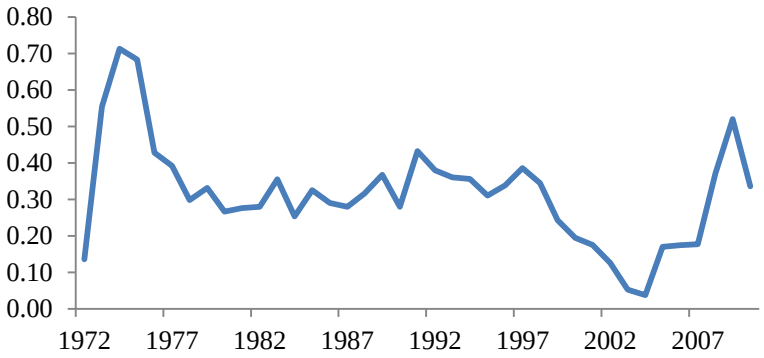
Where $\omega_1 > 0$, $\omega_2 > 0$ and $\omega_3 > 0$ are the weights of Inflation, INF, budget deficit, BD, and exchange rate variability, ERV, respectively. These weights are calculated by using the Principal Component Methodology (PCM). The following weights are obtained:

$$MII = \frac{0.413 * INF + 0.289 * BD + 0.288 * ERV}{3} \ldots\ldots\ldots (4.13)$$

Figure 4.4 represents the Macroeconomic Instability Index (MII) for Pakistan. MII shows that macroeconomic environment remains volatile. The inflation has a large impact on the MII, followed by the budget deficit and exchange rate variability.

The high macroeconomic instability during 1970s was mainly due to political disturbance, war with India and international oil price shock. During this period, economic management shifted towards nationalization. Political disturbance also led to separation of the former East Pakistan. As a result, the country faced the challenges of rehabilitation of war shattered economy, high rate of inflation and budget deficit with stagnant agriculture and industrial sectors. Large scale public sector investment, subsidies and social sector spending mainly caused high budget deficit. The high inflation was mainly due to high oil prices, increased remittances, and enhanced public consumption along with decreased production output.

FIGURE 4.4
Macroeconomic Instability Index (MII) for Pakistan



Source: Author's calculation

The decade of the eighties was marked by privatization, deregulation and liberalization policies. It is witnessed that macroeconomic environment remained quite stable with low inflation during this period. Exchange rate policy was revised in early years of this decade. In 1982, the Managed Float System was adopted which led to 20 percent depreciation of Pak Rupee. During this decade, on average the fiscal deficit remained at about 6.8 percent of GDP whereas the primary deficit, on average, was recorded about 3.5 percent of GDP. The current account deficit, on average, remained 2.8 percent of GDP during the 1980s. Low current account deficit of the 1980s than that of the 1970s was mainly attributed by high inflows of remittances and low imports demand.

Macroeconomic stability conditions were precarious during the period of the nineties. However, in the early period of the 1990s, various measures like trade liberalization policy and financial reforms along with tariff reform were implemented but the economy failed to achieve macroeconomic stability due to political instability, law and order situation and inconsistency in the macroeconomic policies. Nuclear test, freezing of the foreign currency account and military takeover in 1999 led to a further worsening of the economy.

The failure of the government to manage the fiscal as well as current account deficit led to unsustainable and unprecedented levels of public debt during this period. Exchange rate variability escalated significantly during this period. The decade of the 1990s was characterized by high inflation and high budget deficit which had a negative impact on macroeconomic stability. In sum, the decade of the 1990s with high inflation

and budget deficit and low economic growth is termed as a lost decade by the many economic analysts.

During the period of 2000s, the economy was faced with many challenges including poverty and unemployment and fiscal and external sector imbalances besides external shocks of war on terrorism. In early years, the economy experienced low and stable inflation along with low budget deficit because of abundant inflows of capital in the form of remittances and aid, all of which contributed to the macroeconomic stability.

The overall fiscal deficit remained, on average, 4.5 percent of GDP coupled with surplus in primary balance. Expansionary fiscal policy was adopted during early years of 2000s. Huge public sector development programs (PSDP) was initiated during this period. Reduction in debt services charges because of rescheduling of debt, however, did help in reducing fiscal deficit. The current account balance remained in surplus in many years. Macroeconomic stability and liberalization of foreign exchange regime helped in boosting the confidence of investor during this period.

However, international financial crisis (2007-09), high food and oil prices and fragile law and order situation adversely impacted macroeconomic stability after 2006; inflation went up from 7.8 percent in 2006-07 to 20.8 percent on 2008-09, budget deficit increased from 4.3 percent of GDP in 2006-07 to 7.6 percent of GDP in 2007-08, and exchange rate increased from Rs. 60/US$ in 2006-07 to Rs. 78/US$ in 2008-09.

4.5 Conclusion

In this chapter, we have developed three different measures of fiscal decentralization i.e. ‘Revenue Decentralization’, ‘Expenditure Decentralization’ and ‘Composite Decentralization’ for Pakistan. We have also constructed a new Macroeconomic Instability Index (MII) for Pakistan which is more comprehensive than the earlier indices in terms of both the scope as well as the methodology. The indices developed in this chapter are used in chapter seven and eight for empirical analysis.

CHAPTER 5

Fiscal Decentralization, Macroeconomic Stability and Economic Growth: Theoretical Framework

5.1 Introduction

Theoretical as well as empirical literature discussed in chapter 2 reveals that fiscal decentralization plays an important role in promoting economic growth and maintaining macroeconomic stability. Yet, the precise linkages of fiscal decentralization with economic growth and macroeconomic stability remain unclear. In this context, the purpose of this chapter is to set up a theoretical framework to conceptualize the relationship between fiscal decentralization, macroeconomic stability and economic growth. The advantage of this theoretical model over the ones used by Davoodi and Zou (1998) is that it allows us to capture the direct impact, as previously suggested in literature, as well as indirect impact of fiscal decentralization on economic growth within a unified framework. This formulation indicates that fiscal decentralization may affect economic growth directly and indirectly by means of macroeconomic stability.

The structure of the chapter is as follow. In section 5.2, we define fiscal decentralization and its types. A detailed theoretical discussion on the transmission channels through which fiscal decentralization affects economic growth is carried out in section 5.3. How macroeconomic stability is impacted by fiscal decentralization theoretically is also elaborated in this section. In section 5.4, we set up the theoretical model to capture the direct as well as indirect impact of fiscal decentralization. The final section lays out the hypotheses emerging from the theoretical model.

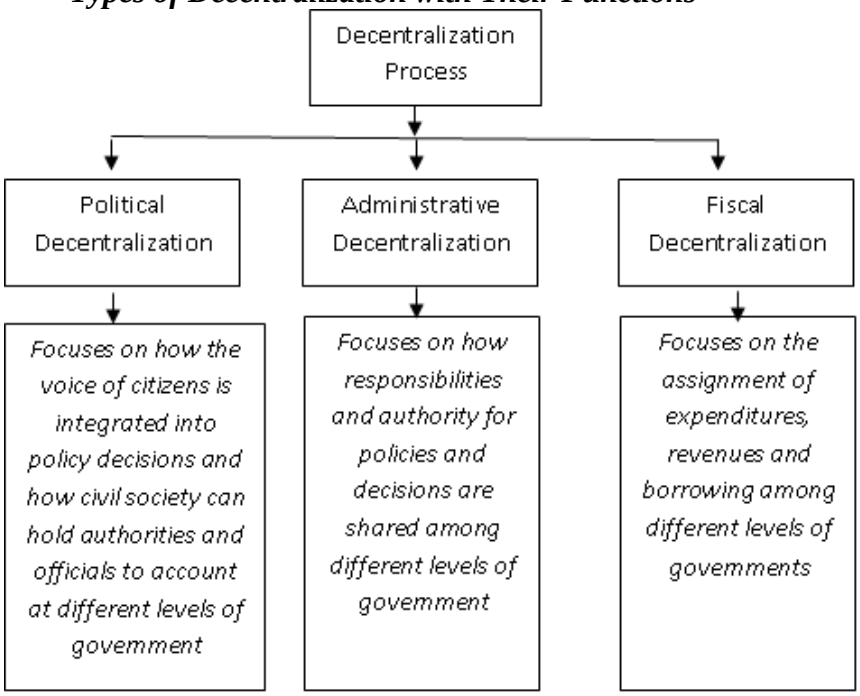
5.2 Decentralization and Its Types

Decentralization is a complex and multidimensional phenomenon. According to World Bank, decentralization involves the transfer of authorities and responsibilities for the public sector functions from the national government to the subordinate and quasi-independent government organizations (World Bank, 2003). In a comprehensive way, decentralization is "*the transfer of authority, or dispersal of power, in public planning, management and decision making from the national level to the sub-national levels or,*

more generally, from higher to lower levels of government is termed as decentralization" (Rondinelli, 1981).

Therefore, the process of decentralization involves the transfer of authority and responsibility of planning, management and resource generation and allocation functions of the public sector from the national level government to the sub-national levels governments (Figure 5.1). According to this definition, there are three type of decentralization: i) political decentralization, ii) administrative decentralization and iii) fiscal decentralization.

FIGURE 5.1
Types of Decentralization with Their Functions



Source: Author's own

Political decentralization provides more power to the citizens and their elected members in making public decisions. The basic idea behind political decentralization is that public decisions based on greater participation is better informed and relevant to the demands of the society than made by national political representatives. The choice of political representatives at local level allows citizens to know their political agents in better way. Similarly, it allows elected representative to know the preferences of their constituents in better way. Administrative decentralization involves the devolution of responsibility and authority of financial resources for the provision of public goods and

services from the central government to the lower levels governments. Fiscal decentralization involves with how public spending and revenues are allocated among the different levels of governments.

Fiscal decentralization, the subject matter of this dissertation, refers to the devolution of authority for public finances and the delivery of public services from the national government to sub-national level governments (Tanzi, 1996). Fiscal decentralization occurs through the "devolution of policy responsibilities for public spending and revenue collection from the central to local governments" (Neyapti, 2010). "Empowering the sub-national government in performing fiscal responsibilities through devolution of power to tax and spending along with arrangements for correcting the imbalances between resources and obligations" is called fiscal decentralization (Thiessen, 2003). Fiscal decentralization involves the transfer of four main responsibilities from the central government to the sub-national governments: i) spending decisions, ii) revenue raising and taxing powers, iii) sub-national governments borrowings and iv) intergovernmental fiscal transfers (World Bank, 2003).

5.3 Fiscal Decentralization and Economic Growth: The Transmission Channels

Fiscal decentralization can contribute to economic growth through a variety of channels. Fiscal decentralization promotes economic growth through generating greater economic efficiency in the allocation of public resources. Fiscal decentralization may have an indirect impact on economic growth through various channels. Fiscal decentralization enhances economic growth through i) promoting consumer and producer efficiency, ii) better allocation of resources among various jurisdictions, iii) maintaining macroeconomic stability and iv) minimizing corruption and capture by elites (Martinez-Vazquez and McNab, 2003).

5.3.1 Fiscal Decentralization and Economic Growth: Direct Linkages

The direct impact of fiscal decentralization on economic growth is derived from the traditional theory of fiscal federalism which presents a general normative framework for the assignment of functions to different levels of governments. Under the traditional theory, fiscal decentralization generates greater economic efficiency in the allocation of

resources in the public sector[6]. Various theoretical explanations are available in the literature that spells out how fiscal decentralization generates economic efficiency in public sectors.

First, economic efficiency can be generated through resource mobilization which occurs through fiscal decentralization. Fiscal decentralization grants greater autonomy and funds to the sub-national governments. Availability of more funds and autonomy in decision making process, the sub-national governments are compelled into mobilizing the available resources in their own jurisdictions, rather than wait for the provision of public goods and services or for solution to come from the central government. This leads to a greater emphasis on economic efficiency across jurisdictions within a country and also to tapping into what otherwise may have been untapped potential (Rodriguez-Pose and Ezcurra, 2010).

Second, the "Theorem of Decentralization" provides a well-known mechanism through which fiscal decentralization may lead to greater economic efficiency. According to this theorem, the preferences for public goods and services differ across individuals and regions. The welfare level achieved by a national government through providing a uniform public goods and services is always inferior to the level achieved in a decentralized setup which allow for different provision of goods and services across the regions (Oates, 1972). The sub-national governments are better informed about the preferences of citizens than national government. Therefore, sub-national governments always perform better in providing public goods and services according to the needs of the local communities.

Third, economic efficiency can be enhanced if citizens are mobile. Citizens, with free mobility, can locate themselves among the jurisdictions that best match their preferences (Tiebout, 1956). Oates (1993) argues that expenditures for social and infrastructure sectors are likely to be more growth enhancing if carried out by sub-national governments than the central government which may ignore preference differences. The growth enhancing advantages of fiscal decentralization are more visible

[6] According to Giugale and Webb (2000) efficiency means satisfying the needs and preferences of taxpayers at the lowest possible cost.

in large and more heterogeneous country. Because, in a small country with homogenous characteristics the informational advantages of implementing policies and providing different public goods and services at the regional or local level may be limited. The benefits of fiscal decentralization increase because internal heterogeneity causes preferences of individual to be more diverse. Therefore, the benefits of fiscal decentralization can only be realized beyond a certain threshold level of country size (Rodriguez-Pose and Ezcurra, 2010).

Fourth, the competition among the jurisdictions is seen as an important mechanism to encourage efficiency in taxation, regulation and supply of goods and services (Tiebout, 1956; Brennan and Buchanan, 1980). In the Public Choice Approach, fiscal decentralization may lead to competition among the jurisdictions for the mobile factors of productions. Thus forcing discipline on public officials who tend to pursue their own interest and seek to maximize their own revenues. Fiscal competition among different levels of government leads to a market-preserving federalism which minimizes the extent of government interventions, hence maintaining market efficiency (Weingast, 1995).

5.3.2. Fiscal Decentralization and Macroeconomic Stability: Indirect Channel

Fiscal decentralization promotes economic growth indirectly by maintaining macroeconomic stability[7] (Martinez-Vazquez and McNab, 2003). The theoretical discussion of the positive or negative impacts of fiscal decentralization on macroeconomic stability is in a way similar to the ones that we have discussed in the preceding section for economic growth. There are controversies in literature as to whether fiscal decentralization promotes or impedes macroeconomic stability.

A number of authors have suggested that devolution of some macroeconomic management policy measures to the lower level government can promote macroeconomic stability, not hinder it (Shah, 1999; Rodden and Wibbels, 2002). Shah (2006) argues that

[7] Martinez-Vazquez and McNab (2003) mention five different channels through which fiscal decentralization may have influence on economic growth including i) consumer efficiency, ii) producer efficiency, iii) the geographical distribution of resources, iv) macroeconomic stability, v) corruption and captures by elites. However, our focus in this dissertation is only to analyze macroeconomic stability channel.

fiscal decentralization enhances fiscal and economic performance because a decentralized fiscal setup provides a greater potential for the development of macroeconomic governance than a centralized fiscal setup.

Public spending under a decentralized setup increases the economic efficiency because sub-national government have more and precise information about the preferences of the local communities that permits non-uniform provisions of public goods and services in the line with the preferences of local citizens (Oates, 1993). The process of decentralization is also associated with more accountability and transparency in public service delivery (De Mello, 2000). Existence of local accountability leads to more responsible behavior of tax-payer that ultimately cooperates with local government in better way (Wasylenko, 1987). This implies that decentralization may lead to macroeconomic stability via increased public sector efficiency (Neyapti, 2010).

The literature on fiscal decentralization mostly uses price stability as a proxy for macroeconomic stability[8]. The role of fiscal decentralization in encouraging price stability is based on the theory of commitment problem. High inflation is attributed to the failure of policymakers to commit a credible way to the monetary restraint which in turn is due to the fact that high inflation, regardless of its costs, is their dominant strategy (Kydland and Presscott, 1997; Barro and Gordon, 1983). This shows that if markets expect low inflation, increasing the money supply has a positive real effects and if markets expect higher inflation still it is less costly to accommodate these expectations in the short run rather than to thwart them.

From this point of view, fiscal decentralization can lead to more macroeconomic stability by making it more difficult for policymakers to go back on their commitment for stability in prices. Indeed, within a decentralized system, the competition among the local governments may reduce their benefits to renege on price stability or stable monetary policy (Qian and Rolland, 1998).

The positive effect of fiscal decentralization on price stability can also take place through the effect that the former has on the independence of central bank. The studies

[8] See for example Treisman (2000), King and Ma (2001) Neyapti (2004), Martinez-Vazquez and McNab (2006), Shah (2006) and Thornton (2007b)

show that the credibility of the commitment to price stability can be established if the monetary authority adheres to a set of formal rules or if there is a guarantee that it is independent from any pressures from all levels of government (Shah, 1994; Barro, 1996)[9].

Shah (2005) argues that the central bank under decentralized system performs better. Neyapti (2004) also argues that decentralization and central bank independence reinforce each other in controlling inflation. Revenue decentralization leads to lower inflation if it is accompanied by both central bank independence and local accountability.

