

**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**THE IMPACT OF FISCAL DECENTRALIZATION ON EDUCATION AND
HEALTH OUTCOMES IN ETHIOPIA: A REGIONAL PANEL DATA ANALYSIS**

By

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List of Acronyms

DLD.....	District-Level-Decentralization
ESDP.....	Education Sector Development program
FD.....	Fiscal Decentralization
FDRE.....	Federal Democratic Republic of Ethiopia
FE.....	Fixed Effects model
GER.....	Gross Enrollment Rate
HSDP.....	Health Sector Development Program
IMR.....	Infant Mortality Rate
MDGS.....	Millennium Development Goals
MoE.....	Ministry of Education
MoFED.....	Ministry of Finance and Economic development
MoH.....	Ministry of Health
NGOs.....	Nongovernmental Organizations
PASDEP.....	Plan for Accelerated and Sustained Development to End Poverty
RE.....	Random Effects Model
SPDRP.....	Sustainable Development and Poverty Reduction Program
UNICEF.....	United Nations Children’s Funds

Abstract

Fiscal decentralization has formed an important component of recent institutional innovation, being widely adopted in both developing and developed countries. It has become a major policy initiative to achieve equity, efficiency, and accountability in the development efforts of many countries. But surprisingly, there is little agreement in the empirical literature in its effects on a number of outcomes. Accordingly, this paper aims to evaluate the effects of such kind of decentralization on basic education and health outcomes in Ethiopia, which undertook a massive decentralization of fiscal resources to regions in 1994/95 and to districts in 2002/03. We estimate the impact of this policy by employing a regional panel data set collected from nine regions and two administrative cities.

The results suggest that although the decentralization has been characterized by some kind of vertical and horizontal fiscal imbalances, it has had a significant effect on increasing public primary gross enrollment and completion rates; and on the selected health outcomes too. The results are also robust to the way fiscal decentralization is measured. Moreover, fiscal decentralization has achieved a satisfactory equity in terms of both equality of opportunity and inter-regional equity by reducing disparity in access to basic social services between previously underserved and better-off regions, suggesting that fiscal decentralization has been a pro-poor policy. Thus, the study urges policy makers and development agencies to close the existing fiscal gaps, possibly via fiscal equalization approach and/or relaxing some taxes to lower tiers of government, for better development outcomes at the grassroots level.

Chapter I

Introduction

1.1 Background of the Study

One role of the public sector is to create a public organization that helps to improve public service delivery and then uphold poverty reduction outcomes. For this reason, in recent years, there have been widespread attempts both to redefine the role of the public sector and to improve its performance in both developed and developing countries. An increasingly important component of these reforms, in the public sector, is the introduction of policies to decentralize the functions of government (Paul Smoke, 2001).

As a result of this, among the various decentralization reforms, the issue of fiscal decentralization has received enthusiastic attention from academic analysts and policy makers alike. It is increasingly seen as a powerful tool to improve sector governance and to reduce poverty. Oates (1993) stated that the basic economic rationale for fiscal decentralization is the enhancement of economic efficiency and equity: the provision of local outputs that are differentiated according to local tastes and circumstances, results in higher levels of social welfare than centrally determined and more uniform levels of outputs across all jurisdictions. Put it simply, in a fiscally decentralized economy, it is expected to achieve many things such as enable efficient allocation of resources, improve governance, accelerate economic growth, reduce poverty, achieve a gender balance and empower weaker sections of society (Rao, 2000).

In view of that, soon after the Transitional Government of Ethiopia (TGE) assumed power in 1991, it set out the institutional framework and basic principles of fiscal decentralization; and more formally, the 1994's Constitution mandated a federal structure with considerable autonomy devolved to the regions in both administrative and fiscal matters.

In enlightening the significance of this new structural arrangement, Berhanu Legese (2009) states that (fiscal) decentralization is the basic platform and instrument for addressing the development, democratic and governance needs of the country. Building on these lessons and realizing the importance of the first phase of decentralization, the Ethiopian government once again introduced the second wave of decentralization in 2002/03, for deepening power to lower tiers of government to districts and urban administrations by rationalizing the powers earlier vested to Regional States. In the two phases of decentralization, enhancing of efficient and equitable service delivery for better development outcomes has been a prime concern.

For instance, since 2002 between 40 and 60% of all government revenues have been transferred to the local level, together with full responsibility for managing social services and increasing shares of capital investment. Accordingly, (MoFED, 2005) states that since fiscal decentralization efforts began, significant improvements have been registered in all sectors of economic activities across all the Regional States in the country.

Overall, fiscal decentralization process, which has been exercised in the country for nearly the last two decades, is presumed to be a response to the country's diversities so as to secure the social welfare (efficiency and equitability) of the regions; and making the public sector work satisfactory by bringing government closer to the local people.

As regard to the specific-sectors, basic public service delivery such as health and education sectors are some of the most decentralized areas in the country. The rationale is that education and health are the basic requirement to sustain and accelerate over all development of the country. It is a widely recognized fact that the challenges of development are the challenges of

education and health. Hence, if real development is pursued, improving the capabilities and health status of citizens should be in the forefront of any policy agenda. Primary education and basic health care are mainly believed to be crucial areas for sustainable progress in any development efforts. The fact is that, say for example, as the inputs of the Higher Education System are nothing but the outputs of the Elementary Education System, the later serves as the base over which the super-structure of the whole education system is built up.

Moreover, World Bank (2005) studies indicate that the *social return* to investment in education is higher for primary education, followed by secondary and higher education. In particular, for Sub-Saharan African countries, the Bank indicates that, the social return on investment in *primary, secondary and higher* education has been estimated at 24, 18 and 11 percent respectively. Furthermore, the distributional benefits from primary education seem to be more pro-poor than to that of higher levels of education (Rao, 2000).

It is for this reason that the Ethiopian government has allocated a significant amount of pro-poor budget to uplift the human capital in the country in a *decentralizing approach* to the regional states and district levels, by vesting full responsibility of decision-making in basic education and health services under the broad fiscal federalism course of action. Therefore, in this study, we are going to evaluate the effect of fiscal decentralization on basic education and health outcomes using regional panel data analysis in the country.

1.2. Statement of the Problem

Fiscal decentralization has formed an important component of recent institutional innovation, being widely adopted in both developing and developed countries. It is seen as central tool to the development efforts of many countries. But surprisingly, there is little agreement in the empirical literature on the effects of fiscal decentralization on a number of important policy goals. In other words, the effects of fiscal decentralization on poverty reduction outcomes is much debated but little agreed upon (Faguet, 2004).

As a result of this little agreement, a large body of scholarly literature has emerged to analyze different aspects of decentralization. Advocates argue that fiscal decentralization can make government more responsive to the communities' demand by tailoring levels of consumption to local preferences with an equitable distribution of resources; and serves as a market preserving device that help to enhance and implement pro-poor policies in far reaching environment, via local empowerment. But opponents dispute this, arguing that local governments are too vulnerable to elite capture, too lacking in technical, human and financial resources, and too corrupt to produce a heterogeneous range of social services that respond inefficiently to local demand; and their wastefulness is likely to endanger macroeconomic stability and deter social welfare outcomes (Fled, 2004).

Nevertheless, neither side is able to validate its arguments convincingly with empirical evidence. For this reason, the relationship between fiscal decentralization and social welfare outcomes has presented much deep intellectual challenges as well as opportunities for useful policy applications that characterize the field of fiscal federalism today (P.Smoke, 2001).

In assessing the actual performance of the Ethiopian basic education and health sectors, many documents [such as World Bank reports (2008), UNICEF's (2008)] indicate that basic education and health outcomes have improved since fiscal decentralization process began. Nowadays, on a relatively basis, the actual basic education and health performances are far better than 20 years ago. Especially, there is a breakthrough or radical improvement in basic education in the country. In its 2006 annual report, World Bank states that, for the last 15 years, school enrollment rates at all levels have risen substantially, albeit from a low base. For instance, primary gross enrollment varies from around 19 percent in 1992/93 to 95.6 percent in 2007/08, which is hopefully expected to meet the target of MDGs by 2015 (World Bank, 2008). Coverage in health care services also increased, although to a smaller extent than in education. For most Ethiopians, health facilities are closer than they were 10 years ago and progress was also made in child health outcomes (MoFED, 2009).

In general, despite the fact that the general basic education and health outcome in Ethiopia are still lower comparing to other developing countries, that is, at least 2 million children still remain out of school and many are in poor health, and die from easily preventable diseases each year, *there is a momentum to enrollment growth and health outcomes that cannot be explained by the linear increase in public spending alone in the country* (World Bank, 2008).

Thus, the question of whether the devised fiscal decentralization policy has been responsible, at least in part, to those human development outcomes (basic education and health outcome improvement, in this case) is open to debate!

Regarding previous empirical studies on how fiscal decentralization may affect basic health and education, results are somehow ambiguous. Notably, while works by Jimenez and Sawada

(1998), Jimenez and Paqueo (1996), and Winkler and Rounds (1996) have all reported positive impacts of fiscal decentralization on education and health outcomes in their respective case studies, studies by Winkler and Gershberg (2000), Paqueo (2000) and Hanushek (2003) have come up with ambiguous results in their case studies.

Empirical studies in Ethiopia are very limited. Wamai (2006) proposes that decentralization creates a conducive public sector in which NGOs can freely participate in the health sector. Additionally, V.Naald (2003) estimates the effects of fiscal decentralization on spending behavior and local health and education outcomes at district level in Amhara region. While results indicate that some district' conditions have an effect on potential local spending behavior, the effect of local spending on the considered outcomes is imprecise.

All in all, even though the superiority of a decentralized system to a centralized organization is recognized in many areas of economic theory, the application of these theories to explain the rationale of decentralization process, as far as my knowledge, has not yet been examined in empirically in a comprehensive way that embrace all the regions in Ethiopia.

In light of these facts, in this study, after fully assessing the trend and structure of the fiscal decentralization, we are to conduct an empirical analysis to examine its effects on basic education and health outcomes across the regions in the country.

1.3. Objective of the Study

For nearly the last two decades, through massive decentralization of fiscal resources to lower tiers of governments, Ethiopia has made significant advances in making basic education and health services more accessible to far reaching environment. Thus, the objective of the study is to

examine the effects of such decentralization on basic education and health outcomes in the country.

In short, we have specifically designed the objective of this study as

- i. To assess the main trends and features of the fiscal decentralization in the country
- ii. To analyze the effect of the fiscal decentralization on basic education and health outcomes (e.g., Primary Gross Enrollment Rate and Infant Mortality Rate) across the regions
- iii. To identify the major challenges encountered in practicing of the fiscal decentralization process, with particular reference to the social development sector.
- iv. To infer some possible remedies to the identified challenges

1.4. Hypothesis of the Study

Given that fiscal decentralization remains at the forefront of the then government's policy agenda, a comprehensive investigation of the inter-relationships between fiscal decentralization and priority social development sectors' outcomes are timely and critical inquiry in the country. More specifically, we are interested primarily in the consequences of the fiscal decentralization on basic education and health outcomes.

- In light of this fact, we seek to test empirically the governing hypothesis that fiscal decentralization affects basic education and health outcomes significantly.

1.5. Significance of the Study

The relevance of this study emanates from lack of concrete information on the extent to which the devised fiscal decentralization has been contributing to the country's poverty reduction outcomes since its setting up in 1991. As it is already mentioned, nowadays, in Ethiopia, the basic structure of governance is being transformed as authority and fiscal resources migrate from

the federal to the regional governments, and further to districts. Nevertheless, though anecdotal evidence and some case studies provide some insights on the massive decentralization process to explain the causes and consequences of these fiscal shifts, systematic empirical testing on poverty reduction outcomes has lagged much behind, in a panel context across all the regions.

Based on this fact, today, we feel that a comprehensive and systematic research is needed to understand more broadly the realities and prospects of the Ethiopian fiscal decentralization on basic human development outcomes. The reason behind is because we believe that such information would lead to a better conceptual development efforts; and to more effective public policy reforms and implementation so that better social welfare outcomes can be achieved at the grassroots level.

In fact, the study will again provide opportunities for further in-depth study on the subject matter of the Ethiopian fiscal decentralization within the structure of the existing federalism system.

1.6. Scope and Limitations of the Study

The scope of this study basically covers the post 1995/96 to present. That is, since the Constitution of the Federal Democratic Republic of Ethiopia has come in to full force and effect in 1995. In this study, we adopt the regional perspective intentionally because we need the study to be manageable in substantiating empirically the effects of fiscal decentralization on important policy goals in the country

I felt that developing of the expected comprehensive paper, *on the regional perspective*; was not being such an easy task. There were a lot of constraints. Some of those constraints were limitation of time, finance, and reliable cross-regional data on decentralization. Above all, there

was a difficulty to access recent and relevant books as well as other published materials on the subject matter of the Ethiopian decentralization policies. Nevertheless, all the institutions such as the Ministry of Education, Ministry of Health and Ministry of Finance and Economic Development were very helpful in solving the mentioned limitations.