Another theory of decentralization suggests that the process of fiscal decentralization does not affect the inflation directly, but it keeps inflation rates constant, whether low or high, through making it difficult to change fiscal or monetary policies (Tsebelis, 1995). The number of agents whose agreement is required for changing a policy is increased in a federal structure. The sub-national governments are sometimes provided with the right to veto the decisions made by the central government. This in turn reduces the probability of changing policy hence more continuity in the existing monetary and fiscal policies which ultimately makes inflation rates constant. Therefore the final macroeconomic outcomes depend on policies which are initially in place.

In countries where the inflation rates are high, decentralization process tends to perpetuate the underlying factors that cause high inflation and hence make it difficult to achieve durable stabilization. On the other hand, in countries where inflation rates are low due to low fiscal pressure and depoliticized monetary policy, decentralization process further promotes stability via marinating inflation rate at low level[10].

Various studies argue that fiscal decentralization *per se* increases macroeconomic instability or works as an obstacle in solving the persistent fiscal imbalance due to potential disregard of local governments for budget constraints under decentralized framework (Rodden, 2002). However, when macroeconomic instability predates decentralization, it is much more difficult to achieve macroeconomic stability although not entirely impossible (Dillinger, *et al*. 2000). The possibility of soft budget constraint at

[9]This statement was later confirmed by empirical studies, showing that the central bank independence is effectively correlated with lower inflation rates. See chapter 2 for more detail on empirical outcome.
[10] The empirical support for this continuity hypothesis is found by Treisman (2000)

the sub-national levels of governments also makes difficult to achieve macroeconomic stability through decentralization (Stein, 1999; Bahl, 1999).

Fiscal decentralization may also have adverse consequences for macroeconomic stability because decentralization may be associated with an increase in the degree of autonomy of the local governments. Ahmad *et al*. (2005) argue that macroeconomic stability or price stability for any economy depends on the overall exposure to the risk. In this situation, the critical element is the borrowing of all jurisdictions in the country. Because under decentralized set up, local governments have more authority in determining the level of expenses as well as revenue in their jurisdictions. Hence, the central government has less control to manage the fiscal activities of local government which ultimately leads to more macroeconomic instability.

Decentralization leads to coordination problem among national and sub-national governments because the sub-national governments mostly have their own agendas to pursue. Sub-national governments respond to different constituencies in decentralized system. This causes the policy divergence across the different levels of government (Riker 1987). According to Wibbels (2000) policy divergence is more likely to happen when it comes to economic reforms as voters usually hold the national and not sub-national governments responsible for macroeconomic performance.

Besides all these, international pressures also tend to focus on the performances of national governments. And since sub-national governments are in a way insulated from the country's macroeconomic situation, their adjustment policies are subject to collective action problem. From the point of view of provincial politicians, the gains achieved via state level economic reform cannot be contained within state boundaries because state economies are open. Furthermore, the impact of any one state's reform efforts is likely to be marginal in terms of the overall success of economic adjustment. As a result, the free rider problem becomes operational. Economic adjustment takes on the quality of public good requiring the individual states to cooperate, but it is more rational for individual provincial politicians to avoid the political costs associated with austerity. Under these circumstances, the coordination of national fiscal and monetary policies as an adjustment tool is complicated, posing a challenge to national economic stability (Prud'homme

1995). In turn, sub-national fiscal fragilities in decentralized system can affect macroeconomic performance in three ways:

- Sub-national governments fiscal policy can starve central government of revenue sources, encouraging fiscal imbalance at the federal level
- Monetary policy can generate inflation if federal authorities cover sub-national fiscal imbalances via seignorage
- Federal indebtedness can increase if national government assumes provincial debt to ensure the solvency of sub-national governments.

In other words, economic adjustment policies within a decentralized system as compared to unitary system are more difficult to implement as it has an important sub-national component.

5.4. Theoretical Model

The discussion in the previous sections reveals that the decentralization-growth nexus is a multifaceted phenomenon. The impact of fiscal decentralization on economic growth works through various channels. Based on the discussion in the previous section, we develop a theoretical framework which, first, incorporates the direct association between fiscal decentralization and economic growth and second, integrates the potential impact of fiscal decentralization on macroeconomic stability into the model thus capturing the indirect influence of fiscal decentralization on economic growth through its impact on macroeconomic stability.

In literature, the direct relationship between fiscal decentralization and economic growth has been examined using endogenous growth model. Davoodi and Zou (1998) use endogenous growth framework to analyze the growth effects of fiscal decentralization. This study extends Barro's (1990) endogenous growth model by assuming that public spending is carried out by three levels of government: federal, state, and local. Later on various studies use this analytical framework to quantify the direct impact of fiscal decentralization on economic growth (see e.g. Xie, *et al*., 1999; Iimi, 2005). The indirect impact of fiscal decentralization via macroeconomic stability on economic growth has not been studied in these models.

However, Martinez-Vazquez and McNab (2006) develop an augmented neo-classical growth model which incorporates the macroeconomic stability effects of fiscal decentralization through technological progress. This study assumes that overall technological progress is determined by three factors including exogenous technological progress, fiscal decentralization, and macroeconomic stability. Based on this augmented model, the study explicitly examines how fiscal decentralization may indirectly effect the economic growth through macroeconomic stability.

In this dissertation, we setup an endogenous growth model to examine the direct and indirect contribution of fiscal decentralization in promoting economic growth in Pakistan. The model consists of a production function with two factors of production i.e. private capital and labor.

$$Y = \Phi(\mathrm{K}, \mathrm{L}) \ldots . (5.1)$$

Where Y is real output, K is the stock of private capital and L is labor. Following Barro (1990), we incorporate government spending for public capital formation in the production function as a factor of production[11]:

$$Y = \Phi(\mathrm{K}, \mathrm{G}, \mathrm{L}) \ldots . (5.2)$$

Where G is the government spending for capital formation[12]. To incorporate the notion of fiscal decentralization in the production function, Davoodi and Zou (1998) split the overall government spending into three categories by supposing that the public spending is carried out three levels of government: federal, state, and local. The total public spending is carried out by these three levels of government. The level of fiscal decentralization, in this study, is defined as "the spending by sub-national governments (state and local) as a fraction of total public spending (federal, state and local). Fiscal decentralization increases if public spending by state and local governments rises relative to spending by the federal government".

[11] Feder (1982), Ram (1986), and Grossman (1988) also incorporated government expenditure for capital formation (G) as an independent variable in production function.

[12] In order to sharpen focus, we do not consider human capital in the production function. This approach allow us to focus over attention on the role of public spending while still allowing for the possibility of involving human capital as control variable in empirical work. See Barro (1990) for a further elaboration of this approach

In Pakistan, there are two levels of government: the federal and the provincial. Public spending is carried out by federal and provincial level governments in Pakistan. Thus total government spending is divided into two components i.e. federal level (F) and provincial level (P) government spending on goods and services respectively.

$$G = F + P \quad \ldots\ldots (5.3)$$

The extent of fiscal decentralization in Pakistan is defined as the spending by provincial governments as a fraction of total government spending. The production function, assumed to be Cobb Douglas[13] type, can be written in per capita form as follow:

$$y = \Psi k^{\alpha} f^{\beta} p^{\gamma} \ldots\ldots (5.4)$$

Where $f + p = g$, y is per capita output, k is the per capita private capital stock, g is the per capita total government spending, f is the per capita federal government spending and p is the per capita provincial government spending. Ψ is the total factor productivity. We also assume constant return to scale for simplicity[14] i.e.

$$0 < \alpha < 1;\ 0 < \beta < 1;\ 0 < \gamma < 1 \text{ and } \alpha + \beta + \gamma = 1.$$

The allocation of total government spending g among federal and provincial governments takes the following form:

$$f = \theta_f g \text{ and } p = \theta_p g$$

Where $\theta_f + \theta_p = 1$ and $\theta_i \in (0,1)$ for $i = f, p$. Thus θ_f represents federal government's share of total expenditure and where θ_p represents provincial government's share. We extend production function to capture the indirect impact of fiscal decentralization on economic growth through macroeconomic stability. For this purpose, we include macroeconomic instability index in the production process which indicates

[13] The use of other functional forms of production function such as the CES does not alter the overall analysis. See Xie, *et al*. (1999) for further discussion.

[14] We can easily extend this model to the cases of increasing or decreasing return to scale by replacing 1 in the exponent of L with a parameter, σ, that representing the return to scale. Increasing or decreasing return to scale only introduce a 'non-scale' endogenous process into the model (Esfahani and Ramirez, 2003)

the level of structural distortion in the production process resulting in price instability, rising unemployment, high deficit and exchange rate volatility[15].

By augmenting the production function with macroeconomic instability index, we can explicitly examine how fiscal decentralization may effect economic growth through its influence on macroeconomic stability. Based on this modification, the aggregate production function 'net of macroeconomic instability index' is assumed as follows:

$$y = (1 - \pi)\Psi k^{\alpha} f^{\beta} p^{\gamma} \ldots . (5.5)$$

Where $\pi \in (0,1)$ is the macroeconomic instability index. Low values indicate more stable macroeconomic environment and vice versa. The economic distortions captured by π reduce the marginal product of the reproducible factors and can be considered resulting from bad government policies frequently observed in developing countries like Pakistan. This index reflects an implicit tax on production including inflation tax, import tariffs and quotas and black market premia in dual foreign exchange markets[16]. The inclusion of macroeconomic instability index in the production function provides a meaningful explanation about the cross country differences in long run growth rates.

The theoretical literature discussed in the previous section suggests that fiscal decentralization may influence macroeconomic stability of the country implying that macroeconomic stability is a function of fiscal decentralization. This relationship can be specified as:

$$\pi = \varphi(FD, Z) \ldots . (5.6)$$

In equation(5.6), π is the macroeconomic instability index, FD represents fiscal decentralization and Z is the vector of control variables that explains the behavior of macroeconomic stability over time[17]. The consolidated government expenditures are financed by imposing a flat income tax at a rate τ which is constant over time. We further

[15] Steger (2000) introduces the similar index (distortion index) in the production function to capture the influence of detrimental government policies on output.
[16] For more detail on implicit tax on production process see Easterly (1994) and Rebelo (1992)
[17] For simplicity, we assume that fiscal decentralization is uncorrelated with the vector of control variables. This assumption is in line with Martinez-Vazquez and McNab (2006).

assume that at the balanced growth path, there is zero surplus i.e. the government does not run any deficit or surplus[18]:

$$g = \tau y \ldots . (5.7)$$

To determine the long run growth path of the economy, we need to examine the consumption and investment decisions made by the individuals. For this purpose, we consider one representative agent facing an infinite planning horizon that always maximizes its discounted utility subject to its dynamic budget constraint. As we mention, the agent takes as given the government's announcement of the constant tax rate and the expenditure by the different level of governments. The representative agent's preferences have the following form:

$$U = \int_0^{\infty} \frac{c^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} dt \ldots \ldots . . (5.8)$$

In equation (5.8), c is the private consumption in per capita form and $\sigma > 0$ and $\sigma \neq 1$. The other multiplier, $e^{-\rho t}$, involves the rate of time preference, $\rho > 0$. A positive time discount rate ρ means that utils are valued less the later they are received. The dynamic budget constraint in per capita terms is given by the following equation:

$$\dot{k} = \frac{dk}{dt} = (1-\tau)y - c = (1-\tau)(1-\pi)\Psi k^{\alpha} f^{\beta} p^{\gamma} - c \ldots \ldots . . (5.9)$$

Equation (5.9) says that the increase in the capital stock equals the total saving which in turn equal the difference between output and consumption. The individual chooses his optimal consumption path $\{c_t : t \geq 0\}$ and his investment path to determine the level of capital stock $\{k_t : t \geq 0\}$. To find this optimal allocation of resources by the individual, we write down the Hamiltonian:

$$H = \frac{c^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} + \lambda\left[(1-\tau)(1-\pi)\Psi k^{\alpha} f^{\beta} p^{\gamma} - c\right] \ldots \ldots . (5.10)$$

[18] The number of studies that use endogenous growth model uses the similar formulation for the financing of consolidated government spending through a flat and constant tax rate. These studies also assume a balance growth path with no surplus of deficit. See for example Davoodi and Zou (1998) and Xie *et al.* (1999).

Where the expression in bracket is equals $\dot{k}$ from equation (5.9) and λ is Lagrange Multiplier representing the present value of shadow price of income. By differentiating Lagrangian function with respect to c and k and we find the first order conditions of given optimization problem:

$$\frac{\partial H}{\partial c} = 0 \Rightarrow c^{-\sigma} e^{-\rho t} - \lambda = 0 \ldots\ldots (5.11)$$

$$\frac{\partial H}{\partial k} + \dot{\lambda} = 0 \Rightarrow \lambda(1-\tau)(1-\pi)\Psi\alpha k^{\alpha-1} f^{\beta} p^{\gamma} = -\dot{\lambda} \ldots\ldots (5.12)$$

By using two first-order conditions and fixing the initial capital stock to $k_{(0)} = 1$; applying transversality condition $\lim_{t\to\infty} k\lambda e^{-\rho t} = 0$ and the budget constraint given in equation (5.9) we can find the growth rate of per capita consumption which is the same as the capital and the output growth rate. So the growth rate of the economy is given as follows:

$$\frac{\dot{y}}{y} = \frac{\dot{c}}{c} = \frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha k^{\alpha-1} f^{\beta} p^{\gamma} - \rho\right] \ldots\ldots (5.13)$$

In more simplified form, it can be written as[19]:

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[\alpha(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}\left((1-\pi)\Psi\right)^{\frac{1}{\alpha}}\left(\theta_f\right)^{\beta/\alpha}\left(\theta_p\right)^{\gamma/\alpha} - \rho\right] \ldots (5.14)$$

Equation (5.14) highlights that the growth rate of per capita output in the long run is a function of the tax rate, macroeconomic stability conditions and the spending shares of the different levels of governments. The given model explicitly introduces the trade-off between provincial and federal government expenditures which is an important result of fiscal decentralization. A country is more fiscally decentralized if it has a higher value of the sub-national spending shares θ_f and vice versa.

There shares are interpreted as measures of the productivity of the public expenditures by each level of government on the aggregate productivity of the federal and the provincial governments spending (Xie *et al*. 1999). This model shows that reallocation of government spending among the various levels of governments can affect

[19] For detailed derivation of model see appendix A

the economic growth. Government can influences the growth rate of the economy by choosing different spending shares among the federal and the provincial levels.

According to Davoodi and Zou (1998), for a given share of total public spending, a reallocation of government spending among the various levels of governments can always lead to a higher economic growth if the prevailing allocation is different from the growth maximizing spending shares. Therefore, government can maximize growth by choosing the spending shares that maximize equation (5.14). In sum, growth can be increased with a reallocation of public spending if the existing shares by the different levels are not those corresponding to the growth maximizing ratios. Thus, even if total public spending as share of GDP stays constant, there can be growth effects through reallocation of government spending.

The key implication of the model regarding the growth effects of fiscal decentralization is that for a specified share of total public spending to GDP, the growth maximizing shares of government budget are proportional to the relative shares of national and sub-national governments. According to Iimi (2005), the per capita growth equation derived on a steady state balanced path indicates the existence of too much decentralization. When the productivity effect of the lower level public spending is comparatively large as compared to the national level public spending, fiscal decentralization has a positive influence on the growth rate of the economy. On the other hand, holding the relative productivity among different levels of governments constant, an excessively decentralized fiscal system is likely to have growth retarding effects. The reason is very simple that the allocation of public resources to less productive levels of government is detrimental to economic efficiency, hence reducing overall economic growth. This indicates that if lower level governments are inefficient and deficient in the capacity for providing public goods and services, fiscal decentralization would not be a good idea (Iimi, 2005).

The growth effect of taxation also depends on the sign of the related parameter. It is because, taxation has two effects. First, it has a positive influence on economic growth, if it curtails lifetime consumption of the households and contributes to the production process. If productivity effect of private capital is small enough, further rise in tax rates is

more likely to have a growth enhancing effect. Second, it has a negative impact on economic growth if the tax rate is exorbitant; than an additional tax increase results in slow down of economic growth (Iimi, 2005). The growth effect of macroeconomic stability index is straightforward. More stable macroeconomic environment of the country leads to higher economic growth and vice versa.

5.4.1 Growth Maximizing Shares

To investigate how the growth rate of the economy in long run responds to various public spending shares, we need to check the growth maximizing shares of public spending. For this purpose, we assume that the objective function of the government is to maximize the growth rate of the economy by using Equation (5.14) through choosing θ_f and θ_p.