1.7. Organization of the Study

The study is going to be organized as follows: the first chapter deals with the introduction part of the dissertation. Chapter 2 reviews the literature related to the effects of fiscal decentralization on basic social welfare outcomes. Here, fiscal federalism theory has advanced a number of arguments in favor and against fiscal decentralization. These arguments will, thus, serve us as theoretical framework for the empirical studies. Chapter 3 assesses the main features of the Ethiopian fiscal decentralization, with particular reference to the education and health sectors. Chapter 4 describes the methodology and data sources used in the empirical analysis. Chapter 5 discusses the results obtained from the descriptive and panel regression analysis. Finally, the sixth chapter provides some concluding remarks and policy implications in line with the findings.

Chapter II

2. Review of Related Literature

2.1. Concepts of Fiscal Decentralization

Fiscal decentralization is one of the dimensions of decentralization policy (administrative and political decentralization). The principal issue in fiscal decentralization is the allocation of expenditure and tax functions to various levels of governments, and the design of a satisfactory system of intergovernmental transfer methods for effective public goods provisions at the grass roots level. For instance, a central government decides the amount of expenditure on education countrywide in a centralized regime, whereas in a decentralized system local governments (e.g. regional or district government) decide the amount of expenditure on education for its own community. Likewise, in a central regime, national government decides tax rates and bases; in contrast, a decentralized regime gives this power to localities (Rondinelli, 1983).

More specifically, fiscal decentralization is defined today as the transfer of expenditure responsibilities and revenue assignments to lower tiers of government with appropriate intergovernmental transfer methods (Bird and Smart, 2001). In fact, fiscal decentralization is concerned with more than the fiscal allocation of public resources. It generally implies a rearrangement of the institutional configuration of a government, the relationships and responsibility between and of different levels of government, as well as the reallocation of resources. Fiscal decentralization is, therefore, about empowerment over the management of public resources in a decentralized setting to support poverty reduction and over all development efforts (Rao, 2000).

2.2. Theoretical Framework of Fiscal Decentralization

Theory regarding fiscal decentralization has been developing for many years; but the foundation for most of the conventional literature is the study of welfare economics by Richard Musgrave (1959). According to Musgrave's analysis, the public sector should intervene in the economy to address the market inability to:

- (i) attain the most equitable distribution of income (*distribution function*);
- (ii) maintain a high level of employment and stable prices (*stabilization function*); and
- (iii) establish an efficient pattern of resource use (*allocation function*).

Musgrave (1959) concludes that an economic rationale for a fiscal decentralization is to improve the performance of the public sector in resource mobilization, efficient resource allocation and in the process enabling the economy achieve fast, shared and sustainable economic development. To materialize the above objectives, the stabilization and redistribution functions are traditionally assumed to be best placed at the central government level. The justification is that with respect to the stabilization function, local governments are believed to have limited means to impose a macroeconomic control of their economies (due to their limited knowledge of the relevant economic variables, their lower capacity to use automatic stabilization instruments, such as progressive income taxes, etc). Besides, decentralized programs to redistribute income may result in sub-optimal levels of support for the low-income individuals in the presence of mobility of economic units (Dolores Jimenez, 2005).

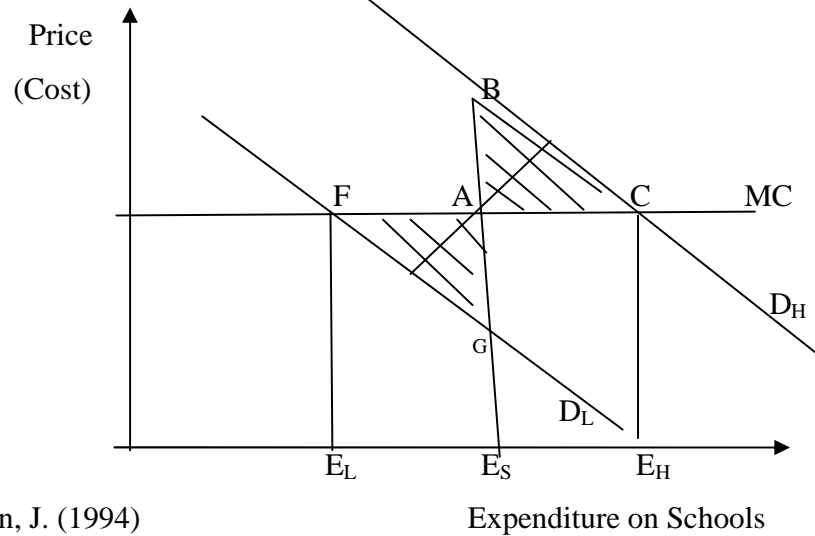
As the result of these justifications, decentralized tiers of government are left with the primary responsibility of providing local public goods and services. That is, the allocation function is the workload left to local authorities. This proposition was later formulated by Oates (1972) into a *decentralization theorem*.

2.2.1. The Neoclassical Theories

Given that local preferences and costs of a local public good or service delivery are likely to vary across jurisdictions or regions, fiscal decentralization could increase economic welfare in a society as a whole (Jimenez, 2003). The major assumption underlying this theory is that a central government, due to imperfect information, will produce a uniform level of public goods across regions or districts. While uniform provision is appropriate for goods with national benefits, such as national defense, it may be inappropriate for goods that are local in scope, such as school funding and health clinic construction. Uniform funding for health clinic construction, for example, may be inefficient because it ignores heterogeneous tastes and preferences across regions or districts. Perhaps one community wants more funding for health related activities, while another prefers the money spent on local schools. Thus, local governments can obtain better information about preferences, costs, and other idiosyncrasies unique to their constituency at a lower cost (Oates, 1972).

The key point is that sub national governments have access to better information about local circumstances than central authorities, and therefore can use this information to shape services and spending patterns to citizens' needs. In contrast, centralized government structures face significant informational and administrative constraints that are likely to prevent them from providing an efficient level of a local public good or service. A centralized government may result in welfare loss when public good provisions are delivered centrally for heterogeneous preference. Based on the neoclassical framework, the concept of welfare loss from a hypothetical public good provision (expenditure on schools, for example), in a centralized government, can be illustrated in the following figure.

Fig.2.1: The Welfare Losses from Central standard in neoclassical framework



Source: Klugman, J. (1994)

Figure 2.1, drawn from Klugman, J. (1994), depicts two districts (Woredas); one exhibits a higher demand for education expenditure than the centrally mandated level, while the other district having lower demand. Both are assumed to face the same constant cost of production of education. The centrally-mandated level of school expenditure is given by E_S ; the high-and low-demand districts' compensated demand curves are D_H and D_L , while the levels of preferred by the districts, given their respective income, prices and preferences are E_H and E_L . For both districts, there is a welfare loss associated with imposition of a centrally determined educational expenditure. For the high-demand district, it is represented by the area of ABC , the excess of the value to fit of $E_S E_H$ units of education over their cost - $ACE_H E_S$, and for the low-demand district, by the area AFG and the excess of the cost of $E_L E_S$ expenditure over its value to the district, $FGE_S E_L$. The total welfare loss to society from the centralized decision is given by the sum of the two triangles ($AFG + ABC$).

Thus, from the above simple graphical illustration, we can conclude that welfare deadweight losses from centralization are greater, the greater the heterogeneity and the more inelastic the

demand curves are prevailing in the provision of public goods across districts or regions. It follows that allocative efficiency is attained by providing the mix of output that best reflects the preferences of local authorities (Oates, 1972).

Furthermore, the neoclassical framework of decentralization states that the gains in allocative efficiency are further enhanced by the increase in competition among local governments that decentralization might bring about (Tiebout, 1956). And through voting *with their feet*, constituents encourage greater efficiency from local governments (ibid). Oates (1999) further states that competition is expected to increase productive efficiency as a result of the greater experimentation and innovation in the production of public goods and services than if those goods or services were provided by the central government. One of the reasons for this is that decentralized governments have more freedom in implementing new production methods, whereas the central government would not embark in a new production technique unless it has gained acceptance in all the local areas. Thus, the increased competitiveness among local governments when one of them implements a new production method that turns out to be superior might also serve as a stimulus to innovation for the other local authority (P. Smoke, 2001). As a consequence, production costs of public goods or service could be lowered while the quality service delivery increases across all jurisdictions (Tiebout, 1956). In general, in explaining the benefits of fiscal decentralization, De Mello (2000) has a nice general statement in the context of neoclassical public sector economics:

“The performance of the public sector can be enhanced by taking account of local differences in culture, environment, preferences and needs, endowment of natural resources; and economic and social institutions. A better match between the supply of public goods and local demands requires information on local preferences and needs; this information can be extracted more cheaply and accurately by local rather

than by central governments. This is because local governments are closer to the people and hence more identified with local causes, more sensitive to local problems and more responsive to local demands. Fiscal decentralization consists in this respect, of shortening the informational difference between the providers and recipients of public goods and services so as to reduce information costs and boost public sector efficiency in service delivery to generate social welfare outcomes.”

Although most of the neoclassical school of thought on fiscal decentralization relies upon the concept of economic efficiency, there is a more recent school of thought that examines fiscal decentralization with a strong emphasis on government behaviors and *intuitional economics*. Those new school of thought, unlike the neoclassical school of thought, assumes that governments are not necessarily interested in maximizing social welfare (Jimenez, 2003). However, as Oates (2005) points out, these new theories do not contradict the old ones, but provide new perspectives on how to think about the centralization versus decentralization issue in the public sector. Thus, it is worth assessing the arguments of second theory of fiscal decentralization as follows:

2.2.2. The New Institutional Economics

More recently, the political economy literature has relaxed the neoclassical theory of decentralization by the modeling of legislative behavior in central government (Besley and Coate, 2003). These studies seem to confirm, however, Oates’ conclusion that decentralization is preferable when externalities are small and/or when there exists a high degree of heterogeneity between regions.

Yet, differences can be identified between the two approaches. Firstly, in the new institutional approach, the costs of centralization are not derived from a *uniform level of provision of public goods*, but rather from the *inefficient spending* decisions made by the central legislative body.

Secondly, the arguments forwarded in support of the belief that centralization improves efficiency in the presence of *externalities* also differ greatly. In Oates' approach, centralization is preferable under these circumstances as the process allows spillover effects to be *internalized*. However, in the intuitional economic literature, externalities influence central government incentives to allocate funds efficiently (Jimenez, 2003). Thus, the general conclusion to be drawn from these theoretical studies is that, if externalities are low and regions are heterogeneous, decentralization will improve allocative efficiency. However, there is an implicit assumption to this proposition that should not be overlooked (Yilma, 2002). To understand the view of institutional economics thoroughly, let us review the following arguments.

2.2.2.1. Political Accountability Argument

In the above discussion we have conclude that the neoclassical studies assume that governments are benevolent, in the sense that they always act in the best interests of their citizens (Smoke, 2001). This hypothesis, however, has been called into question by more than one author in recent years, as governments might very well prioritize their own interests or be under the sway of lobbies and rent-seeking groups, resulting in reduced productive efficiency (Jimenez, 2003). Seabright (1996), for example, has modeled the way in which decentralization can affect a government's incentive to act in the best interests of its citizens. This author argues that government incentives depend on the degree of *political accountability*, defined as the probability that the welfare of a given region might determine the *re-election of the government*. Since *political accountability* or the electoral control over incumbents is greater at the local level, decentralized governments will have more incentives than centralized authorities to act in accordance with the preferences of the population and, therefore, be less corrupt (*accountability*

argument). Hindriks (2000) and Lockwood (2005) reach similar conclusions about the relationship between fiscal decentralization, political accountability and government behavior.

A greater focus on accountability can be presented from the recent literature on fiscal decentralization (Bardhan and Mookherjee 2006,). In principle, decentralization could improve accountability since

“At the local level, citizens can more easily learn of the activities and programs that their local leaders have promoted and supported, discern how much effort they have devoted to improving public services, and confirm whether they have delivered on campaign promises. In other words, the information that citizens need to make judgments about their leaders’ accountability is more readily accessible under decentralization.”

Thus, the main conclusion from this argument is that fiscal decentralization creates a favorable institution of public sector that allows the governments to divert rents and lobbying activity as government’s actions are more easily monitored by the local community; and this should then help to foster *transparency and accountability* in public sector actions to materialize the desired outcomes (Torberg Falch, 2008).

2.2.2.2. Social Capital Argument

Recently a number of researchers have argued that decentralization of fiscal policy, by bringing government closer to the people, may strengthen social capital. To better understand for what social capital is, it is worth briefly defining it from De Mello (2000).

To from quote De Mello (2000):

‘...social capital is a multidimensional concept, broadly defined as trust, norms, and networks that foster mutually beneficial cooperation in society. It involves civic virtue, interpersonal trust, social cooperation and cohesiveness, and associational engagements among social groups’.

Therefore, although there are a variety of determinants of social capital, from religion, education and ethnic polarization, a number of researchers have argued that the vertical structure of government is an important determinant of social capital. There are a number of reasons why the decentralization of fiscal policy may improve social capital (Smoke, 2001). Two of the most important reasons are explained as

First, the decentralization of fiscal policy can lead to stronger links between community groups; and between government and the community in general. With devolved policy making, discussions between the government and local communities tend to be greater at the grassroots level (De Mello, 2000). Second, closer government encourages community-wide participatory initiatives, such as the formation of groups, associations, and social/cultural activities among community members. Such civic cooperation can improve allocative efficiency if the total benefit to society of acting in a cooperative fashion outweighs the total cost of non-cooperative actions. Fostering this civic level organization, it helps citizens not to engage *in free-riding behavior and illegal or illegitimate activities, such as tax evasion, dishonesty and corruption* (De Mello, 2000)

2.2.2.3. Poverty Reduction Argument

As mentioned earlier, it is generally assumed that by bringing decision-making about the provision of public goods and services closer to citizens, decentralization allows poor people to voice themselves more clearly, facilitates communication and information flows between local policy-makers and their constituents, and fosters improved accountability. Fiscal decentralization is, thus, an important cross-cutting thematic area with major implications for poverty reduction in general; and the achievement of the MDGs in particular. On the basis of the “subsidiarity”

principle, sub-national governments are often given the responsibility for managing many “pro-poor” priority sectors, including primary and secondary education, primary health care, agricultural extension, water and sanitation services, and local roads and public infrastructure. In many countries, responsibilities for reducing income poverty and improving food security are also assigned to local government level, since it is assumed that the proximity of local government officials to the target groups reduces the information and transaction costs associated with identifying the poor and thus puts them in a better position to deliver pro-poor services (Rao, 2000). Local governments, then, are generally in a good position to provide many of the key pro-poor public services that can contribute directly to attaining Millennium Development Goals (1-7). The first seven MDGs are stated as:

1. *Eradicate extreme poverty and hunger;*
2. *Achieve universal primary education;*
3. *Promote gender equality and empower women;*
4. *Reduce child mortality;*
5. *Improve maternal health;*
6. *combat HIV/AIDS, malaria and other diseases;*
7. *Ensure environmental sustainability*

As we can see from the above stated MDGs goals, to address them simultaneously, no better policy is there other than decentralization. Accordingly, advocates recommend that to meet the (MDGs), a decentralized system that possesses a well-established institutional framework is a central one (World Bank, 2005).

However, opponents of decentralization argue that potential gains to be realized from fiscal decentralization are conditional on the existence of devolution of political decision-making authority. In particular, effective channels for the individuals to express their preferences,

incentives for the policymakers to respond to those preferences are implicit assumptions in most of the proposed benefits of fiscal decentralization. For this reason, many authors are skeptical about the successful implementation of fiscal decentralization in developing countries, given their weaker institutional capacity and their lower initial levels of democracy as compared to developed countries (Khaleghian, 2003).

Based on these facts, unlike the efficiency and institutional arguments stated by many economists, the literature has identified several arguments (cases) in favor of centralization of the provision of local public goods and services. Some of these arguments contradict the above benefits of fiscal decentralization. For instance, it has been argued that in decentralized settings information can be distorted and misleading. Heavy dependence on transfers may discourage fiscal discipline at lower levels of government, as central governments are more likely to be held responsible for any services' failures (Prud'homme, 1995). Moreover, local governments may claim high spending needs in order to secure a higher share of central funding. On the other hand, too much financial autonomy given to local authorities may result in inefficient levels of provision under decentralization if competition is exercised on tax rates rather than on services (Oates, 1999). The existence of economies of scale and/or externalities in the provision of a public good has also been often put forward as an economic argument for a certain central control. On the equity side, it has often been claimed that likely differences in tax bases among regions would inevitably result in inequalities across them unless the central government carries out a strong redistribution of resources from richer to poorer areas (De Mello, 2000).

2.3. Empirical Literature

In the empirical literature of decentralization, while there is ample analysis regarding the effect of fiscal decentralization on health outcomes, empirical work regarding its effects on education outcome is highly limited.

To begin our empirical review from the health sector side, using a panel data of 29 Chinese provinces for the period 1980-1993, Yee (2001) examines the relationship between several indicators of health care performance -the number of doctors per 10.000 people, mortality rates, hospital beds per 10.000 people, and local health care expenditures-, and various measures of decentralization. These include two indicators of fiscal decentralization—the ratio of local government expenditure to central government expenditure, and the ratio of local government expenditure to total government expenditure, and two other indicators of political decentralization. The results of the regressions, based on either fixed effects or random effects estimations, show that fiscal decentralization has been beneficial to the health sector in terms of reducing mortality rates and increasing local expenditure on health care. Yilmaz et al (2001) also employ an intervention analysis to evaluate the outcomes of decentralization in terms of immunization rates for DPT and measles of children less than 12 months in six developing countries (Argentina, Brazil, Colombia, Philippines, South Africa and Venezuela) during the period 1970-1999. The results of the estimated fixed effects model suggest that intervention by sub national governments has been associated with an increase in the coverage of children immunized for measles.

Similarly, Mahal et al. (2000) use data from rural villages in India for 1994 to test the hypothesis that decentralization is positively associated with child mortality once the effect of socio

economic factors, civil society organizations, and so on, are controlled for. They have used dummy variables for states that have significantly moved towards decentralization during the period 1970-94, and the frequency of local body elections during the same period as proxies for decentralization. While the estimated coefficients for decentralized states have the expected positive signs, the election frequency variable is statistically insignificant. Furthermore, study by Asfaw et al. (2004) verify the previous results for rural India using an index of fiscal decentralization obtained by factor analysis on the basis of three variables for the period 1990-1997. Their results also show that the effectiveness of fiscal decentralization increases with the level of political decentralization.

In the study by Robalino et al. (2001), a panel data of low and high income countries is used to test how a measure of fiscal decentralization, the proportion of sub national government spending over central government spending-, affects infant mortality rates over the period 1970-1995. After controlling by a set of structural variables (GDP per capita, corruption, ethno-linguistic fractionalization, etc.), one of the main results of the fixed effects estimation is that decentralization is associated with lower infant mortality rates. Interestingly, the marginal benefit from decentralization is found to be greater at low-income levels.

The study by Habibi el al. (2001) shows that the percent of revenue raised locally and the proportion of controlled revenue over the total have a negative and significant association with infant mortality rates for a panel of Argentinean provinces over the period 1970-1994. In addition, the authors find that during the period of decentralization reforms studied, regional inequalities were considerably reduced. Khaleghian (2003) also examines the association between decentralization and immunization coverage rates for DPT3 and measles of children at

one year of age in 24 low and middle income countries during the period 1980-1997. The main indicator of fiscal decentralization used in this study is a binary variable defined as the presence of taxing, spending, or regulatory authority on the part of sub national authorities. Two other decentralization indicators were used to double check the results: the share of sub national expenditures on total government expenditures, and the share of health spending on total sub national expenditures. The model also included several control variables (GDP per capita, illiteracy rate, democracy score, ethnic tension, etc). The findings suggest that decentralization improves coverage rates only in low-income countries.

From the education sector side, Habibi *et al.* (2001) report a positive impact of fiscal decentralization on educational outcomes in Argentina when using the ratio of students enrolled in secondary school per thousand primary students as their dependent variable. Likewise, Galiani and Schargrodsky (2002) find a positive impact of fiscal decentralization in the same country on educational outcomes (measured by primary gross enrollment and completion rate) in Argentina, but only in provinces that do not report a very large fiscal deficit. Similar results are reported in Barankay and Lockwood (2007) in their analysis of the effects of decentralization on educational attainment (measured according to the *maturité rate*, i.e., the ratio between the number of students obtaining the university entrance qualification and the number of 19 year olds in the population) in the Swiss cantons. Faguet and Sanchez (2008) also present evidence of improved educational outcomes in Colombia (measured as the year-on-year increase in student enrolment) as a result of decentralization. However, the literature also reports instances in which decentralization has no impact on educational outcomes. This is the case of Mahal *et al.* (2000), who even report negative effects of decentralization on primary health care and education in

India. Whereas, Treisman (2002), who analyses the effects of decentralization on youth literacy rates, as a measure of the quality of public services in basic education, for a cross-section of 91 countries, reports positive impacts.

In case of Ethiopia, empirical studies in this area are scant. Very few studies have been conducted related to the decentralization process. Study by G. Wamai(2006) proposes that decentralization provides a unique opportunity for the participation of NGOs in providing health services. V. Naald (2003) also explores the impacts of fiscal decentralization on spending behavior and local health and education outcomes at Woreda level in Amhara region. While results indicate that some Woredas' conditions have an effect on future local spending behavior, the effect of local spending on these outcomes is ambiguous.

In sum, this literature review has briefly analyzed some key theoretical and practical issues, concepts and arguments on the major dimensions of fiscal decentralization. Based on these grounds, the next chapter examines the trends of the Ethiopian fiscal decentralization before we proceed to analyze its impacts on basic health and education outcomes.

Chapter III

3. Fiscal Decentralization and Access to Basic Education and Health services in Ethiopia

3.1. Constitutional Framework of Decentralization

In response to the failed centralized structures, Ethiopia introduced decentralization process at the regional level by the 1994's constitution, which describes the sub-national boundaries and lays out the mechanisms for intergovernmental fiscal relations, which specifically states the regions shall be formed on the basis of common language, customs, and ethnic heritage (Tassew W. et al, 2004).

According to the Constitution, the Federal structure has comprised nine Regional States, viz. *Tigray; Afar; Amhara; Oromia; Somale; Southern Nations, Nationalities, and Peoples Regional government (SNNPR); Benshangul-Gumuz; Gambella and Harari National Regional States* and two autonomous administrative areas, viz. *Addis Ababa and Dire Dawa*. The Constitution allowed considerable measure of self-rule for Regional States, including the authority to have own executive administrations; independent judiciaries; Regional States' councils; and fully engage in social and economic development efforts of the country.

The regional states are further divided into Zones and Woredas creating a four-tier level of government. In effect, there are 11 regions, 66 zones, 556 Woredas. The Woreda serves as the basic unit of administration in the areas of basic public goods provision or allocations

Some of the main constitutional powers and duties of the Woreda council and its executive are preparing and approving the annual Woreda development plans and budgets and monitoring their implementation; setting certain tax rates and collecting local taxes and levies (principally land use taxes, agricultural income taxes, sales taxes, and user fees); remitting a portion of the local tax

take to the zone; administering the fiscal resources available to the Woreda; constructing and maintaining low-grade rural tracks, water points, and Woreda-level administrative infrastructure; administering primary schools and health institutions; managing agricultural development activities; and protecting natural resources.

Below the Woreda administration, there are Kebele administrative units which are very close to the people and are found in both the urban and rural areas of the country. Kebeles are basically responsible for collecting information, identifying and prioritizing needs, and feeding this information up to the Woreda for inclusion in development plans.

Since the focus of this study is limited two social development sectors, we summarize the allocation of responsibilities of the various tiers of government in the social sector development in the following way;

Table 3.1: Assignment of Functions and Responsibilities for Education, Health, and other basic services, by Tier of Government in Ethiopia		
Tier of Government	Expenditure and functional responsibilities	
Federal	<ul style="list-style-type: none"> • National standard setting for education, health, and water and sanitation, • Tertiary education • Specialized/referral hospitals 	<p style="text-align: center;"><u>Woreda</u></p> <ul style="list-style-type: none"> • Coordination of school management and cost-sharing activities • Coordination of primary preventive and curative health care activities • Establishment and administration of primary schools (grades 1-8) and first cycle of secondary education (grades 9-10) • Implementation of health extension • Construction and administration of health stations and health posts and administration of clinics • Control and prevention of HIV/AIDS and malaria Immunization • Coordination and management of drinking water supplies
Regional	<ul style="list-style-type: none"> • Standard setting for primary and secondary education and regional health • Vocational and technical training, teacher training institutes, and medium-level colleges • Hospitals and referral hospitals • Control and prevention of HIV/AIDS • Immunization • Coordination and execution of civil service reform programs at regional level • Policy setting on regional water resource development and protection • Second cycle of secondary education (Grades 11 – 12) 	

Source: World Bank, 2008

3.2. Phases of the Fiscal Decentralization Process

Ethiopia introduced decentralization as the strategic tool for empowering citizens and devolving power to regional states. This was expected to establish conducive public sector environment for enhancing basic services delivery across the regional states. For this reason, it is apparent to see that decentralization process is strongly emphasized in the country's poverty and social economic development framework namely, the Sustainable Development and Poverty Reduction Program (SPDRP) and its successor the Plan for Accelerated and Sustained Development to End Poverty (PASDEP) which spans the five year period, 2005-2009. For brief understandings of this issue, we can summarize the content of the SPDRP (2002) and its successor PASDEP (2005) in the following manner;

“[Local fiscal empowerment] is a fundamental shift in the history of Ethiopia, which mandates communities through their elected councils to plan, allocate budget and implement to address their socio-economic problems. This is a key process that will unlock the energies of communities to face the challenge of poverty at its root. They will be provided with budget grant to make their own empowerment effective and complement their local resources, which for sure they will mobilize to address their own problems, by themselves.”

In light of the above facts, decentralization of public service delivery to the local government has taken place in two phases. The first phase of the decentralization process covers the period from 1994/95 to 2001/02. However, in this phase the power and resources were concentrated in the hands of regional governments and zonal administration. Resources allocation decisions were made at regional level. And the fiscal autonomy of the local/district government was dominated by the regional government and its zonal administrative organ. This era of decentralization was cementing and strengthening the regional state rather than local governments (districts). The

economic and administrative units, at district level, were highly dependent on the decision power of regional government as they were not given satisfactory fiscal and administrative autonomy to deal with their socio-economic affairs. As a result, the regional government structure became so dominant in decision making of resource allocation, but with some kind of gaps in service delivery to the community at the grassroots level.

To identify the causes of these service delivery gaps, during the second half of the 1990s, the Ethiopian government, together with development partners, conducted a number of studies to identify the factors that hindered public sector efficiency, grassroots empowerment, and accountability. An important lesson learned from these studies was that *woredas* had very limited fiscal and administrative autonomy with which to respond to the needs of their constituencies (World Bank, 2007/08).