To find the growth maximizing shares, we need to optimize the growth rate equation with respect to federal and provincial shares of government spending under the constraint of $\theta_f + \theta_p = 1$. By setting up the Lagrangian

$$\mathrm{L}(\theta_f, \theta_p, \lambda) = \left[\Delta(\theta_f)^{\beta/\alpha}(\theta_p)^{\gamma/\alpha} - \frac{\rho}{\sigma}\right] - \lambda(\theta_f + \theta_p - 1) \ldots\ldots (5.15)$$

Where $\frac{\alpha(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}((1-\pi)\Psi)^{\frac{1}{\alpha}}}{\sigma} = \Delta$

The first-order conditions with respect to θ_f, θ_p and λ is give as follows:

$$\frac{\partial \mathrm{L}}{\partial \theta_f} = 0 \Rightarrow \Delta\frac{\beta}{\alpha}(\theta_f)^{*\frac{\beta}{\alpha}-1}(\theta_p)^{*\frac{\gamma}{\alpha}} - \lambda \ldots\ldots (5.16)$$

$$\frac{\partial \mathrm{L}}{\partial \theta_p} = 0 \Rightarrow \Delta\frac{\gamma}{\alpha}(\theta_f)^{*\frac{\beta}{\alpha}}(\theta_p)^{*\frac{\gamma}{\alpha}-1} - \lambda \ldots\ldots (5.17)$$

$$\frac{\partial \mathrm{L}}{\partial \lambda\lambda} = 0 \Rightarrow {\theta_f}^* + {\theta_p}^* - 1 \ldots\ldots (5.18)$$

$${\theta_f}^* + {\theta_p}^* = 1$$

By using equations (5.16), (5.17) and (5.18), we can derive the growth-maximizing spending shares of the federal and provincial governments. Growth maximizing share of federal and provincial governments can be written as follow:

$$(\theta_f)^* = \frac{\beta}{\beta + \gamma} \dots\dots\dots (5.19)$$

$$(\theta_p)^* = \frac{\gamma}{\beta + \gamma} \dots\dots\dots (5.20)$$

Equations (5.19) and (5.20) shows that growth maximizing shares are function of both federal and provincial governments shares. Therefore, growth maximizing shares equations suggest that as long as the actual government spending shares are different from growth maximizing shares, the growth rate can always be influenced without altering the total government spending share in GDP.

5.5 Summary and Empirical Hypothesis

The theoretical framework developed in this chapter expresses the growth rate of the economy as a function of the shares of aggregate government spending. From this, we could find either a positive association between the two, when spending assignment corresponds to these theoretical growth-maximizing ratios, but also a negative correlation when they differ from them. Knowing that expenditure responsibilities are determined by many political, historical and cultural factors other than strict economic efficiency, we cannot predict the sign of our decentralization coefficients based on theoretical considerations alone. For precise relationship, we conduct an empirical analysis based on this theoretical model. For empirical analysis, we aim to test the following hypotheses:

i) Fiscal decentralization directly influences the evolution of per capita output.

ii) Fiscal decentralization has an effect on macroeconomic stability which, in turn, influences the evolution of per capita output.

In next chapter, we discuss econometric model based on this theoretical framework. We also discuss the estimation methodology and data in the next chapter.

CHAPTER 6

Econometric Model, Estimation Methodology and Data

6.1 Introduction

The first objective of this chapter is to lay out the econometric model based on the theoretical model explained in previous chapter. Secondly, we discuss the estimation methodology used to estimate the relationship between fiscal decentralization and economic growth. A detailed analysis of the data used for estimation purpose is also carried out in this chapter.

6.2 Econometric Model

The theoretical framework highlights that long run growth rate of per capita output is a function of the tax rate, macroeconomic stability and fiscal decentralization (see equation 5.14 in chapter 5). Using theoretical framework, we define econometric model that captures the impact of fiscal decentralization on economic growth. The model is given as:

$$GDPg_t = \delta_0 + \delta_1\tau_t + \delta_2\pi_t + \delta_3\theta_t + \delta X_t' + \varepsilon_t \ldots\ldots (6.1)$$

Where $GDPg$ is the per capita output growth rate, τ is the tax rate, π is the macroeconomic instability index, θ is the measure of fiscal decentralization which could be either revenue, expenditure or composite decentralization, X is the vector of control variables, ε is the disturbance term that is assumed to be serially uncorrelated and orthogonal to the explanatory variables and $t(= 1,2 \ldots\ldots\ldots N)$. δ_0, δ_1, δ_2 and δ_3 are the scalar parameters while δ is the vector of parameters. The vector X consists of a control variables that have been frequently used in growth literature as identified by Mankiw *et al*. (1992), Levine and Renelt (1992), Barro and Lee (1996) and Sala-i-Martin (1997). These include human capital, physical capital and trade openness.

The theoretical framework discussed in the previous chapter also proposes macroeconomic stability as a potential channel through which fiscal decentralization influences economic growth (see equation 5.6 in chapter 5). To capture the impact of fiscal decentralization on economic growth through macroeconomic stability, we define the following econometric model:

$$\pi_t = \Phi_0 + \Phi_1\theta_t + \Phi Z_t' + \varepsilon_t \ldots . (6.2)$$

Where Φ_0 and Φ_1 are the scalar parameters while Φ is the vector of parameters to be estimated. π is a macroeconomic instability index[20]. Z is the vector of control variables. The choice of control variables is based on the existing literature. Neo-classical school of thought uses investment in physical capital as an important determinant based on the idea that investment promotes macroeconomic stability. International trade theory proposes to include openness of the economy because through openness, international community directly influences the macroeconomic conditions of the country in a both positive and negative direction. Money supply is an important indicator for financial development which is necessary for macroeconomic stability. Overall economic development is also necessary for achieving long term macroeconomic stability. Keeping this in view, we use trade openness, physical capital, human capital, money supply, taxes and GDP per capital as control variables.

6.3 Estimation Methodology

There are several studies that have used Ordinary Least Squares (OLS) technique to empirically investigate the impact of fiscal decentralization. The OLS estimators are consistent and unbiased when the independent variables are exogenous with no muliticollinearity, and error terms are homoscedastic and serially uncorrelated. For consistent estimates, the most important assumption is the exogeneity of regressors. This implies that the errors have zero mean and uncorrelated with the regressors.

$$\mathrm{E}[\epsilon] = 0 \ldots \ldots .6.3$$

$$\mathrm{E}[X'\epsilon] = 0 \ldots \ldots . (6.4)$$

There are number of studies that identify the possibility of reverse causality and endogeneity among fiscal decentralization and economic growth (see e.g. Zhang and Zou, 1998; Xie *et al*., 1999; Lin and Liu, 2000; Thiessen, 2003; Jin *et al*. 2005). Martinez-Vazquez and McNab (2003) argue that reverse causality exists because efficiency gains from fiscal decentralization emerge as economies grow or more decentralization is demanded at relatively higher level of development. However, existing literature do not

[20] The construction of this index is explained in chapter 4 equation 4.12.

control endogeneity – due to small sample sizes or the difficulty in finding valid instruments with the only exception of Iimi (2005). Existence of endogeneity implies that:

$$\mathrm{E}[X'\epsilon] \neq 0 \ldots\ldots\ldots (6.5)$$

Under this situation, OLS estimates become biased and inconsistent. To tackle endogeneity, the instrumental variables (IV) methods are used in the empirical estimations. The IV methods are used to solve the problems of simultaneity bias between explanatory variables and dependent variable and the error measurement.

The application of generalized method of moments (GMM) can be considered as an extension of the IV method. The main advantage of the GMM estimation method is that the model needs not to be serially independent and homoscedastic. Another benefit of the GMM estimation technique is that it generates parameters through maximizing the objective function which includes the moment restrictions in which correlation between lagged regressors and error term is zero. Keeping the advantages of the GMM estimation technique to overcome endogeneity and omitted variable bias, the GMM estimation procedure developed by Arellano and Bond (1991), Arellano (1993), and Arellano and Bover (1995) has been applied to estimate growth and stability equations using lagged values of the variables as instruments. The STATA v11 has been used for estimation.

In order to determine the endogeneity in the model, we apply endogeneity test. This test is performed to determine whether endogenous variables in the models are in fact exogenous. After GMM estimation, the C (difference-in-Sargan) is applied the check the endogeneity problem. According to this test, if the test statistic is significant, then the variables being tested are endogenous otherwise they are treated as exogenous. In this test, under null hypothesis, the variables being tested are exogenous and under alternative hypothesis, the variables being tested are endogenous.

If there are more instruments than parameters, the value of the optimized objective function will be greater than zero. Under this situation, the model is over-identified, meaning that the number of additional instruments exceeds the number of endogenous variables. We perform Hansen (1982)'s *J*-statistic χ^2 to check the over-identification

restriction of the model after estimating through the GMM. A statistically significant test indicates that the instrument may not be valid.

6.3.1 The Generalized Method of Moments (GMM)

Hansen (1982) introduced the GMM estimation technique. The basic assumption behind the GMM is that there are a set of L moment conditions that the K dimensional parameters of interest β, should satisfy. These moment conditions are very general in nature. A model with more specified moment conditions than parameters to be estimated can be estimated through the GMM.

The GMM estimates the vector of parameters through minimizing the sum of squares of the differences between the sample moments and the population moments using the variance of the moments as a metric. This is minimum variance estimator in the class of the estimators that use these moment conditions. The vector of $L \geq K$ moment conditions may be written as:

$$E\big(m(y_t, \beta)\big) = 0 \dots \dots \dots (6.6)$$

The assumption of exogeneity of instruments Z can be represented as $E(Z_t \varepsilon_t) = 0$ implying that there are at least L moment conditions that orthogonality conditions[21] between the residual of an equation, $\varepsilon_t(\beta) = \varepsilon(y_t, X_t, \beta)$ and a set of K instrument Z_t. These can be represented as:

$$E\big(Z_t \varepsilon_t(\beta)\big) = 0 \dots \dots \dots \dots (6.7)$$

Each of the L moment equations corresponds to a sample moment. In this case, the traditional Method of Moments estimator can be defined by replacing the moment conditions in equation (6.7) with their sample moment. It can be represented as:

$$m_T(\beta) = \frac{1}{T}\sum_t Z_t \varepsilon_t(\beta) = \frac{1}{T} Z' \varepsilon(\beta) = 0 \dots \dots \dots \dots (6.8)$$

The main purpose behind the GMM is to choose an estimator for β that brings $m_T(\beta)$ as close to zero as possible and solves the set of L moment equations. If we have of as many equation—the L moment conditions— do the unknown— K coefficient in

[21] The prime advantage of the GMM estimation technique is the use of orthogonality conditions.

β—mean $L = K$, the equation to be estimated is exactly identified. In this case, it is possible to find $\hat{\beta}$ that solve the $m_T(\beta) = 0$. This GMM estimator is in fact an Instrumental Variable (IV) estimator.

If we have more moment condition than unknowns $L > K$, the equation is said to be over identified. In that case, we may not have an exact solution for this system. It will not be possible to find $\hat{\beta}$ that will set all the L sample moment equations exactly equal to zero or close to zero. Under this situation, we can reformulate the problem as one of choosing β, so that the sample moment $m_T(\beta)$ is as close to zero as possible. In this case, we take a $L \times L$ weighting matrix W and use it to construct a quadratic form in the moment conditions.

$$J(\beta, \widehat{W}_T) = T\, m_T(\beta)' \widehat{W}_T^{-1}\, m_T(\beta) \dots\dots\dots (6.9)$$

$$J(\beta, \widehat{W}_T) = \frac{1}{T} \varepsilon(\beta)' Z \widehat{W}_T^{-1} Z' \varepsilon(\beta) \dots\dots\dots (6.10)$$

A $L \times L$ weighting matrix W acts to weigh the various moment conditions in constructing the distance measures. In many cases where the $\varepsilon(\beta)$ are the residuals from a linear specification so that $\varepsilon(\beta) = y_t - X_t'\beta$, the GMM objective function based on the equation (6.9) is given as follow:

$$J(\beta, \widehat{W}_T) = \frac{1}{T} (y - X\beta)' Z \widehat{W}_T^{-1} Z' (y - X\beta) \dots\dots\dots (6.11)$$

A GMM estimator for β is the $\hat{\beta}$ that minimizes the $J(\beta, \widehat{W}_T)$. By solving and driving K first order conditions.

$$\frac{\partial J(\hat{\beta})}{\partial(\beta)} = 0 \dots\dots\dots (6.12)$$

The GMM estimator:

$$\hat{\beta}_{GMM} = \left(X' Z \widehat{W}_T^{-1} Z' X\right)^{-1} \left(X' Z \widehat{W}_T^{-1} Z' y\right) \dots\dots\dots (6.13)$$

An important aspect of specifying a GMM estimator is the choice of the weighting matrix $\widehat{W}_T$. One can obtain as many GMM estimators as there are choices of the weighting matrix $\widehat{W}_T$. Hansen (1992) shows that an asymptotically efficient, or

optimal GMM estimator of β may be obtained by choosing $\widehat{W}_T$ so that it converges to the inverse of the long-run covariance matrix S. The covariance matrix S of the moment conditions is given as follow:

$$S = \frac{1}{T}\mathrm{E}(Z'\varepsilon(\beta)\varepsilon(\beta)'Z) = \frac{1}{T}\mathrm{E}(Z'\Omega Z) \dots\dots (6.14)$$

Where S is the $L \times L$ matrix. The general formula for the distribution of a GMM estimator is:

$$V(\hat{\beta}_{GMM}) = (Q'_{XZ}\widehat{W}_T^{-1}Q_{XZ})^{-1}(Q'_{XZ}\widehat{W}_T^{-1}S\widehat{W}_T^{-1}Q_{XZ})(Q'_{XZ}\widehat{W}_T^{-1}Q_{XZ})^{-1} \dots (6.15)$$

The efficient GMM estimator is the GMM estimator with an optimal weighting matrix $\widehat{W}_T$, one which minimizes the asymptotic variance of the estimator. This is achieved by choosing $\widehat{W}_T = \mathrm{S}^{-1}$. By substituting $\widehat{W}_T = \mathrm{S}^{-1}$ into equation (6.13) and equation (6.15), we obtained the efficient GMM estimator:

$$\hat{\beta}_{EGMM} = (X'Z\hat{S}_T Z'X)^{-1}(X'Z\hat{S}_T Z'y) \dots\dots\dots (6.16)$$

With a asymptotic variance

$$V(\hat{\beta}_{EGMM}) = (Q'_{XZ}\hat{S}_T Q_{XZ})^{-1} \dots (6.17)$$

The GMM estimators are more efficient in the existence of heteroskedasticity than the simple instrumental variable estimators. On the other hand, if heteroskedasticity is not present, the GMM estimators are as good as the instrumental variable estimators[22].

The GMM is more flexible estimation methodology in a sense that many commonly used estimators in econometrics, including OLS and IV are derived from the GMM. For example, the GMM is equivalent to the OLS with the moment conditions:

$$\mathrm{E}[x_t(y_t - x'_t\beta)] = 0 \dots\dots\dots (6.18)$$

And is equivalent to the IV with the moment conditions:

$$\mathrm{E}[z_t(y_t - x'_t\beta)] = 0 \dots\dots\dots (6.19)$$

[22] Cragg (1983) pointed that one can improve the estimators over the ordinary least squares in the presence of heteroskedasticity of unknown form by using the generalized method of moments technique.

As with other instrumental variable estimators, for the GMM estimator to be identified, there must be at least as many instruments as there are parameters in the model. In models where there are the same numbers of instruments as parameters, the value of the optimized objective function is zero.

6.4 Data and Descriptive Statistics

Our empirical analysis is based on time series data covering the period 1972-2010. As mentioned in chapter 4, the data on fiscal decentralization variables are collected from the Fifty Year Economy of Pakistan and various annual reports published by State Bank of Pakistan. While the data on economic variables like GDP growth rate, inflation, investment and taxes are mainly taken from Economic Survey of Pakistan (various editions). The data on human capital are taken from Barro and Lee Dataset 2011. The data on democratic institutions are taken from Polity IV Dataset.

Fiscal decentralization is measured using three indicators: i) Revenue Decentralization (RD); ii) Expenditure Decentralization (ED) and iii) Composite Decentralization (CD) (see chapter 4 for detail description of these measures). Descriptive statistics shows that revenue decentralization varies between 0.071 and 0.221. Provincial governments on average have 13 percent share in total expenditure. On expenditure side, expenditure decentralization ranges from 0.336 percent to 0.686 percent. On average the ED is 0.465 implying that the share of provincial governments is 46 percent in total government spending after excluding the defence expenditure and interest payments. The composite measure of RD and ED shows that the composite decentralization lies between 0.129 and 0.494.

Macroeconomic instability is measured using inflation, fiscal discipline and exchange rate management (see chapter 4 for detail). The average value of macroeconomic instability index is 0.316 which varies between 0.038 and 0.713. The average inflation rate is 9.6 varying from 3.1 percent to 30 percent. The overall budget deficit fluctuates between 2.3 and 10.2. On average the overall budget deficit is 6.5 in Pakistan. The exchange rate ranges from 4.8 rupee per dollar in 1972 to 83.8 rupee per dollar in 2010.

The dependent variable in the growth model is GDP per capita growth rate. Descriptive statistics show that the average GDP per capita is 451 US$ at constant 2000 prices. The average growth rate of GDP per capita is 2.234.