In response to this finding and realizing the importance of the first phase of decentralization in resource allocations, the Ethiopian government once again launched the second wave of decentralization through the instrumentality of the so-called- District-Level Decentralization Programme (DLDP) in 2002, for deepening power to lower tiers of government to districts and urban administrations by rationalizing the powers earlier vested to Regional States (Brihanu Legese, 2009).

Consequently, to actualize the second wave of decentralization, block grants to Woreda level were made in June 2002 for the first time, and capacity building programmes aimed at supporting Woreda government in the use of the block grant have been initiated. This phase of decentralization seeks to empower communities to engage in development interventions, improve local democratic governance, and enhance the scope and quality of the delivery of basic services,

principally in pro-poor sectors such as education and health, at the local level. As a consequence, after District–Level-Decentralization, *Woredas* now manage about 45 percent of regional public expenditures (World Bank, 2007/08).

In general, the new decentralization framework established the foundations for consolidating accountability mechanisms for better services. Unlike the first wave of decentralization, it does not only delegate responsibility for service delivery to local governments, but also it devolves substantial control over real resources (personnel, assets, and finances,) to local governments. It provides a platform for citizen participation in all dimensions of development aspects. It also opens the opportunity to private and NGOs to participate in various development programs at local level (G. Wami, 2009).

3.3. Degree of Expenditure Decentralization

Expenditure decentralization is one of the approaches to measure the degree of fiscal decentralization in a decentralized economy. Thus, it is imperative to assess the degree of expenditure decentralization in case of Ethiopia before we proceed into the empirics of equation. Accordingly, when we examine the share of expenditure among the various tiers of the government from Table 3.2 over some selected years, over 1995/96- 2007/08, we find that the Federal Government, on average, spends 60 percent of national expenditure while all regions spend around 40 percent of the national expenditure. Even though the expenditure decentralization trend seems to decline in 2000/01 as the share of the region's decline to 33 percent, the table shows an increasing trend of the decentralization in the country. To state it explicitly, for example, in 2007/08, the regions' share of expenditure of the total national

expenditure is 45%, while the adjusted expenditure decentralization ratio, which excludes the defense expenditure and others, rises to 59%

Table 3.2: Federal and Regional Governments share in Public Expenditure (%)

Description	1995/96	2000/01	2003/04	2007/08	Average
1.Expenditure Decentralization					
Total ^a	0.34	0.33	0.43	0.45	0.40
Modified ^b	0.36	0.38	0.54	0.59	0.49
2. Social Development allocation ratio					
Regional ^c	0.38	0.37	0.72	0.62	0.52
Federal ^d	0.11	0.11	40	0.53	0.28
3. Social Development Decentralization Ratio					
Regional ^e	0.63	0.56	0.45	0.54	0.54
Federal	0.37	0.46	0.55	0.46	0.46

Source: data provided by MoFED

Note: (a) Refers to the ratio of all total regions' Expenditure to national expenditure.

(b) Modified expenditure ratio deducts expenditures that cannot be decentralized.

Therefore, it is a ratio of all regions' total expenditure to total national Expenditure less defense expenditure, debt service and external assistance

(c & d) Social allocation ratio is a ratio of social expenditure as a percentage of total government expenditure at each level (Federal and Regional).

(e) Regional social decentralization ratio is a percentage of social

Expenditure spent by all regions to total national social expenditure.

More specifically, regions have allocated 52 percent of their total expenditure on social sectors, while the Federal Government has spent only 28 percent of its total expenditure on the social sector. Furthermore, the share of regions in total national social sector expenditure is on average 54 percent over the selected years, which indicates that more than the national social expenditure is spent by the regions. The importance of regional expenditures in this sector is strongly driven by national policy which prioritizes the expansion of the primary services at the grassroots level as they are believed to be the foundation for sustainable progress in achieving developmental outcomes.

For more explicit presentation, we can assess the spending pattern by some selected pro-poor sectors in Table 3.3.

Table 3.3: Average annual expenditure decentralization by some selected priority (pro-poor) sectors (In million Birr)

1996/7 -2000/1	priority sectors	Region's share	Federal share	National Expenditure
	Road Construction	2210 (40%)	3186 (60%)	5396 (100%)
	Agriculture and natural Resource	4413 (64.7%)	2404 (35.3%)	6817 (100%)
	Education	6335 (74.9%)	2128 (25.1%)	8463 (100%)
	Health	2475 (76%)	761(23.5%)	3236(100%)
2001/02-2007/08	Road Construction	6488.56(27%)	17986.6 (73%)	24476.21(100%)
	Agriculture Development	10228.66(48%)	11150.5(52%)	21440.2(100%)
	Education	22138(59.6%)	15646(41.4 %)	37785(100 %)
	Health	6265(71%)	2456(29)	8721(100%)

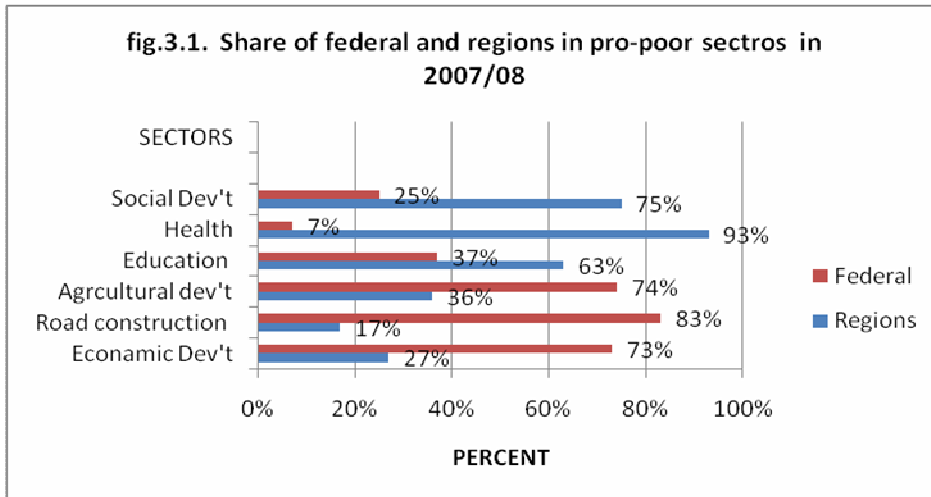
Source: data provided by MoFED

As it can be seen from Table 3.3, over the period 1996/97-2000/01, the average share of the regions in the selected pro-poor sectors is 76.5, 74.9, 64.7 and 40 percent for Health, Education, Agriculture and Natural resource, and Road respectively. And, this does not contradict with Table 3.2, where we have seen that the social development sectors are more decentralized to the regional governments

Coming to the second phase analysis, 2001/02 to 2007/08, though the average share of regions on the social development sector declines due to the federal government involvement in expansion of higher education institution and big referral hospital in the country, the total expenditure in the social sector has shown dramatically increase in all the regional states. It is also clearly seen that large share of the economic development sectors (agricultural development and road construction) are undertaken by the federal government. In fact, this is congruent with the constitutional mandate of the Federal Government in the economic sector particularly in the

highways construction. Accordingly, the share of Road Construction increases from 60% in the first phase analysis to 73% in the second phase of analysis (2000/01-2007/08).

In fact, in addition to the above average years measures of decentralization, we can take a single year data, for the year 2007/08, to reassess the degree of decentralization in recent years in the country.

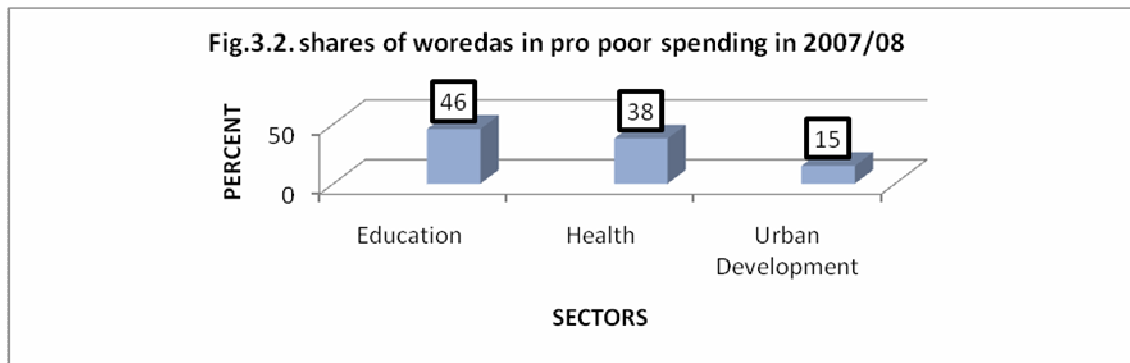


Source: Data Provided By MoFED

Figure 3.1 provides a sectoral breakdown of central and regional shares of government spending in 2007/08. The differences are large. Central government's largest category is infrastructure or road construction which is about 83 percent, whereas local government's largest shares are health, followed by agricultural development and education in which each accounts for 93, 74 and 63 percent, respectively. Thus, Figure 3.1 confirms the shift of social sector priorities, and resources, away from the federal government to lower tiers of government in the country.

The same is true between the regional states and districts. That is, the decentralization process is not limited to the upper tiers of governments only. Woredas are also spending significant amount of budget resources in pro-poor sectors. This can be also seen easily from Figure 3.2 for the year

2007/08. As this figure illustrates 46% of education, 38% of health and 15% of urban development spending were committed at Woreda levels.



Source: Brihanu L. (2009)

In general, from the above expenditure decentralization analysis, we can say that more than any other time, in Ethiopia today, the basic government structure and resources are shifting from the upper tiers of government to lower tiers of government basically to improve service delivery and enhance favorable development outcomes and in so doing reduce the magnitude of poverty level at the grassroots level.

3.4. Revenue Assignment

3.4.1. Revenue sources

Once the assignment of expenditure responsibility has been determined, the second key question is the assignment of revenue sources to shoulder the responsibilities, i.e., who gets what resources. Thus, the assignment of expenditure responsibility is an important determinant of the assignment of revenue sources. This issue is summarized as, “money should follow functions” (Oates, 2001). Since inadequate funding sources may lead to failures in decentralization programs, genuine decentralization programs should try to clarify the fiscal relationship between the central and local government unit. That is, adequate resources should be available to

decentralized units if they are to function effectively and bring the desired outcomes (Melkamu, 2004).

In case of Ethiopia, proclamation No. 33/1992 and the 1995 constitution of the Federal Democratic Republic of Ethiopia had laid a foundation for revenue decentralization /sharing between the Federal Government and State Governments. Article 95 of the 1995 constitution states that, the Federal Government and the states shall share revenues taking the federal arrangement into account. These legal documents categorized revenue sharing power into three. These are Federal power of taxation, regional state power of taxation, and concurrent power of taxation based on, among other things, the character of the source of revenue (national or Regional States); convenience of levying and collecting of the tax or duty and other factors such as the need for maintaining sound macro-economic policy in the country.

As Table 3.4 indicates the regional governments are assigned with the collection of direct taxes within their jurisdictions, land use fees, and taxes on subsistence based farm households. Moreover, the federal government collects payroll, sales taxes and non-tax revenues from public enterprises owned by the federal government irrespective of their location across the country.

Table 3.4: Summary of Division of Major Revenue Sources between the Federal and State Governments in Ethiopia

Federal Government Revenue Sources (article 96)	Regional States Revenue Sources (article 97)	Joint Federal-Regional States Revenue Sources (Article 98).
Customs duties and other charges on exports and imports	Personal income taxes on employees of the Regional States and private enterprises	Income taxes on profits, sales, excise and personal incomes on enterprises jointly owned.
Personal income taxes from employees of the Federal Government and international bodies	Land use fees	Taxes on profits of companies and on dividends due to shareholders
Taxes on income, profit, sales and excise duties on enterprises owned by the Federal Government	Income tax on sole traders	Income taxes on mining and all petroleum and gas operations, and royalties
Income taxes on winnings of national lotteries and other games of chance	Taxes on incomes of private farmers	Income/profits taxes on company profits and shareholder dividends
Income taxes on air, rail and sea transport services	Taxes on income on private houses within the regional government	*****
Taxes on income from houses and properties owned by the Federal Government	Taxes on profit, sales, and excise and personal income on income of enterprises owned by the Regional States	*****
Fees and charges on licenses issued and services rendered by organs of the Federal Government	Taxes on income from mining operations, royalties and land rentals	*****
Taxes on monopolies	Fees and charges on licenses issued and services rendered by Regional States	*****
Federal stamp duties	Royalties from use of forest resources	*****

Source: Constitution of the FDRE, 1995.

The tax base of regional governments generates relatively meager revenues and is relatively stagnant with a property of low buoyancy. Consequently, such kind of constitutional allocation of tax assignment gives raise for the problem of fiscal imbalance among the various tiers of government. As a result of this fiscal imbalance, it is apparent to see that, on average, regional states cover only about 19 of their expenditure for the year 2006/07(see Table 3.5 below).