TABLE 6.1
Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Fiscal Decentralization Variables					
Revenue Decentralization (RD)	39	0.130	0.041	0.071	0.221
Expenditure Decentralization (ED)	39	0.465	0.067	0.336	0.686
Composite Decentralization (CD)	39	0.247	0.089	0.129	0.494
Macroeconomic Instability Variables					
Macroeconomic Instability Index (MII)	39	0.316	0.143	0.038	0.713
Inflation (INF)	39	9.587	5.748	03.10	30.00
Budget Deficit (BD)	39	6.464	1.805	02.30	10.20
Exchange Rate (ER)	39	31.35	22.78	04.80	83.80
Exchange Rate Variability (ERV)	39	8.156	11.57	-04.80	57.80
Other Macroeconomic Variables					
GDP per Capita (Constant 2000 US$)	39	451.7	113.3	279.1	668.6
GDP per Capita (Constant 2000 LCU)	39	23371	5860	14437	34589
GDP per Capita Growth Rate	39	2.234	2.002	-1.950	6.570
Human Capital (HC)	39	20.02	7.111	10.54	34.60
Capital Stock Per Worker (CS/W)	39	75273	16727	42950	95884
Openness (OPN)	39	0.338	0.037	0.273	0.432
Tax to GDP Ratio (T/GDP)	39	0.123	0.015	0.095	0.145
M2 to GDP Ratio (M2/GDP)	39	0.403	0.039	0.297	0.469
Credit to Private Sector to GDP (MC/GDP)	39	0.249	0.027	0.192	0.298
Institutional Variable					
Democratic Institution (INS)	39	0.846	6.745	-7.000	8.000

Human capital is measured using total secondary school enrollment without considering age and gender composition. The average human capital is 20.02 and it moves from 7.1 in 1972 to 34.6 in 2010. It is expected that human capital is positively related to GDP per capita growth and negatively associated with macroeconomic instability. Physical capital is measured using capital stock per worker (CS/W). The capital stock per worker is defined as the ratio of capital stock to the labor force. The capital stock is calculated using the Perpetual Inventory Method (PIM). The initial capital stock is measured using gross fixed capital formation of 1965 at constant prices and 1.75 as incremental capital output ratio. The average capital stock per worker is Rs. 75273 at constant prices. The capital stock varies between Rs. 42950 and Rs. 95884. The capital

stock series is constructed by employing 0.06 as depreciation rate. The capital stock promotes economic growth (Barro, 1990).

Openness is defined as the ratio of total trade (imports plus exports) as percent of GDP. Trade openness varies from 27 percent to 42 percent with the average of 34 percent. It is expected that openness has a positive impact on economic growth while it has a negative association with macroeconomic instability measures.

Tax to GDP ratio is measured as the ratio of the total consolidated tax receipts of government to GDP. The average tax to GDP ratio is 12 percent with the range of 9 to 15 percent. The contribution of taxes in economic growth crucially depends upon the structure of the taxes. The impact of taxation on economic growth is positive if private capital is less productive than public capital and is negative if additional taxation is very expensive (Iimi, 2005).

Money supply is measured as the ratio of M2 to the nominal GDP. M2 based on money and quasi money. M2 to GDP ratio is used a measure of financial development (King and Levine 1993). M2/GDP ratio shows that money supply varies from 30 percent to 47 percent with the average of 40 percent. Credit to private sector is also used as proxy for financial development. Credit to private sector as a percent of GDP (MC/GDP) ranges from 19 percent to 29 percent.

Democracy is used as proxy for measuring the quality of institutions in Pakistan. The data on democracy are taken from Polity IV dataset published by Marshall and Jaggers (2011). The democracy index ranges from +10 (full democracy) to -10 (full autocracy). The descriptive statistics shows that the average quality of institution is 0.85 with the range of -7 to +8 in Pakistan.

6.5 Unit Root Analysis

The standard approach to determine the stationarity of the time series data is checking the existence of unit roots in the given series. The most commonly employed test for unit root analysis is called Augmented Dickey Fuller (ADF) test (Dickey and Fuller, 1981). Dickey and Fuller (1981) developed a methodology to determine stationary

properties of time series data. The stationarity of the series based on unit root analysis defined in ADF test is determined by using the following equation:

$$\Delta y_t = \mu + \beta t + \alpha y_{t-1} + \sum_{i=1}^{k} c_i \Delta y_{t-i} + \varepsilon_t \dots\dots\dots (6.20)$$

Where y represents the time series variable being tested, t represents time trend in the model and Δ represent the difference operator. k represents the number of lags of y included in the model to make sure that the residuals are white noised. Akaike information criterion (AIC) is used to find the optimal lags that make residual white noise.

Stationarity of the series is established on the estimate of α in ADF test. In ADF test, we test the hypothesis $H_0 = \alpha = 0$. The rejection of null hypothesis implies the acceptance of alternative hypothesis that indicates y_t is stationary. The failure in the rejection of null hypothesis implies that the given series has a unit root. This indicates that series at level is non-stationary. After taking the first difference, we apply same procedure to check the existence of unit root. If we are able to reject null hypothesis, we conclude that the given series is stationary at first difference with order one of integration. The difference stationary series is denoted $I(d)$ as where (d) is the order of integration. The order of integration is the number of unit roots contained in the series, or the number of differencing operations it takes to make the series stationary.

The results of ADF test are reported in Table 6.2[23]. The test statistics indicates that inflation, budget deficit, GDP per capita growth rate, openness and M2 to GDP ratio are stationary at level. While revenue decentralization, expenditure decentralization, composite decentralization, macroeconomic instability index, human capita, capital stock per worker, tax to GDP ratio and democratic institution are non-stationary at level and become stationary at first difference which implies that these variables are difference stationary with one order of integration (Table 6.2).

[23] We also use Dickey-Fuller GLS Test and Phillips Perron Test to check the stationary properties of the variables. We find similar results as obtained in case of ADF test with one exception. MII is stationary at level with DF-GLS test while Non-stationary at level with ADF and PP test. The results of DF-GLS (see Table D1) and PP (see Table D2) are reported in appendix D.

TABLE 6.2
Unit Root Test (ADF Test)

Variables	Level			First Difference		
	No Trend	With Trend	Result	No Trend	With Trend	Result
Revenue Decentralization (RD)	-2.13	-3.24	NS	-4.63	-4.56	S
Expenditure Decentralization (ED)	-1.72	-2.48	NS	-7.19	-7.02	S
Composite Decentralization (CD)	-1.69	-3.41	NS	-5.49	-5.43	S
Macroeconomic Instability Index (MII)	-2.62	-3.08	NS	-6.36	-6.55	S
Inflation (INF)	-4.02	-3.62	S			
Budget Deficit (BD)	-2.95	-3.77	S			
GDP per Capita Growth Rate	-5.72	-5.63	S			
Human Capital (HC)	1.29	-2.26	NS	-4.19	-5.23	S
Capital Stock Per Worker (CS/W)	-2.81	-1.62	NS	-1.44	-3.83	S
Openness (OPN)	-2.93	-3.56	S			
Tax to GDP Ratio (T/GDP)	-1.32	-2.02	NS	-5.12	-5.71	S
M2 to GDP Ratio (M2/GDP)	-2.95	-4.58	S			
MC/GDP	-3.59	-3.47	S			
Democratic Institution (INS)	-1.97	-1.91	NS	-5.71	-5.76	S

Note: 5% critical value is -2.87 for the case of no-trend, and -3.42 when a trend is included. AIC is used for lag selection. S stand for stationary series and NS stand for non-stationary series

6.6. Conclusion

In this chapter, we have developed econometric models for empirical analysis. First, we have set up a regression model to analyze the growth effects of fiscal decentralization. Second, we have specified a regression model to estimate the impact of fiscal decentralization on macroeconomic stability. We have also discussed the estimation methodology and data. Based on these regression models, we quantify the growth and stability impacts of fiscal decentralization in the next two chapters.

CHAPTER 7

The Growth Effects of Fiscal Decentralization: An Empirical Investigation

7.1 Introduction

In this chapter, we empirically investigate the impact of fiscal decentralization on economic growth in Pakistan using time series data over the period 1972-2010. Three different measures namely revenue decentralization, expenditure decentralization and composite decentralization are used to quantify the growth effects of fiscal decentralization.

This chapter consists of five sections. The next section examines empirically the impact of revenue decentralization on economic growth while in section 7.3, the impact of expenditure decentralization on economic growth is analyzed. In section 7.4, we estimate the growth effects of composite decentralization while the last section summarizes the discussion.

7.2 Revenue Decentralization and Economic Growth

To investigate the impact of revenue decentralization on economic growth, the GMM technique has been used and the results are presented in Table 7.1. The impact of revenue decentralization on economic growth is measured using nine different specifications. In first specification, we used only revenue decentralization (RD) as an explanatory variable along with constant term. In second specification, we include trade openness (OPN), tax to GDP ratio (T/GDP) and human capital (HC) as control variables along with revenue decentralization. In the third model, we add macroeconomic instability index (MII) along with revenue decentralization and other control variables. In fourth and fifth model we add inflation (INF) and budget deficit (BD) respectively as alternative measures of macroeconomic stability and drop the MII variable. In the sixth specification both inflation and budget deficit has been used in the same specification but there is no MII. In seventh model, we use exchange rate variability instead of inflation and budget deficit. In eighth model we drop tax/GDP ratio while in last model we incorporate dummy variables to capture the policy change due to National Finance Commission (NFC) award.

Revenue decentralization (RD) has a positive and statistically significant impact on economic growth in all specifications which is consistent with theory of decentralization. This positive association indicates that higher the level of decentralization on revenue side; higher the GDP per capita, hence transfer of revenue enhancing responsibilities to provincial governments is conducive for economic growth in Pakistan. As shown in Table 7.1, this result is robust, regardless of the inclusion of other control variables; the estimated impact of revenue decentralization on economic growth remains positive and significant.

Tax to GDP ratio (T/GDP) has a positive and statistically significant relationship with economic growth. This implies that higher the tax to GDP ratio; higher the GDP per capita growth. The positive association of tax with economic growth is very important for Pakistan. Tax to GDP ratio is very low (about 10 percent of GDP) in Pakistan. The higher tax revenue reduces the fiscal deficit, thereby allowing higher developmental spending that leads to higher economic growth. Theoretically, non-distortionary taxes positively contribute to the process of economic growth through providing more space for public spending. Through these taxes, the government generates capacity to manage the economy and shape the society.

Trade openness (OPN) has a positive and significant impact on economic growth, implying that trade is beneficial for economic growth in Pakistan. The positive association of trade openness and economic growth is due to the benefits emerging from specialization, competition and economies of scale and also due to productivity improvements made possible through he access of advanced technologies (Din, *et al*. 2003). Various empirical studies also provide evidence that trade promotes economic growth in Pakistan (Khan, *et al*, 1995; Iqbal and Zahid; 1998; Din, *et al*, 2003).

Human capital (HC) has a positive and statistically significant impact on per capita GDP growth, implying that Pakistan could increase its per capita growth rate by investing more in human capital. This finding confirms the traditional view that countries that invest more in their human capital do better in terms of economic growth. These results are broadly in line with the other studies that have found a positive association

between human capital and economic growth in Pakistan (Abbas, 2001; Abbas and Foreman-Peek, 2008; Qadri and Waheed, 2011).

Macroeconomic stability is a crucial precondition for sustainable economic growth. We use various proxies to quantify the growth effects of macroeconomic stability in Pakistan including macroeconomic instability index, inflation, budget deficit, exchange rate variability. First we use macroeconomic instability index (MII) developed in chapter 4. MII has a negative and significant impact on economic growth (Table 7.1, model 3). This implies that macroeconomic stability is important for achieving high economic growth. Secondly, we use inflation (INF) as a measure of macroeconomic stability in model 4. Inflation has a negative and significant impact on economic growth, implying that inflation hurts the growth process. In Pakistan, the periods of high inflation especially the decades of 1970s and 1990s exhibited low economic growth, whereas during high growth period, inflation has remained very low. Most recently Pakistan is facing the problem of double digit inflation with low economic growth. Consequently, policy-makers consider inflation as an impediment for economic growth. Inflation mainly operates through investment channel. High inflation creates uncertainty in the economy which is harmful for investment. Earlier Iqbal and Nawaz (2009) found that inflation negatively impacted the investment in Pakistan. Thirdly, we use budget deficit (BD) as an indicator of macroeconomic stability. We find a negative and significant relationship between budget deficit and economic growth. Budget deficit has also been considered as one of the major constraints on the growth process in Pakistan. On average the budget deficit remained between 7 to 9 percent during the last forty years. Fourth, we use exchange rate variability (ERV) as a measure of instability. ERV has a negative and significant impact on economic growth implying that stability in exchange rate is important for economic growth.

In last model we use dummy variable to capture the role of policy change due to NFCs awards. Through NFCs awards, resources are distributed among federal and provincial governments. This variable also indicates the process of decentralization in Pakistan. We find a positive and significant relationship between policy change and economic growth. The positive association between NFC award dummy variable and economic growth shows that policy shift is helpful for economic growth in Pakistan.

TABLE 7.1

The GMM Estimates: Dependent Variable (GDP per Capita Growth)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RD	0.0206*	0.0455***	0.0424***	0.0461***	0.0487***	0.0530***	0.0296*	0.0360**	0.0360**
	(0.0120)	(0.0167)	(0.0163)	(0.0176)	(0.0160)	(0.0173)	(0.0167)	(0.0148)	(0.0148)
OPN		0.0414**	0.0669*	0.0705**	0.0625*	0.0245	0.0167*	0.0391**	0.0390
		(0.0204)	(0.0380)	(0.0327)	(0.0337)	(0.0317)	(0.0101)	(0.0197)	(0.0389)
T/GDP		0.0475*	0.0463*	0.0592*	0.0675**	0.0808**	0.0348*		
		(0.0274)	(0.0264)	(0.0312)	(0.0276)	(0.0348)	(0.0210)		
HC		0.0505***	0.0402**	0.0515***	0.0381**	0.0426**	0.0829***	0.0257*	0.0254*
		(0.0159)	(0.0173)	(0.0190)	(0.0157)	(0.0185)	(0.0227)	(0.0133)	(0.0138)
MII			-0.00873*					-0.00944**	-0.00968**
			(0.00448)					(0.00436)	(0.00487)
INF				-0.00966*		-0.00687*			
				(0.00529)		(0.00399)			
BD					-0.0292***	-0.0337***			
					(0.00852)	(0.00939)			
ERV							-0.0247**		
							(0.0113)		
NFC_Dummy									0.0178*
									(0.0102)
Constant	0.0658**	0.113*	0.119*	0.112*	0.243***	0.251***	-0.0432	0.0533	0.0546*
	(0.0263)	(0.0642)	(0.0621)	(0.0640)	(0.0690)	(0.0698)	(0.0991)	(0.0439)	(0.0330)
Observations	37	37	37	37	37	37	37	37	37
R-squared	0.247	0.409	0.464	0.408	0.532	0.546	0.482	0.439	0.240
Wald Chi2 Test	3.92	10.31	24.86	11.67	31.41	36.38	16.85	20.73	21.13
Normality Test	0.97(0.61)	0.70(0.71)	0.68(0.70)	0.71(0.70)	0.77(0.68)	0.88(0.64)	0.65(0.72)	0.63(0.73)	0.67(0.72)
Endogeneity Test	0.0685	0.0885	0.0526	0.0711	0.0625	0.0305	0.0665	0.0792	0.0454
Over Identification test	0.7070	0.9423	0.7432	0.9638	0.5625	0.6446	0.2056	0.7296	0.7373
D. W. Test	1.89	2.42	2.49	2.43	2.59	2.71	2.57	2.38	2.39

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

7.3 Expenditure Decentralization and Economic Growth

We analyze the impact of expenditure decentralization (ED) on economic growth and results are presented in Table 7.2. The impact of ED on economic growth is measured using six different models. In the first specification, we use only ED as an explanatory variable along with constant term. In second specification, we also include trade openness (OPN), tax to GDP ratio (T/GDP) and human capital (HC) as control variables along with ED. From model 3 to 6, we add various measures of macroeconomic instability like Macroeconomic Instability Index (MII), inflation (INF) and budget deficit (BD).

After checking all diagnostics tests, the final estimated models show expected results for all control variables. The average tax rate measured as tax to GDP ratio (T/GDP) has a positive and significant relationship with economic growth in all specifications. Trade openness (OPN) has a positive and significant impact on economic growth. Human capital (HC) has a positive and statistically significant impact on GDP per capita growth. All macroeconomic instability indicators are negatively associated with economic growth (Table 7.2). The impact of all control variables remains the same on growth as we found in Table 7.1.

Expenditure decentralization (ED) has a negative and statistically significant impact on economic growth in all specifications[24]. As shown in Table 7.2, these results are robust, regardless of the inclusion of other control variables; the estimated impact of ED on economic growth remains negative and statistically significant. The negative association between ED and economic growth implies that ED has growth retarding effects in Pakistan. These results are contrast to the theory of decentralization. There are several justifications that explain the negative association of expenditure decentralization with economic growth in Pakistan.