3.4.2. Horizontal Fiscal Imbalance

It is usual that, regions in federal countries differ in their development level and resource endowment. Some may be industrial areas that could collect adequate revenues while others may be dominantly rural areas with high backlogs in the provision of physical and social infrastructures. Thus, this backlogs call for higher fiscal needs. The component states of a federal country also differ in their ability to raise revenue and expenditure need. Thus, the inconsistency between the ability to raise revenue and the fiscal needs at the same levels of a government is what we call as horizontal fiscal imbalance. In other way, horizontal fiscal imbalance is a fiscal gap created by the ratio of own revenue to expenditure in the same levels of a government. For simple understating purpose, let's have a look at Table 3.5

Table 3.5: Regional governments expenditure financed from own revenue (in Mn Birr) in 2006/07

Regions	Total Exp	Own Revenue	%share of (2)
	1	2	3
Tigray	695.7	194.9	28.0
Afar	332	38.0	11.4
Amhara	1899.7	380.0	20.0
Oromiya	2958.3	624.3	21.1
Somale	506.2	31.0	6.1
B.S.Gumuz	229.0	22.1	9.7
SNNP	1626.4	262.8	16.2
Gambella	156.2	12.0	7.9
Harrari	119.0	20.5	17.2
Diredawa	153.9	34.3	22.3
Total/ average	8676.4	1620.6	18.7

Source: MoFED -2007/08

Even though, on average, regional government cover about 19.0 percent of their total expenditure from their source of revenue, there are significant differences among regions which results in the so-called-horizontal fiscal imbalance Accordingly, for one or various reasons, in fiscal year 2006/07, somale and Gambella regions covered only 6.1 and 7.9 percent of their expenditure from their own source, while Dire Dawa and Tigray covered 22.3 and 28 percent respectively

3.4.3. Vertical Fiscal Imbalance

The typical characteristic of all federations is the disparity between revenue sources and expenditure needs. The aggregate revenue raising capacity of the regions fails to match their expenditure responsibilities, while the central government is able to raise more revenue than is needed to finance its own expenditures. This disparity between revenue sources and expenditure needs at various levels of government is referred to as vertical fiscal imbalance (World Bank, 2000). The reasons for the emergence of vertical imbalance are first, centralization of revenue sources by federal government due to capacity limitations of regions with respect to tax administration. Secondly, when inter-regional *equity* is an important consideration, the federal government needs to hold some resources over and above those required for its own expenditures to distribute them among the sub national governments in a way that promote equity (World Bank, 2001).

When we see vertical fiscal imbalance in Ethiopia in Table 3.6, as measured by the difference between regions' own revenue and their expenditure needs, the decentralized expenditure ratio , on average, exceeds the revenue share of sub national governments by 16.7 percent over the period 1999/00 - 2007/08. This means, their revenue raising capacity failed to match their expenditure needs. In addition, the other measure of vertical imbalance is the coefficient of vertical fiscal imbalance. The implication is that, a coefficient of zero, i.e., low vertical imbalance, indicates that the regions are pretty much self-sufficient in their fiscal matters. This happens when the revenue and expenditure share of the regions becomes the same. On the other hand, a coefficient close to one indicates absolute self-inefficient in financing their functions. This happens when the regions' revenue share in the aggregate is extremely small in comparison to their expenditure share.

Table 3.6: Vertical Fiscal Imbalances in Ethiopia [1999/0-2007/08]

Category/ Year	Combined regions' Share of revenue (%)	Combined regions' share of expenditure (%)	Vertical Imbalance*
1999/00	18.3	23.3	0.214
2000/01	18.0	33.4	0.461
2001/02	18.6	40.4	0.539
2002/03	17.4	31.3	0.444
2003/04	21.6	37.7	0.427
2004/05	22.8	31.7	0.281
2005/06	18.1	35.34	0.487
2006/07	20.6	43.2	0.523
2007/08	19.7	48.4	0.592
1999/0-2007/08	19.4	36.1	0.461

Source: Data Provided by MoFED

Note: *-The vertical Imbalance index is computed as: $VI = \{1 - [(R^R/R)/(E^R/E)]\}$

where R^R is combined revenue of regions and R is the consolidated revenue of the government, E^R measures the amount of combined expenditure of regions whereas, E measures the total (federal plus regional governments) expenditure.

On average, over the period under consideration, 1999/00-2007/08, Table 3.6 depicts that the regional governments have a combined expenditure responsibility of about 36.1 percent of total consolidated government expenditure whereas their share of own revenue was just about 19.4 percent. This indicates that revenue decentralization is smaller than expenditure decentralization, the apparent consequence of which is the emergence of vertical fiscal imbalance. As a result of this vertical fiscal imbalance, public financing of basic social services is implemented through intergovernmental fiscal transfers from the federal government to the regions as well as from regional governments to Woredas.

For that reason, in implementing the decentralization strategy, the government has developed a body of rules that govern transfers from one tier to the next. Thus, the most important source of financing of the regional and Woreda-level governments is the block grant transfer from the next higher level of government. Accordingly, the following sub-section describes the features of allocation rules and recent development trends of the grant formulae in the country.

3.5. Federal Grants and Intergovernmental Transfer Issues

3.5.1. The Federal Grant System

A major transfer of federal resources to the regions takes place through the federal grant system, which consists of block grants and specific-purpose grants. According to the Proc. 33/1992, the objectives of grants to the regions are: to promote social services and economic development of the National/Regional Governments; accelerate the development of the hither-to neglected and forgotten regions; to narrow income disparities between regions; to encourage activities with positive externalities and control those with external diseconomies, and to encourage foreign currency earning projects and other projects of national interest (Proc. No. 33/1992).

In fact, the grants are intended not only to shift resources from the federal to regions, but also to redress the fiscal imbalances across the regions, in a way that do not undermine their incentive to draw on their own revenue sources (World Bank, 2001). More specifically, this emanates from the fact that (Article 90) of Constitution states that given the resource constraints, policies shall be aimed to provide all Ethiopians access to health and education, clean water, housing, food and social security (FDRE,1995).

Though federal transfers were started in 1992/1993, the formula based approach of transferring subsidies to the regions was first attempted in 1994/95. Hence, since 1994 the federal government has adopted more conventional approach and relatively transparent distribution formula to determine the share of regional governments from the federal grants pool (MoFED, 2007/08). Of course, the grant distribution formula has been frequently adjusted to develop fair distribution of resources and encouraging efficiency and effort of regional governments to mobilize resources from local sources.

The most important variables included in the grant formula are population, composite index of level of development (known as I- Distance factor), sector performance (revenue effort) and in 2001 an index of poverty situation was added in the respective regions. The initial phase of this practice provided equal weight for three indicators: population, level of development and revenue effort. But, this was changed in 1998 and in 2001, and finally the ad hoc formula was totally transferred in to more flexible one in 2007. A closer observation of the pre-2007 federal grant distribution formula, as summarized in Table 3.7, reveals important issues. The relative weight of population of regions in the formulae increased from a 33.3 to 60 percent in 1998 and then reduced to 55 percent in 2001 and again rose to 65% in 2004-2007. Thus, population as an indicator was an important factor for decision making in the federal block grant distribution. The frequent changes in the formula suggest genuine effort of the government to make the formula reflect equitable approach in distribution of transfers to the eleven regions (MoFED, 2007/08).

Table-3.7. Relative Weights of Variables in the Ethiopian Federal Grant Formula

Variables	1994 Formula	1998 Formula	2001 Formula	2004-2007 Formula	2008- 2010 Formula
1. Index of Population	33.33	60.0	55.0	65	No fixed Value is given for those Specific Variables: currently Expenditure Need Based Assessment and Unit Cost Approach are being used (for more information see next pages)
2. Composite Inverted Index of Development	33.33	25.0	20.0	25	
3. Index of own revenue raising effort	33.33	15.0	15.0	10	
4. Poverty Index	0.0	0.0	10.0	0.0	

Source: MoFED

The other variable is a composite index of development that combines index of unit expenditure variable and sector indicators of development in areas such as education, health, road, and access to water. These are proxy indicators of the level of development variation across regions. The inverted level of development index has been assigned 20 percent weight in 2001.

The third category of variables consists indicators of the effort of regional governments to increase own revenue from sources assigned to them and how these resources are used to improve budgetary performance. This is an important element in the rationalization of public resource utilization. Nevertheless, for various reasons, its relative weight decreased from 33.33 to 15 percent in the pre-2004 distribution of federal grants and further declined to 10 percent in the 2004 grant formula. From 2001 to 2004, the federal grant distribution formula also introduced the distribution of poverty across regions with a 10 percent weight to determine the share of regions in the total pool of federal grants. The introduction of this variable is an important development in the grant formula history. The indicator of poverty serves as a gauge to distribute public resources and preferably to finance programs that would enable the poor to escape chronic poverty on a sustainable basis (MoFED, 2001).

Nevertheless, from 2004 to 2007, after the District-Level-Decentralization Programme (DLDP) the grant formula uses three parameters only: population, level of development, and revenue collection effort. It is apparent to see that the index of poverty which was introduced in the 2001-grant formula was eliminated in 2004. Perhaps, the possible reason is that as the three-parameter approach will be used at both federal and regional level, it will be very difficult task to evaluate the level of poverty index among Woredas within each region. Therefore, the allocation to each locality was based on the following simple formula:

$$G_i = \left[\frac{\text{pop}_i}{\sum_{i=1}^{11} \text{pop}_i} * w_1 + \frac{\text{Dev}_i}{\sum_{i=1}^{11} \text{Dev}_i} * w_2 + \frac{\text{Re} \text{ } vper_i}{\sum_{i=1}^{11} \text{Dev}_i} * w_3 \right]$$

Where: (i) G_i is the percentage share of grant entitlement for locality i ; (ii) Pop_i is the population of locality i ; (iii) Dev_i is an Index of development level of locality i (with a higher value indicating a less developed locality); (iv) $Re \text{ } vper_i$ is an index of revenue raising and sectoral output performance indicator of locality i ; and (v) w_j are weights assigned to the indicators as specified in the Table 3.7.

However, the "three-parameter" formula has a number of problems. Besides a bias against large and poor regions, the formula does not take into account the greater needs that some regions may have over others, after controlling for differences in population and development level.

For these reasons, various new formulas were being considered, including in particular one that is based on a "fiscal equalization approach." Thus, throughout the period of 2004-2007, a new "fiscal equalization approach" was under way and negotiations with development partners to adopt a new allocation system based on other countries experience that would create a shift away from the "three-parameter" approach (MoFED, 2007/08). And lastly, decisions were made to develop a formula that is more similar to the Australian grant formula. This new "need based" formula is stated as:

$$G_i = \text{Pop}_i (\text{APCG} + \text{ADF}_1 + \text{ADF}_2 + \dots + \text{ADF}_i)$$

Where:

- G_i = the budget grant to Regional States
- Pop_i = the population of each Regional State
- APCG = Average Per Capita Grant, and is simply the average per capita subsidy for all Regional States Governments combined (total allocation divided by total population)
- ADF_i = Assessed Difference Factor, and is for factor i , the assessed expenditure need or revenue capacity of each regional government in per capita terms relative to the average for all Regional States, brought by calculating number of variables such as disabilities, sector standards etc. More briefly, (ADF_i) may be positive or negative in value. But, in Birr term, these amounts will aggregate to zero for each factors for all regions (as statistically, the sum of the deviations from their mean is always 0!)

One of the virtues of this formula is that it evolves over time. It easily accommodates new and revised factors and data which enhance its simplicity and transparency. The principle of the new

formula are equity, efforts neutrality and the recognition of sectors disabilities are the pillars that make it distinct from the old formula which was based on the subjective variables and weights (MoFED, 2007).

Hence, this new formula is "needs-based", in the sense that recurrent funding-which accounts for the bulk of total funding is allocated in higher quantities to regions with higher demand and provision levels of public services. For example, *ceteris paribus*, regions with higher enrollment rates would receive higher per capita recurrent allocations. At the same time, capital funding is equity-oriented in the sense that regions that are more "backward lower," with public service provision levels, are favored in the allocations so that they have the means to advance by accelerating their production of the appropriate types of capital stock. The approach thus strives for equal per capita distribution of grant, while considering the needs or capacities of the regions.

Nevertheless, still the federal grant budget formula development is never a finished business, but rather one that to be continuously revisited and amended in response to the emerged economic, social and political realities of the country (FDRE, House of Federation, 2009). In recognition of this principle, the House of federation has undertaken a number of revisions on the federal grant formula of 2007/08 once again.

Accordingly, the house of federation has come up other revised block grant formula in May 2009. This new distribution formula is based on Unit Cost Estimation. This Unit Cost Approach takes in to account the unique needs of the emerging regions.

In view of that, three scenarios of block grant allocations formula are developed based on the estimated relative revenue raising potentials, expenditure need and simple indicators to determine the share of the block grant. Those three scenarios are named as

1. Formula that equalize expenditure need and fiscal need
2. Formula that equalize expenditure need only; and
3. Formula based on simple indicators

While the first scenario is block grant based on raising capacities and expenditure need equalizations, the second scenario is based on expenditure need only. This scenario assumes that all regions will have equal fiscal capacity though regions may have different fiscal capacities. These two scenarios are also adjusted for disability factors namely price differences; dispersion factors, poverty, unemployment. Whereas, the third scenario is developed using simple indicators that reflect expenditure need and revenue efforts of the regions.

Generally, the development of the this new grant allocation formula starts with estimation of the relative fiscal gaps which involves the estimation of the relative revenue potentials and expenditure need of the regions. Steps used to estimate the fiscal gap are the following;

1. Determine the sector to be included in the expenditure need estimation based on four years average expenditure data.
2. Select sectors that make up more than 90% of the total budget for all regions
3. Compute the expenditure shares of the sectors to be include in the expenditure need (Weight/ shares should be adding up to one). This helps to determine to determine the relative importance of the sectors in the determination of expenditure need of regions
4. Estimate the unit cost and expenditure need for the sectors selected in (2) for the all regions.
5. Adjust the unit cost need of regions by sector based on sector's development program and poverty reduction strategy known as PASDEP and unit cost estimated in (5).
6. Compute the total budget for each region (weighted sum of the estimated sectors expenditure need).

7. Compute fiscal gap by subtracting the revenue raising potential from the total expenditure need.
8. Compute the region's share of fiscal gap from the regional total fiscal gap which is known as '*Kemer*'

Those steps are considered for the total block grant to be distributed to the regions, but when we assess for particular sectors, it is based on the sectors' indicators. For example, with respect the education, expenditure need of regions is determined based on the number of students enrolled, the number of school-age population who are not enrolled in schools and text book development. While the enrolled numbers of students are indicators for recurrent budget, the latter two serves for the determination of capital budget.

The recurrent budget is obtained by multiplying the unit cost of primary and secondary education by the number of children enrolled in 1st and 2nd education. Accordingly, the following table indicates the unit cost of education in expenditure need of the 2009/10 federal grant formula

Table 3.8: Estimated Unit cost (cost per student per year) for Regional Education in 2009/10

	Recurrent (Birr)	Capital (Birr)
Primary	182.89	567.94
Secondary	537.21	2168.83

Source: FDRE: House of Federation, May, 2009

Similar to the education sector, in the health sector, the expenditure need of the regions is determined based on the unit cost of both treatment and prevention. For example, cost per visit is considered in the treatment expenditure need assessment of the public health sector.

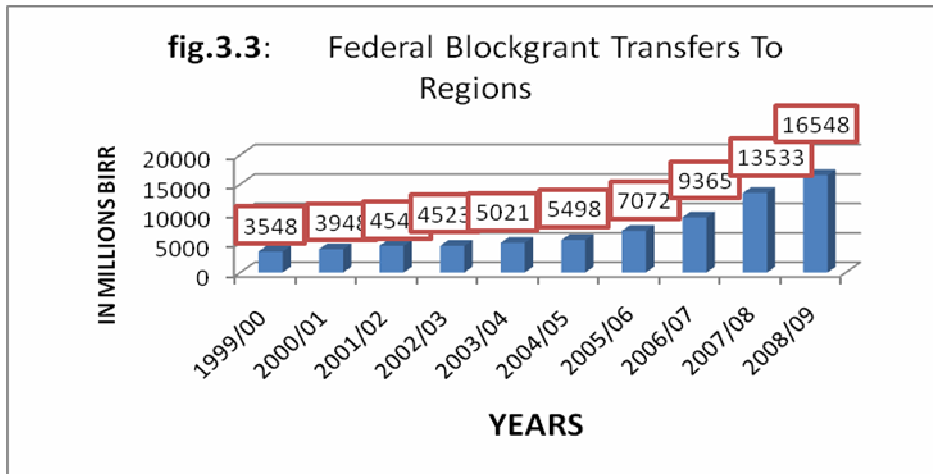
In sum, the unit cost approach grant formula has a number of new features that make it more progressive than its predecessors. For instance, it has three alternative scenarios, through which the block grant can be distributed with due emphasis to the emerging regions.

3.5.2. Block grant Transfers to Regions

The aim of the federal block grant transfer is to address the vertical imbalances in revenue versus expenditure assignments between the federal and regional administrations. In fact, Article 42 of the Federal Constitutions states that ‘every Ethiopian has the right to equal access to publicly funded social services’. It is on this basis that the federal government has to allocate to regional states to enable them provide public services in similar range and quality across all regions.

Based on such constitutional provision to the citizens, the trends of block grant transfers to regions are increasing over time. These trends in absolute amounts can be seen in Figure 3.3 for the period from 1998/99 to 2008/09.

The figure confirms that the federal government has made commitments to increase block grant transfers to the regions substantially over the period under consideration. To illustrate it, total block grant transfers to the regions in 2006/07 are budgeted to be 9.365 billion Birr, as compared to 5.021 billion Birr in 2004/05.



Source: Data provided by MoFED

And this further increases to 16.548 billion Birr in 2008/09. These huge and ever increasing amounts of fund transfers clearly indicate the federal government's firm dedication to reverse the vertical allocation of resources gaps (fiscal imbalance), which we have fully discussed in the previous subsections.

Coming to the recent unit cost grant formula, it has three alternative scenarios through which the block grant can be distributed, but, at the end, the actual distribution is made based on the one that suits majority of the regions, with due emphasis the emerging regions. For example, when we observe from Table 3.9, before the distribution of the grant, the share of each region was prepared based on the three scenarios. But the share of the block grant to each region was made based on scenario-1 as this scenario is the most suitable for the emerging regions.

Table 3.9: Share of Block Grant Incorporating Special Grant for Regions in the 2009/10 Unit Cost Approach

Regions	Share of Block grant and Specific grant for regions (%)			Discussion and Consensuses	Actual Grant Share (%) of regions for 2009/10
	Alternative Scenarios				
	1	2	3		Scenario-1
<i>Tirgay</i>	7.04	7.14	8.32		7.04
<i>Afar</i>	3.34	3.27	2.56		3.34
<i>Amhara</i>	23.33	23.28	23.96		23.33
<i>Oromia</i>	32.53	32.81	36.53		32.53
<i>Somalie</i>	8.43	8.25	5.1		8.43
<i>B.Gumz</i>	1.96	1.95	2.27		1.96
<i>SNNP</i>	19.9	19.83	16.83		19.9
<i>Gambella</i>	1.57	1.53	1.29		1.57
<i>Harari</i>	0.89	0.90	1.19		0.89
<i>DireDwa</i>	1.01	1.03	1.19		1.01
<i>Total</i>	100	100	100		100

Source: FDRE: House of Federation, May, 2009

However, the reverse is true for the rest regional states. For instance, while the shares of the block grant for Tigray and Amhara are 8.32% and 23.96 in scenario-3, the values of these shares in scenario-1 are 7.04% and 23.33% respectively. Thus, this formula has again inbuilt bias against the some regions. Accordingly, though it takes in to consideration the unique needs of the emerging regions (Afar, Somalie, B. Gumz and Gambela), some complain may come from the rest of the regions as their best scenario is scenario-3.

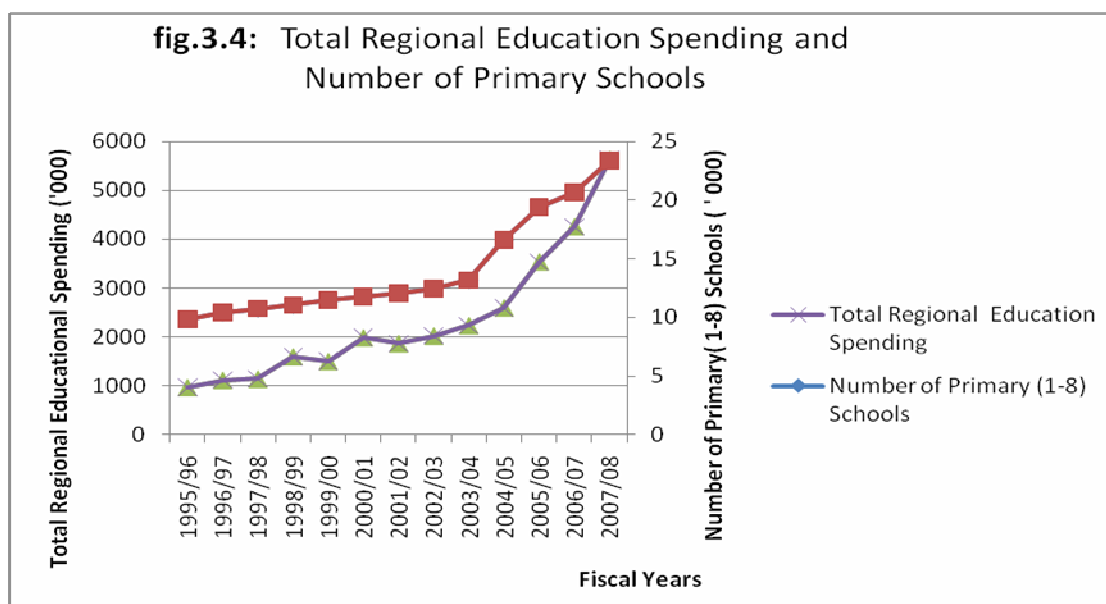
Having reviewing the trend and feature of the Ethiopian fiscal decentralization, we now are to advance to review again the basic social service delivery and outcomes along with the decentralization process before we proceed to the empirics of question.

3.6. Access to Basic Education and Health Services

Ethiopia has made major strides in improving its human development indicators in the past 18 years, achieving significant increases in the coverage of basic education and health services in a short period of time. According to World Bank (2007/08), improvements took place during a period of massive decentralization of fiscal resources, to the regions in 1994/95 and to Woredas in 2001/02.

3.6.1. Basic Education Coverage and Outcomes

During the period of Massive decentralization, school enrollment rates have increased significantly in the country. One among the most significant progress is Gross Enrolment Rates (GER) in primary schools. The main reason for the success in access to primary education is the increase in the number of primary school to 24 thousand in 2007/08 from below 10 thousand in 1995/6. This is complemented by constructing more than 80% of the schools in rural areas (MoE, 2007/08).



Source: Educational statistical abstracts (MoE, various years)

As we can easily see from Table 3.10, in 1991/92, the gross primary enrollment rate was 22 percent which was the lowest enrollment rate by any standard measure in the world, even comparing to other sub-Saharan countries (World Bank, 2005). This figure clearly indicates that many Ethiopian children did have little access to basic education before the launching of decentralization. However, after introducing a comprehensive decentralization in 1994/95, the gross enrollment ratio has shown up a sustained increase. It is thus apparent to see that primary gross enrolment ratio is more than tripled between 1993/94 and 2004/05, from 26 to 79.8 percent, and reached to 95.6 percent in the fiscal year of 2007/08, an impressive 65.5 percentage points above the value for 1995/96. The same is true for the net enrollment that it has reached 83.4 percent, which is 71 percent above that of 2000/01.

It is based on this fact; various documents, such as World Bank (2007/08), indicate that Ethiopia has made considerable progress towards meeting the MDGs in the education sector (see Table 3.10).

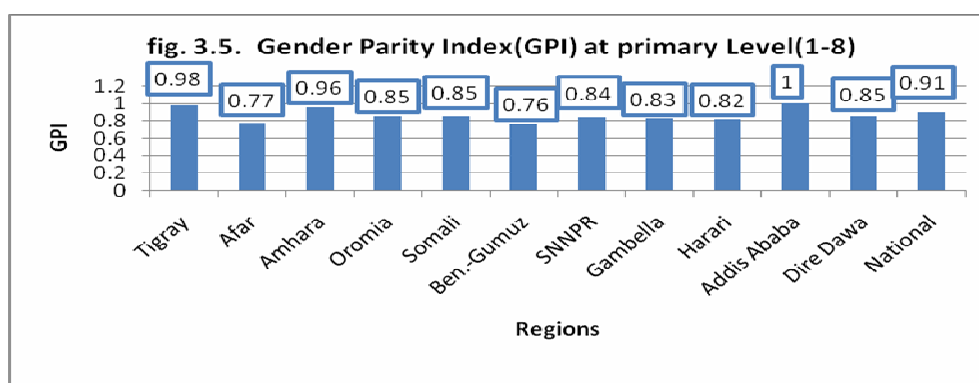
Table.3.10 Gross and Net Enrollment Rates for Different Levels of Education in Ethiopia:
1991/92 1993/94 1995/96 2000/01 2004/05 2007/08

	1991/92	1993/94	1995/96	2000/01	2004/05	2007/08
Gross enrollment rate						
Primary level (1-8)	22	26	30.1	56.4	79.8	95.6
Junior secondary level (8-10)	*	8	8.1	11.3	27.3	37.1
Net enrollment rate						
Primary level	*	*	*	48.8	63.6	83.4
Junior secondary level	*	*	*	8.6	11.8	13.8

Source: Educational statistical abstracts (MoE, various years). , * Data is not available

Additionally, the table indicates that the gross enrollment rate for junior secondary education has shown a modest increase, rising from 8 percent in 1993/04 to approximately 37 percent in 2007/08. Likewise, World Bank (2007/08) asserted that enrollment rates in preparatory school; and technical and vocational training and education have also been increasing, although at a more modest rate relative to the primary level.

Similar to the above facts, now days in Ethiopia, there is fairly improvement in gender parity at primary level. The gender gap index, the ratio of female to male enrollments across the regions, is shown in Figure 3.5. The figure shows that the national gender parity index is around 0.91. More specifically, the figure shows that while Tigray, Amhara and Addis Ababa have shown nearly equality opportunity between boys and girls at primary school level, there is relatively high gender parity in Afar and Benishangul-Gumuz.