First, the composition of public spending carried out by provincial governments may explain the growth retarding effects of ED. Expenditure decentralization measure in

[24] In term of negative association of expenditure decentralization with economic growth, our findings are in line with the findings of other empirical studies such as Davoodi and Zou (1998), Zhang and Zou (2001), Rodriguez-Pose and Kroijer (2009) and Nguygen and Anwar (2011)

this dissertation does not tell us about the composition of the public spending of the provincial governments. Provincial governments generally allocate excessive amount on the current expenditure instead of capital and infrastructure spending. The literature suggests that the growth effects of capital and infrastructure spending are positive and that of current spending are negative.

TABLE 7.2
The GMM Estimates: Dependent Variable (GDP per Capita Growth)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
ED	-0.0922**	-0.116***	-0.126***	-0.129***	-0.115***	-0.122***
	(0.0400)	(0.0392)	(0.0294)	(0.0317)	(0.0341)	(0.0338)
OPN		0.0385*	0.0278*	0.0274*	0.0251*	0.0238*
		(0.0215)	(0.0151)	(0.0162)	(0.0135)	(0.0127)
T/GDP		0.0371*	0.0356	0.0387*	0.0497*	0.0498*
		(0.0196)	(0.0247)	(0.0201)	(0.0285)	(0.0291)
HC		0.0241*	0.0232*	0.0183*	0.0266*	0.0279*
		(0.0128)	(0.0133)	(0.0103)	(0.0144)	(0.0149)
MII			-0.0167***			
			(0.00632)			
INF				-0.00980*		-0.00598*
				(0.00577)		(0.00332)
BD					-0.0368***	-0.0346***
					(0.0118)	(0.0130)
Constant	-0.0509*	0.0289*	0.0504	0.0547	0.190***	0.194***
	(0.0300)	(0.0171)	(0.0524)	(0.0581)	(0.0552)	(0.0555)
Observations	37	37	37	37	37	37
R-squared	0.207	0.421	0.476	0.493	0.451	0.537
Wald Chi2 Test	5.32	11.54	30.08	27.28	19.73	25.22
Normality Test	0.31(0.85)	0.67(0.72)	0.17(0.92)	0.37(0.70)	0.24(0.88)	0.16(0.92)
Endogeneity Test	0.0395	0.0154	0.0152	0.0265	0.0495	0.0028
Over Identification test	0.6341	0.6149	0.7610	0.5225	0.7243	0.7903
D.W Test	2.29	2.52	2.69	2.54	2.68	2.65

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Second, the institutional weaknesses at the provincial level may lead to more corruption and hence low economic growth. The third reason may be the lack of autonomy in decision making by the provincial governments that in turn can lead to inefficient outcome. The process of fiscal decentralization may not materialize in its true sense because the decisions by provincial governments may still be influenced by the federal government. Fourth, the provincial governments may be unable to execute

proficient policies and organize efficient governance due to lack of human as well physical resources.

Fifth, the provincial government may not be able to achieve economies of scale for the reason that provincial governments may be too small to efficiently carry large scale infrastructure development projects. Finally, the provincial governments often lack the institutional framework that is required to gain the benefits of fiscal decentralization. Lack of institutional framework can contribute to more corruption, less accountability and inefficiency in policy making processes, causing a slowdown in growth process.

The benefits of expenditure decentralization—through enhancing the efficiency of the public goods and services provision by matching the local citizen preferences; by increasing competitions among the provincial governments; by reducing corruption and by enhancing accountability—can only be materialized if and only if the process of fiscal decentralization is complemented with good institutions. The role of institutions is very crucial in making the theorem of decentralization applicable. The literature suggests that expenditure decentralization may positively affect economic growth in the presence of strong democratic institutions.

In order to check the role of institutions in expenditure decentralization process, we add the interactive term of democratic institutions and expenditure decentralization in our model. Neyapti (2004; 2010) similarly suggests the use of expenditure decentralization with other institutions, such as central bank independence, local accountability, and governance quality, to test for the effectiveness of expenditure decentralization. In Table 7.3, we add democratic institutions and interactive term of democratic institutions and expenditure decentralization.

All the control variables like openness, tax to GDP ratio, macroeconomic instability index, inflation and budget deficit have the expected signs. The ED has a negative and statistically significant impact on economic growth in all specifications. The variable of democratic institution has a positive and significant impact on economic growth, implying that democratic institutions are growth promoting in Pakistan. Better institutions leads to higher per capita output.

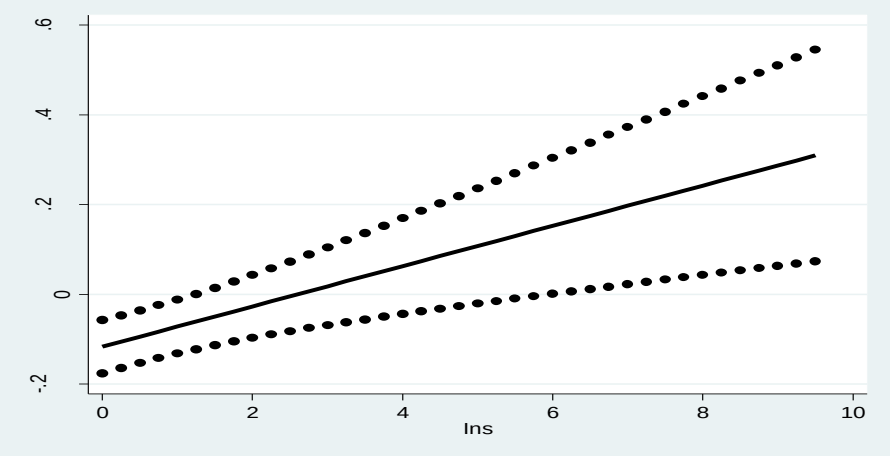
TABLE 7.3
The GMM Estimates: Dependent Variable (GDP per Capita Growth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ED	-0.0934**	-0.117***	-0.131***	-0.129***	-0.130***	-0.124***	-0.122***
	(0.0370)	(0.0305)	(0.0303)	(0.0298)	(0.0315)	(0.0280)	(0.0294)
INS	0.00113*	0.00150*	0.00137*	0.00136*	0.00138*	0.00128*	0.00120*
	(0.000500)	(0.000836)	(0.000788)	(0.000764)	(0.000793)	(0.000710)	(0.000714)
ED*INS		0.0449***	0.0414***	0.0393***	0.0486***	0.0361***	0.0431***
		(0.0129)	(0.0131)	(0.0139)	(0.0152)	(0.0116)	(0.0125)
OPN			0.0579*	0.0509*	0.0589*	0.0542*	0.0560*
			(0.0320)	(0.0301)	(0.0341)	(0.0319)	(0.0309)
T/GDP			0.0339*	0.0407*	0.0466*	0.0424	0.0472*
			(0.0201)	(0.0237)	(0.0267)	(0.0303)	(0.0273)
MII				-0.00523**			
				(0.00239)			
INF					-0.00976*		-0.00854
					(0.00572)		(0.00651)
BD						-0.0226*	-0.0223*
						(0.0119)	(0.0117)
Constant	-0.0509*	-0.0546**	0.0145	0.0181	-0.00259	0.0750	0.0552
	(0.0290)	(0.0245)	(0.0570)	(0.0556)	(0.0606)	(0.0669)	(0.0668)
Observations	37	37	37	37	37	37	37
R-squared	0.206	0.240	0.480	0.425	0.442	0.568	0.505
Wald Chi2 Test	12.66	33.54	37.41	40.30	34.84	42.43	39.05
J.B. Normality Test	0.19(0.81)	0.17(0.91)	0.11(0.96)	0.12(0.94)	0.12(0.95)	0.13(0.92)	0.21(0.90)
Endogeneity Test	0.0236	0.0464	0.0128	0.0321	0.0038	0.0013	0.0230
Over Identification Test	0.5704	0.8442	0.8926	0.9219	0.6197	0.7976	0.5380
Durban Watson Test	2.46	2.24	2.40	2.42	2.43	2.45	2.52

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The interactive term of expenditure decentralization and democratic institutions has a positive and significant impact on economic growth implying that expenditure decentralization and democratic institutions are complemented by each other. However, Brambor *et al*. (2006) shows that it is incorrect to decide on the inclusion of the interactive term simply by looking at the significance of the coefficient of the interactive variable. The marginal effect of expenditure decentralization on economic growth should be observed by constructing confidence intervals for the estimates of coefficient of ED and interactive term of ED and institutions over the possible values of the institutions. If the interval lies above the zero line, then the effect is significantly positive and vice versa. Through this, one can found the range of institution values for which the effect of ED can be said to be significant. The Figure 7.1 is constructed on the basis of the coefficient estimates and their variance-covariance matrices reported in Table 7.3 column 2. The Figure 7.1 shows that with low quality of institutions the growth effect of expenditure decentralization is negative. However, as the quality of institutions improves, the expenditure decentralization exerts positive impact on economic growth.

FIGURE 7.1
Determining the Range of Significance of the Marginal Effect of ED*INS
(Dashed lines show the 95% confidence band)



7.4 Composite Decentralization and Economic Growth

Similar to RD and ED, we estimate the impact of composite decentralization (CD) on economic growth. In CD, revenue decentralization and expenditure decentralization reinforce each other. The Table 7.4 presents the results obtained from GMM estimation. Six different models are used to quantify the impact of CD on economic growth and to

check the robustness of results. All the control variables have expected signs (Table 7.4). The impact of composite decentralization on economic growth is positive and significant in all models. The positive association reveals that composite decentralization (CD) is beneficial for Pakistan.

TABLE 7.4
The GMM Estimates: Dependent Variable (GDP per Capita Growth)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
CD	0.0190*	0.0444***	0.0414**	0.0452**	0.0478***	0.0528***
	(0.0113)	(0.0166)	(0.0163)	(0.0176)	(0.0159)	(0.0171)
OPN		0.0392*	0.0340*	0.0382*	0.0285*	0.0207
		(0.0218)	(0.0186)	(0.0222)	(0.0158)	(0.0317)
T/GDP		0.0494*	0.0479*	0.0514	0.0692**	0.0837**
		(0.0273)	(0.0267)	(0.0316)	(0.0276)	(0.0344)
HC		0.0519***	0.0419**	0.0532***	0.0403**	0.0455**
		(0.0162)	(0.0177)	(0.0193)	(0.0157)	(0.0185)
MII			-0.00834*			
			(0.00435)			
INF				-0.0108**		-0.00713**
				(0.00517)		(0.00379)
BD					-0.0283***	-0.0330***
					(0.00821)	(0.00890)
Constant	0.0570***	0.0953	0.100*	0.0940	0.218***	0.227***
	(0.0215)	(0.0610)	(0.0598)	(0.0611)	(0.0665)	(0.0661)
Observations	37	37	37	37	37	37
R-squared	0.248	0.420	0.470	0.419	0.538	0.553
Wald Chi2 Test	2.85	10.48	26.06	11.69	33.15	39.10
J.B. Normality Test	0.91(0.63)	0.69(0.71)	0.69(0.70)	0.69(0.71)	0.72(0.69)	0.81(0.66)
Endogeneity Test	0.0462	0.0733	0.0862	0.0613	0.0548	0.0767
Over Identification test	0.7536	0.8955	0.7221	0.9176	0.5239	0.5983
Durban Watson Test	1.88	2.39	2.45	2.40	2.55	2.68

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

7.5 Conclusion

In this chapter, we have analyzed the growth effects of fiscal decentralization in Pakistan over the period 1972-2010 using the GMM estimation procedure. The empirical analysis shows that revenue decentralization is growth enhancing in Pakistan. Decentralization of revenue generation responsibilities generates positive externalities which increase the per capita income of the country. On the other hand, we find that

expenditure decentralization has a negative association with the growth rate of per capita income. This is mainly due to low institutional quality which may increase the corruption level and make public official less accountable. Lack of human and physical infrastructure may also lead to inefficient outcome of expenditure decentralization in Pakistan. We empirically prove that expenditure decentralization becomes effective in the growth process if it is complemented with good quality institutions. We observe that the interaction of expenditure decentralization and democratic institution has a positive impact on economic growth.

Composite decentralization also has a positive association with growth mainly due to positive effect of revenue decentralization. This implies that if Pakistan focuses simultaneously on both types of decentralization, then this helps in enhancing the per capita income. Only expenditure decentralization is not helpful in achieving high and sustainable economic growth.

The empirical analysis also reveals that tax to GDP ratio has a positive association with economic growth. This finding has important implication for Pakistan. In Pakistan tax to GDP ratio is very low as compared to other developed and developing countries. Due to low tax base, Pakistan is consistently facing the problem of high budget deficit. So, increasing the tax to GDP ratio has two advantages; firstly, it directly contributes to economic growth and, secondly, it mitigates the negative impact of budget deficit on economic growth through reducing budget deficit. In Pakistan the main source of tax is the general sale tax on goods and services (GST) which is non-distortionary in nature. Trade openness and human capital have a positive association with economic growth in Pakistan.

Macroeconomic stability is pre-requisite for long term high and sustainable economic growth in any country across the globe. We measure macroeconomic stability using MII, inflation, budget deficit and exchange rate variability. The results demonstrate that macroeconomic instability index is negatively linked with economic growth. This implies that sound macroeconomic management is required for growth. These results are also important for Pakistan which is facing the problem of macroeconomic instability. Over the last three decade, Pakistan is experiencing the problem of high budget deficit

which undermines the growth prospects of the country. Similarly, inflation is also hurting the economic growth.

A question arises, is fiscal decentralization helpful in maintaining the macroeconomic stability in Pakistan? The theoretical literature alone is unable to answer this question. Thus, it is important to examine the impact of fiscal decentralization on macroeconomic stability in Pakistan. In the next chapter, we examine this relation.

CHAPTER 8

Fiscal Decentralization and Macroeconomic Stability: An Empirical Investigation

8.1 Introduction

In the previous chapter, we find that macroeconomic stability is pre-requisite for high and sustainable economic growth. In this chapter, we empirically investigate the impact of fiscal decentralization on macroeconomic stability in Pakistan. We examine fiscal decentralization-macro stability nexus using a comprehensive indicator of macroeconomic instability namely macroeconomic instability index (MII) (developed in chapter 4) based on inflation, fiscal discipline and exchange rate management.

The structure of the chapter is as follows. In section 8.2, we empirically investigate the impact of fiscal decentralization on inflation and budget deficit as proxies for macroeconomic instability[25]. In section 8.3, we examine the impact of fiscal decentralization on macroeconomic instability using the composite index (MII). In last section, we conclude the discussion.

8.2 Impact of Fiscal Decentralization on Inflation and Budget Deficit

Table 8.1 shows the results regarding the impact of fiscal decentralization on inflation rate. Three indicators of fiscal decentralization are used. We use GDP per capita and GDP per capita growth, capital stock per worker, money supply as percent of GDP, credit to private sector as percent of GDP, trade openness, tax as percent of GDP and dummy variable for NFC as control variables.

In all the specifications, we find a negative and significant relationship between the GDP per capita and inflation rate. In last column, we use GDP per capita growth instead of GPD per capita and find similar results. This implies that an increase in the level of GDP is associated with a decrease in the rate of inflation. It is evident from historical perspective that during high growth period, the inflation remains quite low and stable in Pakistan. During the decades of high growth like 1980s and early 2000, the

[25] This is done for the case of comparison with the earlier literature that uses mostly inflation and budget deficit as measures of macroeconomic instability.

inflation rates remains very low (around 6 percent on average). The GDP growth is essential for macroeconomic stability especially for the price stability. Similar results are found in a number of other studies (Martinez-Vazquez and McNab, 2006; Thornton, 2007a).

The capital stock per worker (CS/W) has a negative and significant impact on the rate of inflation in all the models. This implies that increased investment in capital stock is associated with a decrease in level of inflation. Investment in capital stock is crucial for maintaining macroeconomic stability in the country. Higher public investment reduces the structural bottlenecks on the supply side of the economy and hence reduces the level of inflation. Investment in capital stock helps to manage the supply shocks, which boost the output in the economy and leads to the price stability. In Pakistan, we have been facing supply-side constraints for the last few years. These supply-side constraints are considered as the main hurdle in the growth process and macroeconomic stability of the country. In this situation, public investment for capacity building especially in the power sector is required to maintain stability and growth.

The money supply has a negative but insignificant relation with the rate of inflation in all models. The insignificant association implies that any growth in money supply may not hamper the macroeconomic stability of the country. It also indicates that inflation is not primarily because of money supply but it may be structural in nature and mainly attributed to supply-side factors. This result is in line with the impact of capital stock on inflation which shows that inflation in Pakistan is mainly supply-side driven (Nasir and Malik, 2011). The money supply positively affects the price level only when output growth reaches capacity limits. In this situation, firms do not be able to produce more and fulfill the increased demand that is generated due to money supply. This negative association suggests the fact that Pakistan's economy has not yet reached its productive capacity and has the capacity to absorb more investments.