Source: Educational statistical abstracts (MoE, 2007/08)

Reducing the gender parity index in to less than 10 percent in the country was not such an easy task (MoE, 2007/08). A lot of works have been done at school level with in the broad frame work of massive decentralization. It is well documented fact that no nation has been able to achieve universal basic education without programs that assist girls. Recognizing this fact, community based participation and parent teacher association have been organized and played significance role in creating awareness at the grassroots level that help to mobilize all school age girls to their nearby primary schools (World Bank, 2007/08).

In addition to the above assessment of current gender parity, quantitative assessment of current urban-rural comparisons are also important in education. In light of this fact, the latest, as of

2007/08, comparison of rural and urban enrollment indicates that, out of the total gross enrollment ratio of 95.06%, 79.4% of primary enrollment was accounted for by rural areas and 20.6% by urban. This is more or less similar to the pattern of population's proportion residing in the rural areas. However, for secondary (9-10), conditions were almost reversed; urban enrollment is 90.0%, with only 10.0% for rural.

Table 3.11: Urban/Rural Enrollment by Level (by residence and sex) in 2007/08

	Urban Enrollment				Rural Enrollment			
	Male	Female	Female %	Urban %	Male	Female	Female %	Rural %
Primary (1-8)	1592822	1568820	49.6	20.6	6612623	5566521	45.7	79.4
Secondary (9-10)	709,104	468,091	39.8	90.0	84,124	46,600	35.6	10.0
Secondary (11-12)	123,077	59,845	33.2	94.6	7,456	3,066	29.1	5.4

Source: Educational statistical abstracts (MoE, 2007/08)

The critical issue that we can infer from the above table is that while the country has recorded a satisfactory enrollment rate in rural primary school level, little is achieved in rural secondary school level. Although clearly more research is needed to understand for the rural-urban variation in secondary school, part of the variation appears to be explained by distance to school (Tassew W. et al, 2005).

The 2004 Welfare Monitoring Survey indicates that rural households continue to face significant travel times and distances in order to access public services (see Table 3.12). While, on average, children in rural areas have a 45-minute walk to primary school, secondary school access is still highly problematic – the average rural household is 20 km away from a secondary school and children face nearly a four-hour journey each way to reach one. The average rural household is more than two hours away from a health center and an all-weather road. By contrast, access to

these basic services is much better for urban households. On average, primary schools are less than 20 minutes away and health clinics are less than an hour for the average urban household.

Table 3.12: Distance to services, in kilometers and in minutes

Item	In minutes			In kilometers		
	Rural	Urban	Total	Rural	Urban	Total
Primary school	47	19	42	2	0	1
Secondary school	223	38	192	20	6	18
Clinic	162	59	146	14	2	12
Health center	260	132	240	22	10	19
Hospital	545	74	465	75	43	70
All weather road	134	41	120	10	2	8

Source: MoFED(2007/08)

But these distances to social services are much improved comparing to the distances indicated by the 1995/6 and 1999/00 Welfare Monitoring Surveys.

It is based on this fact that, along with other matching policies such as the Education Sector development programs [ESDP (I-III)]; the already introduced decentralization policy is given unique expectation in closing the existing regional, gender and urban-rural enrollment differences and then helps to achieve the universal primary education at national level by 2015.

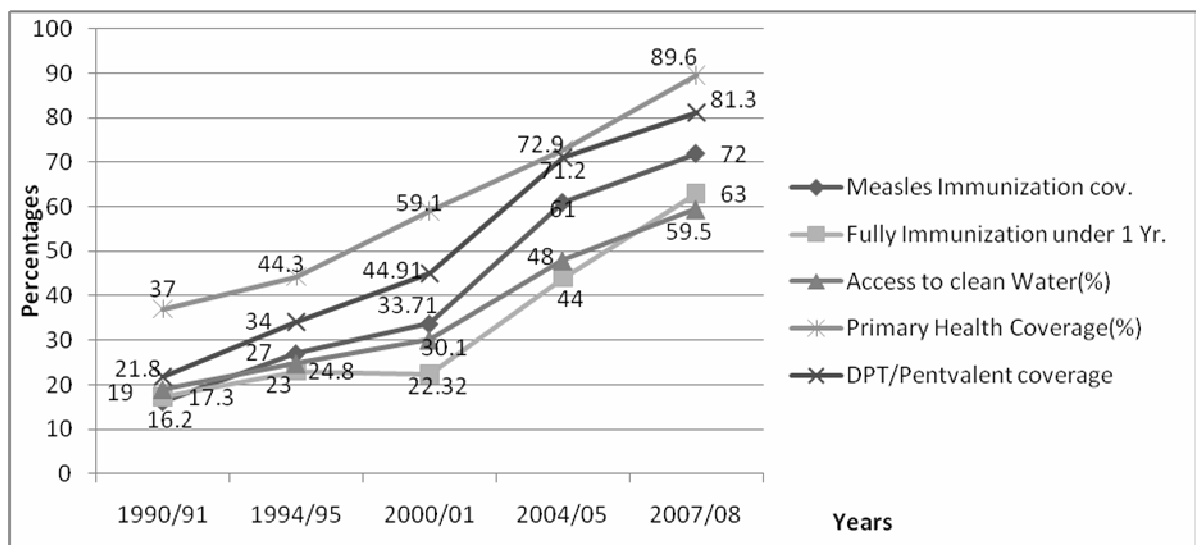
3.6.2. Basic Health Coverage and Outcomes

In the health sector, like in the education sector, the government has designed the Health Sector Development Programme (HSDP) – a 20 year health strategy- to be implemented under the broad framework of decentralization. As it is mentioned now and then, the main reason is decentralization has been touted as the key management strategy in the country’s health policies as well. It emphasizes the importance of achieving access to a basic package of quality primary health care services by all segments of the population, using the decentralized state of governance. By its very nature decentralization provides an excellent framework for local

communities, NGOs, and private health practitioners to legitimately participate in local governance, planning and service delivery of the health sector (G.waimi, 1993).

Consequently, as we can see from the following figure, decentralization has created a favorable health sector ground in which access to primary health services has reached 89 percent in 2007/08 from 29 percent in 1990/91.

Fig 3.6: Basic Health Coverage



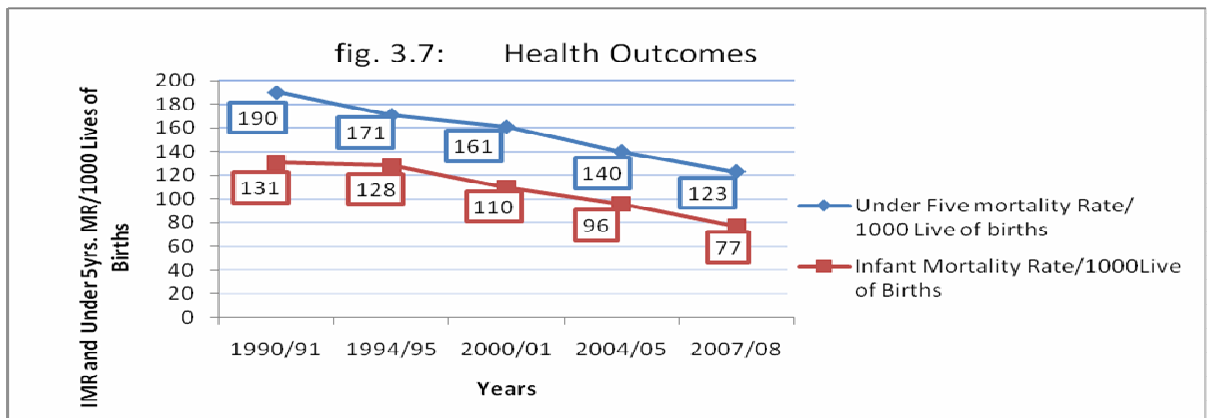
Source: World Bank (2007/08) and MoH (Health Indicators of various issues)

Similarly, the HSDP dictates that immunization against childhood illnesses is an important objective of the decentralized health sector. In this respect, we assessed the trend of some types of childhood immunization, namely DPT vaccines, measles immunization and fully immunized children against all potential threats of diseases between 1990/91 and 2007/08.

Accordingly, as it can be seen from the above figure, the coverage for Measles and DPT immunization improved from 19 and 21.8 percent in 1990/01 to 72 and 81.3 percent in 2007/08 respectively. This is a remarkable increase in the country's health sector with average annual

growth rate of 16 percent for both types of immunization throughout the period of under consideration. The same is true for the trend of fully immunization against all major diseases. The figure indicates that, with average annual growth rate of 16.1 percent, the percentage of fully immunization children has reached 63 percent in 2007/08 from 16.2 percent in 1990/91.

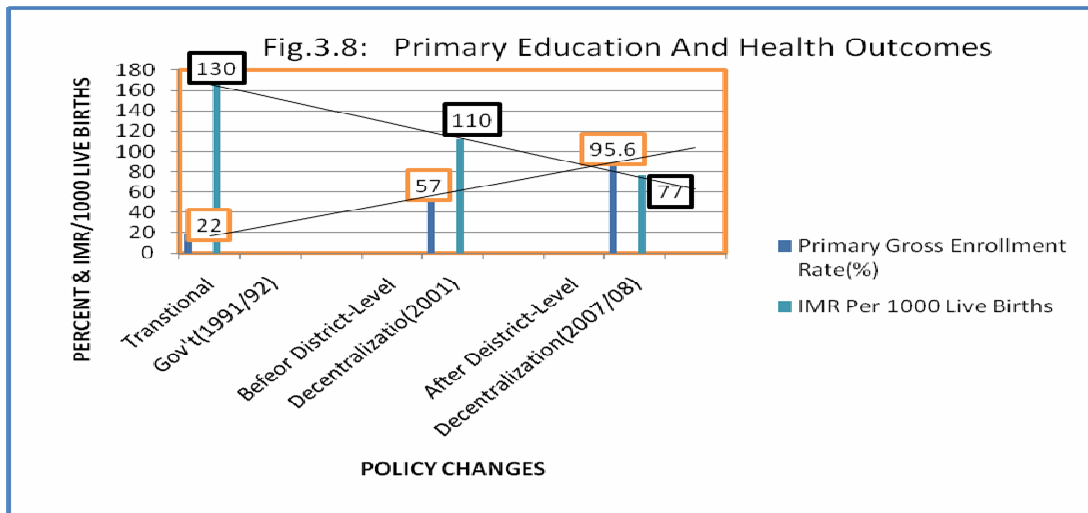
Additionally, when we again assess other health outcomes such as child mortality in Figure 3.7, they have shown a remarkable decline. The figure indicates that infant mortality rate (IMR) and under 5 mortality rate, which are key indicators targeted by MDGs, fell from 131 and 190 per 1000 live births in 1990 to 77 and 123 in 2007/08 respectively. Those mortality rates have declined continuously; and the decline has been more pronounced after 2000/01, a period that represents for massive fiscal decentralization in the country.



Source: World Bank (2007/08) and MoH (Health Indicators of various issues)

In fact, all those results are good only on a relative basis to the past, but comparing to other developing nations; those figures are still very disappointing in several ways (MoH, 2007/08). Nevertheless, when we evaluate those results along with a policy change, the records are impressive that the devolution of massive fiscal resources from the federal and regional governments to Woredas appears to have improved the delivery of basic services in the country.

If we look in Figure 3.8, we can easily see that there is huge difference on basic education and health outcome as the fiscal decentralization has been expanded to lower tiers of government over time.



Source: Data provided by MoH and MoE

However, although basic coverage of social services and outcomes are improved during the period of decentralization in the country, without further and rigorous analysis, we cannot conclude fiscal decentralization was responsible for these changes. Outcomes such as these are only suggestive. For this reason, the following chapter examines the impact of fiscal decentralization on these outcomes thoroughly by employing econometric models in a panel context across all the regions and city administrations for the period that covers the two phases of decentralization in the country.

Chapter IV

4. Methodology and Specification of Models

4.1. A Simple Theoretical Model of Public Goods Provision

As in many decentralized countries, education and health services, in Ethiopia, are jointly provided by central and local governments. Thus, before investigating into the empirics of the question, it is useful to formalize the underlying relationship in which center and local are involved. To do so, this section develops a simple theoretical model of joint provision, following Varian (1994) and Paul Faguet(2009) in which central government moves first, and local government is a Stackelberg follower in a dynamic game with full information.

The key trade-off is that local governments have *better information*, but central governments enjoy economic scale in the production of public goods. The former is due to local political competition, which we can think of as election cycles and the lobbying, campaigning and related dynamics that these entail, which provide local governments with information about local preferences. Political competition does not, by contrast, provide central government with useful information about local preferences. This is because national elections do not focus on local issues and specific local policy options in the way that local elections do. However, the latter half of the trade-off may be thought of as technological or organizational advantages over local governments in the production of public goods. In many countries, for example, the most capable public sector professionals work for central, not local, government. This allows central agencies to design, plan, and implement interventions that are higher quality, more cost effective, or both.