We also use domestic credit to private sector as percent of GDP to measure the financial development in Pakistan. It is considered one of the keys for economic growth. This indictor measures the financial development that occurs outside of the banking sector. It is known as market capitalization (MC). Results show that market capitalization

(MC/GDP) has a negative impact on inflation. Qayyum (2002) also established a negative relationship between bank credit expansion to the private sector and inflation.

Trade openness has a negative and statistically significant impact on inflation. This result is in line with Romer' view (1993), that inflation is lower in small open economies. A number of other studies also show that trade openness is negatively associated with inflation in Pakistan (Ashra, 2002; Gruben and McLeod, 2004; Kim and Beladi, 2005; Hanif and Batool, 2006; Mukhtar, 2010). Openness enhances the efficiency through reducing cost by changing composition of inputs procured internationally and domestically, thus leading to lower inflation. Openness also affects inflation through better allocation of resources and increased capacity utilization. Openness may also boost foreign investment which can stimulate output and reduce the price level (Ashra, 2002).

Tax to GDP ratio has a negative and statistically significant impact on inflation, implying that higher the tax to GDP ratio; lower the level of inflation in the country. Taxation generally reduces the level of income and with lower level of income; demand for goods and services will decline that will eventually lead to lower inflation.

Table 8.1 shows the impact of revenue decentralization on inflation rate. We observe a negative and significant impact of revenue decentralization on inflation. This negative association implies that increase in revenue decentralization leads to lower level of inflation. The estimated coefficient for revenue decentralization is statistically significant at the 5 percent level. This finding suggests that a more decentralized system of revenue generation assignments tends to cause stability in the price level. Revenue decentralization is favorable in achieving high GDP per capita growth through reducing the level of inflation in Pakistan. Revenue decentralization helps in maintaining low inflation in three ways. First, higher the level of provincial own revenue, less will be the dependence of provincial government on federal revenue. Subsequently, the federal government can enhance its own capacity by allocating more resources to public sector projects such as power and infrastructure. Secondly, it also reduces overall fiscal deficit. Thirdly, it provides more space to central bank in controlling inflation. The combined effect of all these factors result in low inflation through revenue decentralization.

TABLE 8.1

The GMM Estimates: Dependent Variable (Inflation rate)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP per capita	-0.125**	-0.146**	-0.119*	-0.344**	-0.199*	-0.153*	-0.262	-0.155**	
	(0.0619)	(0.0717)	(0.0636)	(0.167)	(0.106)	(0.091)	(0.154)	(0.0727)	
GDP Growth rate									-0.338***
									(0.101)
CS/W	-1.190***	-0.997*	-1.258***	-0.790***	-0.783***	-0.689***	-0.744**	-0.962***	-0.632***
	(0.358)	(0.554)	(0.371)	(0.209)	(0.269)	(0.174)	(0.318)	(0.347)	(0.227)
M2/GDP	-1.382	-0.555	-1.222					0.842	
	(1.088)	(2.266)	(1.118)					(1.472)	
MC/GDP				-2.281**	-2.483***	-2.648***	-2.499***		-2.685***
				(0.919)	(0.790)	(0.664)	(0.877)		(1.024)
OPN	-1.076***	-0.939*	-1.028***	-1.378***	-1.356***	-1.355***	-1.385***	-0.975**	-1.086***
	(0.212)	(0.541)	(0.223)	(0.341)	(0.290)	(0.271)	(0.309)	(0.460)	(0.251)
T/GDP	-1.393**	-1.359**	-1.512**					-1.512**	
	(0.664)	(1.205)	(0.673)					(0.770)	
RD	-1.126**				-1.0535**				-0.671*
	(0.438)				(0.533)				(0.357)
ED		-3.534				-2.239		-1.646	
		(4.608)				(2.950)		(3.363)	
CD			-1.187***				1.0771*		
			(0.459)				(0.637)		
INS								-0.0217*	
								(0.0119)	
ED*INS								-0.684***	
								(0.227)	
NFC_Dummy				-0.210*	-0.247*	-0.218*	-0.328**		
				(0.113)	(0.141)	(0.121)	(0.161)		
Constant	29.06***	22.01*	31.21***	31.21***	31.42***	29.60***	30.61***	24.68***	27.71***
	(9.728)	(11.58)	(10.16)	(5.574)	(6.052)	(4.416)	(7.342)	(6.386)	(4.809)
Observations	37	37	37	37	37	37	37	37	37
R-squared	0.631	0.671	0.619	0.386	0.529	0.571	0.478	0.684	0.581
Wald Chi2 Test	102.5	36.02	97.99	32.63	47.34	66.48	38.96	141.3	67.64
Normality Test	1.18(0.55)	1.29(0.52)	1.61(0.44)	0.81(0.66)	1.36(0.50)	1.19(0.55)	1.23(0.54)	1.45(0.49)	0.54(0.76)
End. Test P.V.	0.0583	0.1091	0.0438	0.0647	0.0935	0.0923	0.0811	0.0564	0.0499
OI Test P.V.	0.6533	0.7226	0.6000	0.1223	0.1494	0.1142	0.1619	0.2211	0.3495
D. W. Test value	1.89	1.80	1.98	1.96	1.87	1.96	1.93	1.89	1.99

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8.1 shows that the estimated coefficient for expenditure decentralization is negative but statistically insignificant[26]. Therefore, decentralization of expenditures may not be helpful in reducing the level of inflation in Pakistan. In the previous chapter, we found that expenditure decentralization has growth reducing effect in Pakistan due to weak institutional framework. Expenditure decentralization is only affective when it is complemented with good institutions. Similar explanations are documented in the literature that explains the insignificant contribution of expenditure decentralization in controlling the level of inflation.

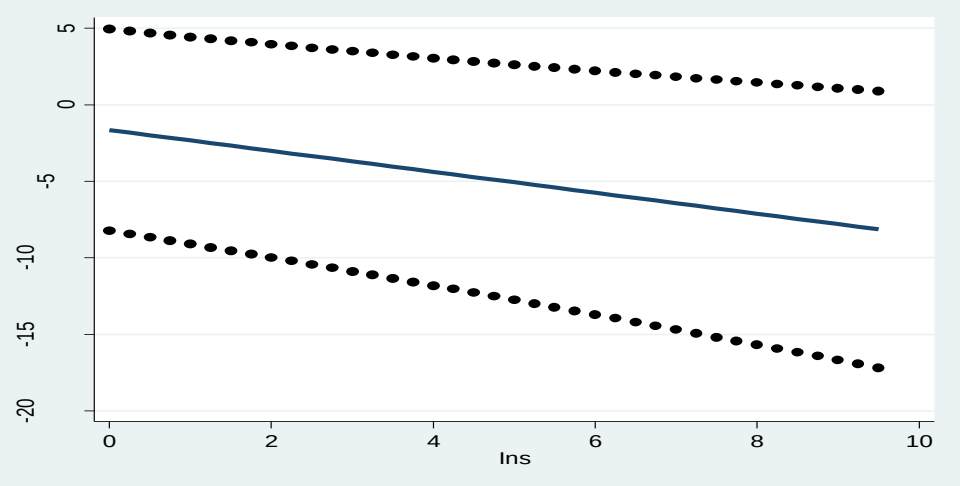
Lack of economies of scale, absence of local accountability, lack of institutional and administrative capacity and coordination problems are the major factors that make expenditure decentralization less effective in controlling the inflation level (Martinez-Vazquez and McNab, 2006). We test the role of institutional factors in making expenditure decentralization an effective instrument for controlling inflation. For this purpose, interactive term of democratic institutions and expenditure decentralization is added as an additional explanatory variable in the model.

We estimate the impact of expenditure decentralization on inflation in the presence of democratic institutions. Expenditure decentralization still has a negative but statistically insignificant association with inflation rate. However, the interactive term of expenditure decentralization and democratic institution has a negative and statistically significant relationship with inflation. The Figure 8.1 is drawn on the basis of the coefficient estimates of expenditure decentralization and its interactive term with democratic institutions and their variance-covariance matrices reported in last column of Table 8.1.

The Figure shows that as the quality of institutions improves, the expenditure decentralization exerts negative and significant impact on macroeconomic instability. The figure also reveals that even in the presence of negative and insignificant impact of expenditure decentralization, their combined effect is still significant in curtailing macroeconomic instability.

[26] Martinez-Vazquez and McNab (2006) find similar results for developing countries

Figure 8.1
Determining the Range of Significance of the Marginal Effect of ED*INS
(Dashed lines show the 95% confidence band)



We measure the impact of composite decentralization on inflation and results are presented in Table 8.1. Our results are somehow similar to the one found for revenue decentralization. The composite decentralization appears to be negatively and significantly correlated with inflation rate even without controlling for the role of institutions. This implies that expenditure decentralization becomes effective when it is complemented with revenue decentralization. Intuitively, provincial governments become more responsive when their expenditure needs are met with their own revenues.

Table 8.2 shows the impact of fiscal decentralization on budget deficit. Revenue decentralization has a negative and statistically significant impact on budget deficit. On the other hand, expenditure decentralization has a negative but statistically insignificant impact on budget deficit. While, composite decentralization has a negative and significant impact on budget deficit. These results show that revenue decentralization is helpful in achieving fiscal discipline in Pakistan. In all regression reported in Table 8.2, government spending as percent of GDP (measure the size of government) has a positive and significant impact on budget deficit. The overall economic development as measured by GDP per capita has a negative impact of budget deficit.

TABLE 8.2
The GMM Estimates: Dependent Variable (Budget Deficit)

Variables	(1)	(2)	(3)
GDP per capita	-1.538***	-1.314***	-1.584***
	(0.305)	(0.361)	(0.315)
Govt. Spending	0.166***	0.167***	0.163***
	(0.0428)	(0.0425)	(0.0419)
Population Growth	-0.0521*	-0.0766	-0.0564*
	(0.0301)	(0.0574)	(0.0337)
RD	-0.369*		
	(0.215)		
ED		-0.934	
		(1.494)	
CD			-0.372*
			(0.213)
NFC_Dummy	-0.0527*	-0.0667	-0.0384**
	(0.0293)	(0.117)	(0.0194)
Constant	8.785***	6.998***	9.226***
	(1.412)	(1.102)	(1.515)
Observations	37	37	37
R-squared	0.347	0.303	0.355
Wald Chi2 Test	44.03	40.57	46.42
J.B. Normality Test	0.18(0.96)	0.67(0.71)	0.13(0.93)
Endogeneity Test	0.0598	0.0457	0.0710
Over Identification test	0.1160	0.3107	0.1655
Durban Watson Test	2.13	2.01	2.13

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

8.3 Fiscal Decentralization and Macroeconomic Instability Index (MII)

Table 8.3 shows the impact of fiscal decentralization on macroeconomic instability index (MII) using three indicators of fiscal decentralization as mentioned earlier. We use GDP per capita, capital stock per worker, money supply as percent of GDP, credit to private sector as percent of GDP (MC/GDP), trade openness, tax as percent of GDP and dummy for NFCs as control variables.

The growth rate of GDP per capita has a negative and significant association with macroeconomic instability index. The estimated coefficient is significant in all models. This implies that higher the level of GDP per capita, lower the macro-instability in the country. It is also evident that during high growth period, macroeconomic stability indicators remain stable. During high growth periods, inflation remains low, exchange

rate shows low variability and budget deficit remains under control. For example, from 2003-04 to 2006-07, Pakistan has enjoyed high economic growth. On average GDP grew at the rate of 7.3 percent during this period. While during same the period average inflation remained around 6 percent while budget deficit remained 3.6 percent on average. Exchange rate remained in the range of 58 to 62 rupees per US$ (GOP, 2011). After 2006-07, Pakistan's economy grew at the rate of 2.5 percent on average. This low economic growth period is accompanied by high inflation (on average 15 percent), high budget deficit (on average 6.5 percent) and high exchange rate volatility (exchange rate jumped from 60 to 85 rupees per US$). During this low growth period, Pakistan economy faced severe problem of macroeconomic stability. In sum, we conclude that economic growth is essential for macroeconomic stability of the country. High growth is required for stable economy.

The capital stock per worker (CS/W) has a negative and significant impact on the Macroeconomic Instability Index (MII) in all models implying that increase in capital stock is helpful in reducing instability in the economy. Investment in capital stock maintains macroeconomic stability via reduction in structural bottlenecks in the economy. Money supply as percent of GDP and credit to private sector as percent of GDP have a negative and statistically significant impact on macroeconomic instability.

Openness has a negative and statistically significant impact on macroeconomic instability index. The negative sign of the coefficient indicates that greater the trade openness lesser the macroeconomic instability in Pakistan. Satyanath and Subramanian (2004) have found similar result.

Tax to GDP ratio has a negative and statistically significant association with macroeconomic instability in two of the four models. The negative sign of the coefficient indicates that higher the tax to GDP ratio less will be the macroeconomic instability in Pakistan (Table 8.3). Taxes contribute to less stability via changing the structure of taxes that maximizes the economic efficiency and market flexibility. These factors enhance the resilience of the economy during instable environment especially generated through supply shocks (Debrun and Kapoor, 2011).

TABLE 8.3

The GMM Estimates: Dependent Variable (Macroeconomic Instability Index)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita	-0.165**	-0.213***	-0.160**	-0.385*	-0.887**	-0.292	-0.969**	-0.131*
	(0.0783)	(0.0738)	(0.0813)	(0.227)	(0.383)	(0.205)	(0.463)	(0.0674)
CS/W	-0.591*	-0.673*	-0.615*	-0.505**	-0.613*	-0.375*	-0.146	-0.237*
	(0.334)	(0.343)	(0.356)	(0.235)	(0.347)	(0.223)	(0.513)	(0.131)
M2/GDP	-1.741*	-2.566	-1.597					-1.432
	(1.053)	(2.189)	(1.110)					(1.989)
MC/GDP				-0.899	-0.575	-1.031*	-1.690*	
				(0.891)	(1.542)	(0.612)	(1.051)	
OPN	-0.570**	-0.803*	-0.535*	-0.625**	-0.827*	-0.246	-0.918*	-0.466*
	(0.287)	(0.418)	(0.311)	(0.305)	(0.501)	(0.289)	(0.544)	(0.280)
T/GDP	-0.0581*	0.607	-0.178**					0.192
	(0.0350)	(1.179)	(0.0796)					(1.032)
RD	-0.904**				-0.957*			
	(0.421)				(0.497)			
ED		-1.067				-1.212		0.100
		(4.159)				(0.799)		(3.026)
CD			-0.952**				-1.165*	
			(0.464)				(0.622)	
INS								0.0223*
								(0.0128)
ED*INS								-0.371*
								(0.205)
NFC_Dummy				-0.138*	-0.208	-0.252*	-0.236**	
				(0.072)	(0.189)	(0.150)	(0.113)	
Constant	15.10*	3.732	15.96*	19.23***	11.95	14.54***	10.19	7.549
	(8.811)	(8.627)	(9.403)	(5.545)	(10.71)	(4.851)	(12.75)	(6.581)
Observations	37	37	37	37	37	37	37	37
R-squared	0.614	0.575	0.599	0.554	0.509	0.539	0.589	0.600
Wald Chi2 Test	27.83	27.59	27.09	19.50	16.56	28.22	13.33	43.18
J.B. Normality Test	0.93(0.61)	0.97(0.57)	0.78(0.73)	0.73(0.70)	0.23(0.90)	0.97(0.57)	0.25(0.87)	0.87(0.75)
Endogeneity Test	0.0854	0.0627	0.0717	0.0590	0.0766	0.0265	0.0263	0.0993
Over Identification test	0.2434	0.1918	0.1599	0.1865	0.6755	0.6265	0.6859	0.4977
Durban Watson Test	1.85	1.76	1.85	1.88	2.31	1.90	2.29	1.96

Robust standard errors in parentheses

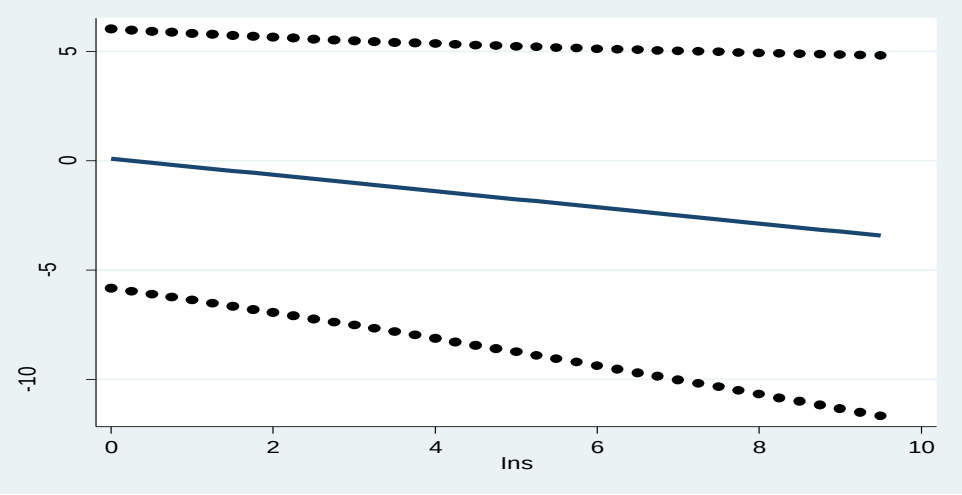
*** p<0.01, ** p<0.05, * p<0.1

Revenue decentralization is an important determinant of macroeconomic instability index as shown in the Table 8.3. The negative sign of coefficient indicates that under more decentralized set up on revenue side, there is lesser macroeconomic instability in Pakistan.

The estimated impact of expenditure decentralization on macroeconomic instability is negative but statistically insignificant. To test the role of institutional factors in making expenditure decentralization an effective instrument, we add interactive term of democratic institution and expenditure decentralization as an additional explanatory variable in the model.

In last column, we present the results of expenditure decentralization on macroeconomic instability in the presence of democratic institutions. Expenditure decentralization still has a negative but statistically insignificant association with macroeconomic instability. However, the interactive term of expenditure decentralization and democratic institution has a negative and statistically significant relationship with macroeconomic instability index. Figure 8.2 is constructed on the basis of the coefficient estimates of expenditure decentralization and its interactive term with democratic institutions and their variance-covariance matrices reported in Table 8.3.

FIGURE 8.2
Determining the Range of Significance of the Marginal Effect of ED*INS
(Dashed lines show the 95% confidence band)



The figure shows that with low level of institutional quality, the expenditure decentralization still remains insignificant in maintaining the macroeconomic stability in

Pakistan. However, with the improvement in the quality of institutions, the impact of expenditure decentralization in controlling instability becomes significant.

Composite decentralization has a negative and significant impact on macroeconomic instability index as reported in Table 8.3. These results are somewhat similar to the one found for revenue decentralization. In absolute terms, the coefficient of composite decentralization is greater than that of revenue decentralization, which indicates that the former is more important than the latter in achieving macroeconomic stability. This highlights the positive influence of expenditure decentralization when combined with revenue decentralization in maintaining macroeconomic stability in the country.

8.3 Conclusion

In this chapter, we have empirically explored the impact of fiscal decentralization on macroeconomic stability. The overall results confirm that revenue decentralization is an effective policy instrument in combating the problem of macroeconomic instability. Revenue decentralization is helpful in reducing the inflation by lowering the pressure on monetary and fiscal authority. Similarly revenue decentralization is a useful tool in maintaining the overall macroeconomic stability of the country.

On the other hand, the expenditure decentralization has a negative but statistically insignificant impact on inflation and overall macroeconomic instability index. The inefficiency of expenditure decentralization in controlling macroeconomic instability is mainly due to week institutional framework of the country. A weak institutional framework leads to more corruption and less accountability when resources are relatively easily available to the provincial government.

By using the interaction term of democratic institutions and expenditure decentralization, we have observed a significant contribution of the expenditure decentralization in maintaining the macroeconomic stability in Pakistan. This finding suggests that expenditure decentralization is helpful in reducing inflation and in promoting macroeconomic stability if it is complemented with good institutions.

The combined effect of revenue decentralization and expenditure decentralization, measured using composite decentralization is found to be statistically significant in maintaining the macroeconomic stability. The estimated coefficient of composite decentralization is greater than the revenue decentralization in both inflation and macroeconomic instability index models. This suggests that revenue decentralization and expenditure decentralization reinforce each other. It is better to implement both type of decentralization simultaneously for better economic outcomes.

The overall analysis concludes that fiscal decentralization especially revenue decentralization is good for macroeconomic stability of the country.

CHAPTER 9

Summary and Conclusions

Over the last three decades, there has been a growing tendency towards the process of decentralization especially in emerging and developing economies. Decentralization, a process of devolution of power and authority from the national government to the sub-national governments, is a complex and multidimensional phenomenon. Fiscal decentralization occurs through the devolution of fiscal responsibilities for the government expenditures and revenue generation or collection from the central level government to the provincial or local level governments.

Fiscal decentralization is considered as an effective strategy to promote economic growth through increasing the efficiency of the public sector and maintaining macroeconomic stability. This process promotes sound macroeconomic management via streamlining public sector activities and reducing operational and information costs of service delivery. Fiscal decentralization increases the competition among different tiers of governments in delivering public goods and services which leads to higher economic growth. Fiscal decentralization breaks the monopoly power of the central government and makes public officials more accountable and responsive that ultimately leads to lower corruption and better provision of public goods hence higher economic growth.

Recently, the government of Pakistan has taken two major steps towards strengthening the process of fiscal decentralization by signing 7th National Finance Commission (NFC) award – through which a bulk of resources has been transferred to the provinces – and by passing 18th Constitutional Amendment – though that a wide range of fiscal responsibilities have been shifted from the center to the provinces. These developments would cause a fundamental shift in the division of powers between the center and the provinces. Now, provinces have more autonomy in performing various functions like provision of public goods and services and macroeconomic management.

The existing literature suggests that fiscal decentralization can contribute to economic growth directly and indirectly through macroeconomic stability. The empirical literature on the growth effects of fiscal decentralization remains inconclusive. Some studies have found a positive association while others have found a negative or

insignificant relationship between fiscal decentralization and economic growth. Similarly, the literature regarding the macroeconomic stability effects of fiscal decentralization also shows mixed results. Some studies have shown a positive association while others have found a negative relationship between fiscal decentralization and macroeconomic stability. In sum, the existing literature on the relationship among fiscal decentralization, economic growth and macroeconomic stability is unable to provide distinct conclusion on the direction and significance of the relationship.

With the increasing trend towards the process of fiscal decentralization and inconclusive outcomes of the existing studies, it becomes necessary to examine the potential effects of fiscal decentralization in Pakistan. In this context, the main objective of this dissertation has been analyzing, both theoretically and empirically, the impact of fiscal decentralization on macroeconomic stability and economic growth by looking at various dimensions of fiscal decentralization and macroeconomic stability.

Three different measures of fiscal decentralization namely revenue decentralization, expenditure decentralization and composite decentralization, are used to quantify the growth and macro-stability effects. The revenue decentralization is measured as the ratio of provincial governments revenue to the total government revenue and expenditure decentralization is measured as the ratio of provincial governments expenditure to the total government expenditures less the defence expenditures and interest payments on debt. The composite decentralization is measured by using both revenue decentralization and expenditures decentralization. We have constructed a new Macroeconomic Instability Index (MII) for Pakistan which is more comprehensive than the earlier indices in terms of both the scope as well as the methodology. It is based on inflation, fiscal discipline and exchange rate management.

We developed a theoretical framework based on endogenous growth model to theoretically analyze the impact of fiscal decentralization on economic growth. The advantage of this theoretical model over the ones used by Davoodi and Zou (1998) is that it allows us to capture the direct impact, as previously suggested in literature, as well as indirect impact of fiscal decentralization on economic growth within a unified framework. This formulation indicates that fiscal decentralization may affect economic

growth directly and indirectly through the macroeconomic stability. This model provides basis for empirical analysis.

The Generalized Method of Moment (GMM) is used to empirically estimate the impact of fiscal decentralization on macroeconomic stability and economic growth using time series data over period 1972-2010. The choice of estimation technique is particularly important because the literature in the field of fiscal decentralization suggests that there is endogeneity in the fiscal decentralization measures.

In chapter 7, we empirically estimate the growth effects of fiscal decentralization. The empirical analysis shows that revenue decentralization has a positive impact on economic growth in Pakistan implies that revenue decentralization promotes economic growth. Therefore, the decentralization of revenue generation responsibilities generates positive externalities which increase the per capita income of the country. These findings suggest that when provincial government have a greater share of own revenue, they become more responsible and accountable in their expenditures. Hence there is a greater chance of achieving economic efficiency of public sector predicted in the theories of fiscal decentralization. Provincial government with greater ability of revenue generation may enhance fiscal responsibility to meet the spending obligation in a more transparent way.

On the other hand, we find that expenditure decentralization has a negative association with the economic growth indicating that expenditure decentralization is operating in the opposite direction than what is highlighted by the 'theorem of decentralization'. The results conclude that the public spending at, and transfer to, the provincial governments have had negative association with overall economic growth.

The negative association between expenditure decentralization and economic growth is mainly due to low institutional quality which may increase the corruption level and make public official less accountable. Lack of human and physical infrastructure may also lead to inefficient outcome of expenditure decentralization in Pakistan. We empirically prove that expenditure decentralization becomes effective in the growth process if it is complemented with good quality institutions. We observe that the interaction of expenditure decentralization and democratic institution has a positive

impact on economic growth. This finding amplifies the risks attached with the process of fiscal decentralization. Fiscal decentralization leads to lower macroeconomic performance in a country with weak institutional framework.

Composite decentralization has a positive association with growth mainly due to positive effect of revenue decentralization. This implies that if Pakistan focuses simultaneously on both types of decentralization, then it helps in enhancing the per capita income. Only expenditure decentralization is not helpful in achieving high and sustainable economic growth.

The empirical analysis also reveals that tax to GDP ratio has a positive linkage with economic growth. Trade openness has positive linkages with growth rate of per capita income in Pakistan. Human capital also positively influences the economic growth. Macroeconomic stability is pre-requisite for long term high and sustainable economic growth. The results demonstrate that macroeconomic instability index is negatively linked with economic growth. This implies that sound macroeconomic management is required for growth.

In chapter 8, we empirically investigate the macroeconomic stability effects of fiscal decentralization. The overall results confirm that revenue decentralization is an effective policy instrument in combating the problem of macroeconomic instability. Revenue decentralization is helpful in reducing the inflation by lowering the pressure on monetary and fiscal authority. Similarly revenue decentralization is a useful tool in maintaining the overall macroeconomic stability of the country. The analysis, on the other hand, also shows that expenditure decentralization may even promote inflation and macroeconomic instability in Pakistan. The inefficiency of expenditure decentralization in controlling macroeconomic instability is linked with week institutional framework of the country. A weak institutional framework leads to more corruption and less accountability when resources are relatively easily available to the provincial government. By using the interaction term of democratic institutions and expenditure decentralization, we have observed a significant contribution of the expenditure decentralization to maintain macroeconomic stability. This finding suggests that expenditure decentralization is helpful in reducing inflation and in promoting

macroeconomic stability if it is complemented with good institutions. The combined effect of revenue decentralization and expenditure decentralization, measured using composite decentralization, has a positive association with macroeconomic stability. The estimated coefficient of composite decentralization is greater than the revenue decentralization in both inflation and macroeconomic instability index models. This suggests that revenue decentralization and expenditure decentralization reinforce each other. It is better to implement both type of decentralization simultaneously for better economic outcomes.

The results also show that economic development measured by GDP per capita has a negative association with macroeconomic instability implying that economic development is necessary for sustainable macroeconomic environment. Investment has a negative relationship with inflation and macroeconomic instability index indicates that investment is crucial for maintaining macroeconomic stability in the country. Openness has a negative impact on inflation and macroeconomic instability index indicates that greater trade openness contribute to less macroeconomic instability in Pakistan. Tax to GDP ratio has a negative association with macroeconomic instability implies that higher the tax to GDP ratio less the macroeconomic instability.

Policy Implications

Few policy implications emerge from the empirical analysis:

i) Macroeconomic stability and economic growth reinforce each other. This suggests that the objective of governmental policies must be to ensure both growth and macroeconomic stability. To achieve both stability and growth objectives simultaneously, such policies are required that place emphasis on prudent macroeconomic management, efficiency of public expenditures, and addressing bottlenecks in the growth process.

ii) The tax to GDP ratio has a positive association with economic growth and macroeconomic stability. This finding has important implications for Pakistan. In Pakistan tax to GDP ratio is very low as compared to other developed and developing countries. Due to low tax base, Pakistan is consistently facing the problem of high budget deficit. Increasing the tax to GDP ratio has two

advantages; firstly, it directly contributes to economic growth and, secondly, it mitigates the negative impact of budget deficit on economic growth through reducing budget deficit. In Pakistan the main source of tax is the general sale tax on goods and services (GST) which is non-distortionary in nature. Taking into account the growth and stability effect of taxation, there is a need to further broaden the tax base and tax rates. To widen the tax base, all sources of income – including services, real estate and agriculture – must be brought under the tax net. Implementation of Reformed General Sale Tax (RGST) can be an option for increasing the tax base and tax revenue. Implementation of RGST is essential to fully tap the revenue generation capacity as well as to help the documentation process in the economy.

iii) The results of this dissertation reveals that the process of fiscal decentralization especially revenue decentralization is beneficial for the economy of Pakistan. To achieve long run economic growth and macro-stability, revenue decentralization should be better streamlined through making the provinces more reliant on their own resources. The positive association of revenue decentralization with macroeconomic stability and economic growth has important implication for the design of fiscal decentralization in Pakistan because the process of restructuring government which began with passage of 7th NFC ward and 18th Constitutional Amendment is in the early stage. This requires a serious effort both in term of strengthening the institutions and promoting fiscal decentralization to achieve the objective of better economic growth. The benefits of fiscal decentralization can only accrue when provincial governments have a real fiscal autonomy, adequate accountability and sufficient capacity to respond the local requirements.

iv) Expenditure decentralization can only be effective when the provinces have sufficient administrative capacity and are made accountable and transparent through good institutions. The expenditure decentralization can make positive contribution to economic growth if steps are taken to improve the administrative capacity of the provincial governments. This requires initiating such programs that provide technical and administrative skills to the public officials at provincial

level. These programs are more likely to enhance the spending management skills of the provincial governments.

v) The present initiatives undertaken by the government in strengthening the provinces through providing more autonomy and resources have a clear implication for the Pakistan's long term economic prosperity and macroeconomic stability. However, the outcome of these reforms crucially depends upon the institutional framework of the country. Strengthening of democracy is pre-requisite for achieving the fruits of fiscal decentralization.

Limitations and the way forwards

There are various limitations of the study. First, due to unavailability of data at local level, this analysis only focuses at aggregate level using time series data. Second, due to unavailability of data, this analysis only considers the fiscal side of decentralization while ignoring the administrative and political dimensions of the decentralization. Last, this study only uses one institutional indicator i.e. democratic institutions. Various other institutional measures like control over corruption, democratic accountability and rule of law can be used to further explore the role of institutions.

There are various avenues on which future research can be conducted to further explore the role of fiscal decentralization in promoting economic growth and macro-stability. Few possible areas include: First, the empirical analysis can be extended further to analyze the role of fiscal decentralization at more disaggregated level. For example overall expenditures can be disaggregated into developmental expenditures and current expenditures. Second, the research can be extended to analyze redistributive effects of fiscal decentralization. Finally, the research can be extended to explore the impact of fiscal decentralization on poverty and inequality.

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APPENDIX A: SOLVING MODEL

Before solving the model, we need to specify the objective function, budget constraints, initial condition, and terminal condition.

A.1.1: Objective Function

The discounted utility maximization problem for the representative individual is given by following utility function:

$$U = \int_0^{\infty} \frac{c^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} dt \ldots\ldots (A.1)$$

This formulation assumes that the individual's utility at time 0 is a weighted sum of all future flow of utility where c is the per capita private consumption and $\sigma > 0$ which shows that the elasticity of marginal utility equals the constant $-\sigma$. We assume that U is increasing in c and concave $-u'(c) > 0, u''(c) < 0$. The concavity assumption generates a desire to smooth consumption over time. The other multiplier, $e^{-\rho t}$, involves the rate of time preference, $\rho > 0$. A positive time discount rate ρ means that utils are valued less the later they are received.

A.1.2: Dynamic Budget Constraint

The dynamic budget constraint in per capita terms is given by the following equation:

$$\dot{k} = \frac{dk}{dt} = (1-\tau)y - c = (1-\tau)(1-\pi)\Psi k^{\alpha} f^{\beta} p^{\gamma} - c \ldots\ldots (A.2)$$

Equation $(A.2)$ says that the increase in the capital stock equals the total saving which in turn equal the difference between output and consumption.

A.1.3: Initial and Terminal Conditions

The initial condition of the model is written as follow:

$$k_{(0)} = 1 \ldots\ldots (A.3)$$

The initial condition in equation $(A.3)$ says that the capital stock at time 0 is 1. The terminal condition of the endogenous growth model is given as follow:

$$\lim_{t\to\infty} k\lambda e^{-\rho t} = 0 \ldots\ldots (A.4)$$

The terminal condition in equation $(A.4)$ says that the capital stock left over the "end of the planning horizon," when discounted at the time discount rate, is zero. This restriction rules out the type of chain-letter finance.

A.1.3: Optimization Problem

The individual's optimization problem is to maximize U in equation $(A.1)$, subject to the budget constraint given in equation $(A.2)$, the stock of initial capital given in equation $(A.3)$ and the limitation on the borrowing as given in equation $(A.4)$. To solve the optimization problem, we set up the present-value Hamiltonian:

$$H = \frac{c^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} + \lambda\left[(1-\tau)(1-\pi)\Psi k^{\alpha} f^{\beta} p^{\gamma} - c\right] \ldots\ldots (A.5)$$

Where the expression in braces is equals $\dot{k}$ from equation $(A.2)$ and λ is Lagrange Multiplier representing the present value of shadow price of income.

A.1.4: Solving the Optimization Problem

The individual's optimization problem is to maximize U. The stating point for optimization is to apply first order conditions by differentiating the Lagrangian function define in the form of Hamiltonian. We differentiate Lagrangian function with respect to c and k and find the first order conditions of given optimization problem:

$$\frac{\partial H}{\partial c} = 0 \Rightarrow c^{-\sigma} e^{-\rho t} - \lambda = 0 \ldots\ldots (A.5)$$

This result is called maximum principle.

$$\frac{\partial H}{\partial k} + \dot{\lambda} = 0 \Rightarrow \lambda(1-\tau)(1-\pi)\Psi\alpha k^{\alpha-1} f^{\beta} p^{\gamma} = -\dot{\lambda} \ldots\ldots (A.6)$$

The equation $(A.6)$ says that the partial derivative of the Hamiltonian with respect of state variable k equals the negative of the derivative of the multiplier. This result and the transition equation $(A.2)$ are often called the Euler equations.

Now by taking the log and time derivative of $(A.5)$, we obtain

$$-\sigma\frac{\dot{c}}{c}-\rho=\frac{\dot{\lambda}}{\lambda}\ldots\ldots\ldots(A.7)$$

Where $\dot{c}\equiv\frac{dc}{dt}$ and $\dot{\lambda}\equiv\frac{d\lambda}{dt}$. By solving equation $(A.6)$ for $\frac{\dot{\lambda}}{\lambda}$, we get following equation:

$$(1-\tau)(1-\pi)\Psi\alpha k^{\alpha-1}f^{\beta}p^{\gamma}=-\frac{\dot{\lambda}}{\lambda}\ldots\ldots..(A.8)$$

From these two first-order conditions and using both the initial and terminal conditions given in equation $(A.3)$ and equation $(A.4)$ to determinate the equation system, we find the growth rate of per capita consumption which is the same as the capital and the output growth rate. The growth rate of the economy can also be expressed as function of shares for federal and provincial governments of aggregated government spending.

$$\frac{\dot{y}}{y}=\frac{\dot{c}}{c}=\frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha k^{\alpha-1}f^{\beta}p^{\gamma}-\rho\right]\ldots\ldots..(A.9)$$

$$\frac{\dot{y}}{y}=\frac{dy/dt}{y}=\frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha k^{\alpha-1}f^{\beta}p^{\gamma}-\rho\right]\ldots\ldots..(A.10)$$

$$\frac{\dot{y}}{y}=\frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha\left(k^{\alpha(\alpha-1)}f^{\alpha\beta}p^{\alpha\gamma}\right)^{\frac{1}{\alpha}}-\rho\right]\ldots\ldots..(A.11)$$

$$\frac{\dot{y}}{y}=\frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha\left(k^{\alpha(\alpha-1)}f^{\alpha\beta-\beta+\beta}p^{\alpha\gamma-\gamma+\gamma}\right)^{\frac{1}{\alpha}}-\rho\right]\ldots\ldots..(A.12)$$

$$\frac{\dot{y}}{y}=\frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha\left(k^{\alpha(\alpha-1)}f^{\beta(\alpha-1)}p^{\gamma(\alpha-1)}f^{\beta}p^{\gamma}\right)^{\frac{1}{\alpha}}-\rho\right]\ldots\ldots..(A.13)$$

$$\frac{\dot{y}}{y}=\frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha\left(\left(\frac{(1-\pi)\Psi}{(1-\pi)\Psi}\right)^{\alpha-1}k^{\alpha(\alpha-1)}f^{\beta(\alpha-1)}p^{\gamma(\alpha-1)}f^{\beta}p^{\gamma}\right)^{\frac{1}{\alpha}}-\rho\right]\ldots..(A.13)$$

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\Bigg[(1-\tau)(1$$

$$-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}\left(\left((1-\pi)\Psi\right)^{\alpha-1}k^{\alpha(\alpha-1)}f^{\beta(\alpha-1)}p^{\gamma(\alpha-1)}f^{\beta}p^{\gamma}\right)^{\frac{1}{\alpha}}$$

$$-\rho\Bigg] \ldots . (A.14)$$

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\Bigg[(1-\tau)(1-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}\left(\left((1-\pi)\Psi k^{\alpha}f^{\beta}p^{\gamma}\right)^{\alpha-1}f^{\beta}p^{\gamma}\right)^{\frac{1}{\alpha}}$$

$$-\rho\Bigg] \ldots . (A.15)$$

Where $(1-\pi)\Psi k^{\alpha}f^{\beta}p^{\gamma} = y$ so we can write it as follow:

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}\left(y^{\alpha-1}f^{\beta}p^{\gamma}\right)^{\frac{1}{\alpha}}-\rho\right] \ldots . (A.16)$$

Consolidated government spending is defined as $g = \tau y$. It can also be written as $y = \frac{g}{\tau}$. By putting the value of y in equation $(A.16)$ we will get following equation:

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}\left(\left(\frac{g}{\tau}\right)^{\alpha-1}f^{\beta}p^{\gamma}\right)^{\frac{1}{\alpha}}-\rho\right] \ldots . (A.17)$$

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[(1-\tau)(1-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}\left(\left(\frac{\tau}{g}\right)^{1-\alpha}f^{\beta}p^{\gamma}\right)^{\frac{1}{\alpha}}-\rho\right] \ldots . (A.18)$$

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}(1-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}\left(\frac{1}{g^{1-\alpha}}f^{\beta}p^{\gamma}\right)^{\frac{1}{\alpha}}-\rho\right] \ldots . (A.19)$$

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}(1-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}\left(\left(\frac{f}{g}\right)^{\beta}\left(\frac{p}{g}\right)^{\gamma}\right)^{\frac{1}{\alpha}}-\rho\right] \ldots . (A.20)$$

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}(1-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}\left(\frac{f}{g}\right)^{\beta/\alpha}\left(\frac{f}{g}\right)^{\gamma/\alpha} - \rho\right] \ldots . (A.21)$$

Where $\frac{f}{g} = \theta_f$ and $\frac{p}{g} = \theta_p$, so equation $(A.21)$ can be written as follow:

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}(1-\pi)\Psi\alpha\left(\frac{1}{(1-\pi)\Psi}\right)^{\frac{\alpha-1}{\alpha}}(\theta_f)^{\beta/\alpha}(\theta_p)^{\gamma/\alpha} - \rho\right] \ldots . (A.22)$$

In more simplified form, it can be written as

$$\frac{\dot{y}}{y} = \frac{1}{\sigma}\left[\alpha(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}\left((1-\pi)\Psi\right)^{\frac{1}{\alpha}}(\theta_f)^{\beta/\alpha}(\theta_p)^{\gamma/\alpha} - \rho\right] \ldots . (A.23)$$

$$\frac{\dot{y}}{y} = \frac{\alpha(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}\left((1-\pi)\Psi\right)^{\frac{1}{\alpha}}}{\sigma}(\theta_f)^{\beta/\alpha}(\theta_p)^{\gamma/\alpha} - \frac{\rho}{\sigma} \ldots . (A.24)$$

With $\frac{\alpha(1-\tau)\tau^{\frac{1-\alpha}{\alpha}}\left((1-\pi)\Psi\right)^{\frac{1}{\alpha}}}{\sigma} = \Delta$, the growth rate of the economy can also be expressed as follow:

$$\frac{\dot{y}}{y} = \Delta(\theta_f)^{\beta/\alpha}(\theta_p)^{\gamma/\alpha} - \frac{\rho}{\sigma} \ldots . (A.25)$$

A.1.4: Growth Maximizing Shares

In order to find the growth maximizing shares, we need to optimize the growth rate equation with respect to federal and provincial shares of government spending under the constraint:

$$\theta_f + \theta_p = 1 \ldots . (A.26)$$

By using equation $(A.25)$ which represents the growth rate of the economy in decentralized structure and equation $(A.26)$ which represents the spending share of federal and provincial governments in total government spending, we define following Lagrangian function in order to find the growth maximizing shares both level of governments:

$$\mathrm{L}(\theta_f, \theta_p, \lambda) = \left[\Delta(\theta_f)^{\beta/\alpha}(\theta_p)^{\gamma/\alpha} - \frac{\rho}{\sigma}\right] - \lambda(\theta_f + \theta_p - 1) \ldots\ldots (A.27)$$

The first-order conditions with respect to θ_f, θ_p and λ is give as follows:

$$\frac{\partial \mathrm{L}}{\partial \theta_f} = 0 \Rightarrow \Delta\frac{\beta}{\alpha}(\theta_f)^{*\frac{\beta}{\alpha}-1}(\theta_p)^{*\frac{\gamma}{\alpha}} - \lambda \ldots\ldots (A.28)$$

$$\frac{\partial \mathrm{L}}{\partial \theta_p} = 0 \Rightarrow \Delta\frac{\gamma}{\alpha}(\theta_f)^{*\frac{\beta}{\alpha}}(\theta_p)^{*\frac{\gamma}{\alpha}-1} - \lambda \ldots\ldots (A.29)$$

$$\frac{\partial \mathrm{L}}{\partial \lambda\lambda} = 0 \Rightarrow {\theta_f}^* + {\theta_p}^* - 1 \ldots\ldots (A.30)$$

From equation $(A.28)$ and equation $(A.29)$, we have

$$\Delta\frac{\beta}{\alpha}(\theta_f)^{*\frac{\beta}{\alpha}-1}(\theta_p)^{*\frac{\gamma}{\alpha}} = \Delta\frac{\gamma}{\alpha}(\theta_f)^{*\frac{\beta}{\alpha}}(\theta_p)^{*\frac{\gamma}{\alpha}-1} \ldots\ldots\ldots (A.31)$$

$$\frac{\beta}{(\theta_f)^*} = \frac{\gamma}{(\theta_p)^*} \ldots\ldots\ldots (A.32)$$

From $(A.32)$, we find the growth maximizing shares of spending by the federal and provincial governments.

Growth maximizing share of federal government can be written as follow:

$$(\theta_f)^* = \frac{\beta}{\beta + \gamma} \ldots\ldots\ldots (A.33)$$

Growth maximizing share of provincial government can be written as follow:

$$(\theta_p)^* = \frac{\gamma}{\beta + \gamma} \ldots\ldots\ldots (A.34)$$

APPENDIX B: MACROECONOMIC INSTABILITY INDEX DATA

	Weighted Index			
Year	Inflation	Budget Deficit	Exchange Rate Variability	MII
1972	0.025	0.089	0.022	0.136
1973	0.101	0.164	0.289	0.554
1974	0.413	0.131	0.168	0.713
1975	0.362	0.298	0.022	0.683
1976	0.132	0.274	0.022	0.428
1977	0.134	0.236	0.022	0.392
1978	0.066	0.210	0.022	0.298
1979	0.061	0.248	0.022	0.331
1980	0.117	0.149	0.001	0.267
1981	0.143	0.111	0.022	0.276
1982	0.123	0.113	0.044	0.279
1983	0.025	0.178	0.152	0.355
1984	0.064	0.139	0.050	0.253
1985	0.040	0.206	0.079	0.325
1986	0.020	0.218	0.052	0.290
1987	0.008	0.220	0.052	0.280
1988	0.049	0.234	0.033	0.316
1989	0.112	0.191	0.064	0.368
1990	0.045	0.160	0.075	0.280
1991	0.147	0.242	0.043	0.433
1992	0.115	0.193	0.072	0.380
1993	0.103	0.215	0.043	0.360
1994	0.126	0.134	0.097	0.356
1995	0.152	0.126	0.032	0.310
1996	0.118	0.158	0.063	0.339
1997	0.134	0.156	0.096	0.386
1998	0.072	0.201	0.072	0.345
1999	0.040	0.143	0.060	0.243
2000	0.008	0.116	0.071	0.195
2001	0.020	0.074	0.081	0.175
2002	0.006	0.074	0.046	0.126
2003	0.000	0.053	0.000	0.053
2004	0.023	0.000	0.015	0.038
2005	0.095	0.039	0.036	0.170
2006	0.074	0.075	0.026	0.175
2007	0.072	0.077	0.028	0.177
2008	0.137	0.198	0.036	0.371
2009	0.271	0.109	0.140	0.520
2010	0.132	0.150	0.053	0.336

APPENDIX C: DATA ON FSICAL DECENTRALIZATION MEASURES

	Decentralization		
Year	Expenditure	Revenue	Composite
1972	0.686	0.155	0.494
1973	0.551	0.169	0.377
1974	0.472	0.181	0.343
1975	0.471	0.193	0.366
1976	0.503	0.188	0.379
1977	0.527	0.180	0.381
1978	0.497	0.187	0.372
1979	0.391	0.187	0.306
1980	0.410	0.155	0.264
1981	0.389	0.141	0.230
1982	0.498	0.126	0.252
1983	0.492	0.126	0.248
1984	0.462	0.131	0.244
1985	0.454	0.158	0.289
1986	0.470	0.194	0.366
1987	0.433	0.221	0.390
1988	0.405	0.184	0.309
1989	0.379	0.128	0.207
1990	0.465	0.098	0.184
1991	0.458	0.120	0.221
1992	0.506	0.093	0.188
1993	0.489	0.071	0.140
1994	0.535	0.091	0.197
1995	0.504	0.080	0.162
1996	0.519	0.075	0.156
1997	0.545	0.084	0.186
1998	0.545	0.095	0.209
1999	0.503	0.095	0.191
2000	0.515	0.112	0.230
2001	0.469	0.107	0.202
2002	0.440	0.092	0.164
2003	0.421	0.110	0.189
2004	0.430	0.109	0.191
2005	0.428	0.114	0.200
2006	0.383	0.116	0.189
2007	0.422	0.111	0.192
2008	0.336	0.104	0.156
2009	0.383	0.080	0.129
2010	0.353	0.089	0.137

Appendix D: Unit Root Tests (DFGLS and PP)

Table D1: Unit Root Test (DFGLS Test)

Variables	Level			First Difference		
	No Trend	With Trend	Result	No Trend	With Trend	Result
Revenue Decentralization (RD)	-1.268	-2.241	NS	-4.082	-4.365	S
Expenditure Decentralization (ED)	-0.601	-1.899	NS	-3.630	-5.517	S
Composite Decentralization (CD)	-0.910	-2.676	NS	-3.029	-4.251	S
Macroeconomic Instability Index (MII)	2.371	2.875	NS	2.399	3.733	S
Inflation (INF)	-3.060	-3.248	S			
Budget Deficit (BD)	-2.570	-3.196	S			
GDP per Capita Growth Rate	3.704	4.837	S			
Human Capital (HC)	1.124	-1.617	NS	5.252	5.383	S
Capital Stock Per Worker (CS/W)	-0.238	-2.152	NS			
Openness (OPN)	-2.311	-2.738	S			
Tax to GDP Ratio (T/GDP)	-1.271	-1.679	NS	-7.044	-7.323	S
M2 to GDP Ratio (M2/GDP)	-2.894	-4.002	S			
MC/GDP	-2.962	-3.344	S			
Democratic Institution (INS)	-1.751	-1.852	NS	-5.789	-5.905	S

Note: 5% critical value is -1.94 for the case of no-trend, and -3.19 when a trend is included. AIC is used for lag selection. S stand for stationary series and NS stand for non-stationary series

Table D2: Unit Root Test (PP Test)

Variables	Level			First Difference		
	No Trend	With Trend	Result	No Trend	With Trend	Result
Revenue Decentralization (RD)	-1.57	-2.28	NS	-4.19	-4.07	S
Expenditure Decentralization (ED)	-1.76	-3.73	NS	-9.93	-9.60	S
Composite Decentralization (CD)	-2.77	-3.38	NS	-6.94	-6.67	S
Macroeconomic Instability Index (MII)	3.00	3.87	S			
Inflation (INF)	-3.25	-3.39	S			
Budget Deficit (BD)	-2.92	-3.80	S			
GDP per Capita Growth Rate	5.73	5.65	S			
Human Capital (HC)	0.27	-1.94	NS	-5.23	-5.29	S
Capital Stock Per Worker (CS/W)	-4.61	-1.26	NS	-4.78	-4.39	S
Openness (OPN)	-4.54	-4.79	S			
Tax to GDP Ratio (T/GDP)	-1.26	-1.93	NS	-7.00	-7.70	S
M2 to GDP Ratio (M2/GDP)	-2.34	-3.03	S			
MC/GDP	-2.83	-2.99	S			
Democratic Institution (INS)	-2.11	-2.03	NS	-5.71	-5.76	S

Note: 5% critical value is -2.87 for the case of no-trend, and -3.42 when a trend is included. AIC is used for lag selection. S stand for stationary series and NS stand for non-stationary series