Thus, to formalize this trade-off, assume a country made up of T regions, each with population n_j where j denotes a region. Individuals have linear utility $U_j = \log(X_j) + \theta_j \log(g_j)$, where X_j is the

amount of private good consumed by individual i , g_i the amount of public good available in region j , and θ_i is individual i 's preference for public good g . Central and local governments' contributions to the common public good are denoted g_j^L and g_j^C , hence $g_j = g_j^L + g_j^C$. We denote the local median preference for the public good in region j as θ_{mi}

Local social welfare is defined as median utility, $U_{mi} = \log(X_{mi}) + \theta_{mi} \log(g_j)$

The function of government is to provide public goods, which it finances with a local head tax. Local government ascertains θ_{mi} with probability P_L ; and θ_{-mi} with probability $(1-P_L)$, and central government ascertains θ_{mi} with probability P_C ; and θ_{-mi} with probability $(1-P_C)$. Probability varies as $P_{L,C} \in [0,1]$, and θ_{-mi} is defined as an unrestricted value of θ other than θ_{mi} . By assumption (see above), p_L increases with the amount and duration of political competition in a region, whereas P_C does not. For notational simplicity political competition is proxied by e , the number of elections since the inception of local government in a region. Hence

$$P_L = f(e), \quad dP_L/de > 0, \quad dP_C/de < 0$$

Central government's superior in economic scale is modeled as a cost advantage in the provision of a given public good. The head tax needed to finance a given level of provision under central government is thus $\alpha g_j/n$ with $0 < \alpha \leq 1$, lower than local government's tax g_j/n_j .

In this Stackelberg game central government is the leader, and announces its level of provision first. Local government observes this and calculates its optimal reaction, which it then provides. The solution is via backwards induction, and so we begin with local government's reaction. For any g_j that central government chooses, local government's problem in region j is

$$\text{Max}_{g_j^L} [(P_L \theta_m + (1-P_L) \theta_{-m}) \log(g_j^L + g_j^C) - g_j^L/n] \dots\dots\dots (1)$$

where for convenience we drop subscripts j . We take first order conditions and simplify the expression without loss of generality by letting $\theta_{-m} = 0$. Re-arranging provides local government's optimal response

$$g^{L*} = nP^L \theta_m - g^c \dots\dots\dots (2)$$

Central government's problem over T regions is

$$\text{Max}_{g^L \dots g^T} \left[\sum_j (P_c \theta_{mj} + (1 - P_c) \theta_{-mj}) \log(g_j^{L*} + g_j^C) - \sum_j \alpha g^L / n \right] \dots\dots\dots (3)$$

As this is a full information game, central government can calculate local governments' reactions as well as local governments can. The center thus anticipates optimal local responses and incorporates them into its initial maximization. Solving for region j , we take first order conditions and once more simplify by letting let $\theta_{-m} = 0$. Re-arranging, we get central government's optimal level of public good provision

$$g^{c*} = \frac{nP_c \theta_m}{\alpha} - g^{L*} \dots\dots\dots (4)$$

which is similar to (2), but also invokes central government's superior economic of scale.

Local government's share of public good provision can be represented as a fraction of central government's, $g_i^L = \gamma g_i^C$ ($\gamma \geq 0$; local provision can exceed central provision). Substituting for g^{L*} in (2) and re-arranging yields:

$$\gamma = \frac{P^L \theta_m}{g^{c*}} - 1 \dots\dots\dots (5)$$

Which is an expression for the relative contributions of local and central governments to total public good provision; g^L/g^C . This equation shows that the relative contribution of local government falls with g^c , but rises with:

- population n , because public goods can be provided more cheaply when the tax base is larger,
- probability P_L that local government *senses local preferences correctly*, and
- Median preference for the public good- θ_m implying that local government spends *more on public goods that locals prefer more----proper allocation of fiscal resources.*

In short, local governments will provide a larger share of those public goods that local citizens prefer most. The presence of budget constraints means that local governments effectively concentrate their resources in these most-preferred goods and services, leaving less-preferred areas to mostly central provision. The model's assumption that p_L increases with the number of election cycles further implies that local government's share of locally-preferred goods will increase over time. This is consistent with the stylized facts that we have reviewed in chapter three on enrollment and immunization coverage, and is the logical outcome of combining increasing information with stable local preferences. In terms of the empirical results that follow, we can infer that citizens will most intensely use those public services in which the share of local provision is highest, as these are the services they prefer most.

4.2. Empirical Model Specification

4.2.1. Data Source

The study is conducted based on the Regional States' panel data. Thus, it mainly utilizes secondary data collected from various institutions. For instance, regional annual Gross Enrolment Rate (GER) of both primary and secondary school are collected from the Ministry of Education, while Infant mortality Rate (IMR) and other health inputs and outputs are collected from the Ministry of Health (MoH). In fact, I am also benefited more from the Central Statistical Authority and Ministry of Finance and Economic Development (MoFED) as they are the main data suppliers for many other variables used in the data analysis. In addition to these, so as to have complete data sources, different books, journal articles, and bulletins published by various institutions, websites, and Regional States' Bureaus of Finance and Economic development (BoFED) have been visited and examined extensively on regular basis.

4.2.2. Measures of Fiscal Decentralization

Since fiscal decentralization is so multidimensional, there is no single, or simple, measure of it. So, the studying of the impact of fiscal decentralization on various outcomes lies in its specific measures. The justification is that to measure fiscal decentralization, we have firstly to know the degree of devolution or the level of authority that regional governments actually possess. Despite the fact that the authority associated with decision making has been allocated on the basis of constitutional relationships among tiers of government, it is still difficult to measure quantitatively the allocation of authority or responsibility in real terms (Akin et al, 2002).

Nevertheless, notwithstanding all these reservations, in order to investigate numerically the potential contribution of fiscal decentralization to the outcomes considered, we must first

construct a quantitative measure of fiscal decentralization, at least as a proxy for the devolved fiscal resources. The ordinary approach in measuring the level of decentralization is to make use of Budget Data Approach such as the formal division of expenditures and revenues between levels of government. Hence, among the several budget data measures used in analysis of any fiscal decentralization, in the context of Ethiopian fiscal decentralization, we are confined to the following measures.

a) **Expenditure Decentralization Ratio:** this is an annual percentage of regional government spending to total federal government spending. This is the standard measurement for fiscal decentralization commonly used in the literature (Yee, 2001). Yee (2001) also adds that the higher the ratio of this measure, the greater the degree of fiscal decentralization. The implication is that once the expenditure responsibility is given to regions, each region has its own options to allocate its budget to its priority sectors. That is, a region will have a wider opportunity to trade-off among sectors in allocating its annual budget. For example, for a given year, one region may have more need in health expenditure, while other region may incline to allocate its budget to education. Thus, in case of this situation, expenditure decentralization gives each region an oscillation to allocate its expenditure to its preferable sectors that help it to improve its sector performance in realizing the desired outcomes (Habibi et al, 2001).

Block grant to Expenditure Ratio: it is an annual percentage of block grant given to a specific region from the federal government to its annual expenditure. In fact, the block grant given to regions has two purposes: first, it has an equity impact among the regions, especially on the underserved regions where particular emphasis is given on the grant distribution

formulae. Second, the block grant has supplementary effects on the financial capacity of all regions to carry out their investment in their preferable projects or sectors. Thus, in addition to the expenditure decentralization, it is also essential to analyze the impact of this block grant on the outcomes separately, as it has both equity and complementary effects in financing regional priority sectors such as health and education

- d) **Revenue Decentralization Ratio:** - it is the ratio of annual regionally raised revenue to a regional expenditure. In this regard, the grant given to the specific region will not be added to the regional revenue. This gives an indication of the regional government's independence from the federal government's supplementary funding. More clearly, this measure indicates to what extent that each region is able to finance its priority sectors by itself in a given year. So inclusion of this variable in the analysis will indicate us a region's ability of self financing in enhancing the outcome considered.
- e) **District-Level-Decentralization:** - District-Level Decentralization was the second major program introduced towards public sector improvement in the country. It was initiated in 2002 with the aim to devolve powers and resources from the regional and zonal administrative levels to district level. Woredas were given greater economic (fiscal) and administrative powers to implement development plans based on locally determined priorities, consistent with national development goals and priorities. Based on this fact, District-Level Decentralization is also our fourth and *major measure of fiscal decentralization* to be incorporated in the regression analysis.

In fact, this measure is a good summary of all measures as it clearly indicates the effects on the outcomes both *before* and *after* the launching of massive fiscal decentralization. Additionally, it has the potential to include not only the fiscal decentralization, but also all dimensions of decentralization that are not captured by the fiscal decentralization such as administrative and political decentralization.

However, even though it is also possible to quantify the District-Level Decentralization numerically using district's annual budget, revenue and block grant given from regions, we have restricted this kind of measurement in to a *dummy variable*. The first reason why we have limited it in to a binary variable is because our models are specified at regional level not at Woreda level. The second reason is because the District-Level Decentralization was introduced after some years of the middle-level- decentralization. For this reason, we find it more evident to restrict this measure in to a dummy variable.

Thus,

$$\text{District-Level -Decentralization} = \begin{cases} 0, & \text{for the period before 2002} \\ 1, & \text{for the period after 2001} \end{cases}$$

After developing these quantitative measures as a proxy for the devolved fiscal resources, we can again identify the outcomes that best fit for the purpose of this study.

4.2.3. Choice of Outcome Indicators

To analyze the effects of fiscal decentralization on education and health outcomes, appropriate and specific outcome variables have to be chosen. Accordingly, though it is possible to evaluate the policy's effects on various outcomes, for the purpose of this study, we have chosen the following outcomes.

Education Outcomes: Gross Enrollment Rate is one of the most important measures of education outcomes. It is the percentage of total enrollment in primary schools, irrespective of age, out of the corresponding primary school age population. Gross Enrollment Rate is a crude measure of coverage as it usually includes under-aged and over-aged pupils. In fact, in countries where universal primary education is achieved, net enrollment rate is the best way of measuring participation rate and is a more refined indicator of coverage in terms of explaining the proportion of pupils enrolled from a specific age group. However, in developing countries where universal primary education is still in progress, like in Ethiopia, gross enrollment rate is the most appropriate and widely used indicator of access or participation rate in the education sector. As the result of this phenomenon, we have chosen gross enrollment rate as proper measurement of education outcome in this study. Furthermore, we shall again evaluate the effects on dropout rate so as to assess the efficiency effect of the policy.

Health Outcomes: For the health dependent variable, we have used infant mortality rate (IMR), defined as the number of deaths of children less than 1 year old for every 1000 births. Infant mortality has been considered as the single most exhaustive indicator of health outcomes in a society (Jemez, 2005). It reflects child's health and pregnant women's health, in addition to the state of health development within the society. Moreover, infant mortality is superior to life

expectancy, our alternative measure of health status, for two main reasons. Firstly, because infant mortality is more reliably measured than life expectancy. Infant mortality figures are based on actual data, whereas life expectancy figures are based on extrapolations from child mortality data and assumed life tables. Secondly, because infant mortality is more sensitive to policy reforms such as decentralization than life expectancy. For this reason, we have chosen infant mortality rate as main health outcome indicator for the purpose of this study. In fact, for social service access impact evaluation purpose, we shall also check the effect on percentage of fully immunized children.

The above discussions are justifications as to why these dependent variables are chosen for evaluating the impact of fiscal decentralization on education and health outcomes. But the other side, (RHS), has not been completed yet. In addition to the measures of the fiscal decentralization mentioned above, a set of explanatory variables are needed to be included for controlling purpose. That is, while our main interest is to evaluate the effect of fiscal decentralization on the outcomes considered, fiscal decentralization constitutes only one aspect of the multifaceted reform efforts in the country, and is likely to correlate with others. Thus, we must acknowledge the fact that educational attainments and/or health outcomes are greatly subjected to many influences beyond fiscal decentralization. Based on this fact, we introduce a set of socioeconomic control variables to improve the robustness of the results.

In light of these facts, to realize the objective of the study, the following general equation is used to assess the relationship between fiscal decentralization and targeted outcomes,

$$Y_{it} = f(FD_{it}, X_{it}, Z_{it}) \dots\dots\dots (1)$$

Where y_{it} is education or health outcome for region i at time t ; FD_{it} is fiscal decentralization variables, X_{it} represents regional variables that explains for education or health variables, and Z_{it} is vector of other unobserved variables. For better understanding of the explanatory variables in the general equation specified above, we can rewrite or expand it explicitly in the following way;

$$Y_{it} = \alpha_i + \beta_1 FD_{it} + \beta_2 R_{it} + \beta_3 C_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

Where, Y and FD are as mentioned in equation (1). Whereas R is a vector of measures of resource availability (*i.e.* supply factors) that might independently affect education and health outcomes and C is a vector of socio-economic and geographic controls that affect both outcomes independently. Of course, in this study to make the models easy, while supply-side control variables are different for the two sectors' outcomes, the socio economic control variables used are the same for both education and health outcomes in the analysis.

The most important socioeconomic and geographic control variables included in the analysis are dependency ratios, estimated per capita income, and population size. In fact, we also include percentage of regional urban population to assess *the differential impact* of urban over rural areas on both education and health outcome. The reason is because there is significant difference between urban and rural areas in having access to various public facilities. For instant, the 2004 Welfare Monitoring Survey indicates that rural households continue to face significant travel times and distances to access public services. More specifically, on average, children in rural areas have a 45-minute walk to school. Secondary school access is highly problematic – the average rural household is 20 km from a secondary school and children face nearly a four-hour journey each way to reach one. The average rural household is more than two hours away from a

- **Reduced Model for Health Outcomes**

$$HEALTHOM_{it} = \alpha_i + \beta_1 FD_{it} + \beta_2 HELTHEXPP_{it} + \beta_3 URBIN_{it} + \beta_4 DEP NR_{it} + \beta_5 \log EINC_{it} + \beta_6 \log MHC_{it} + \beta_7 UNDRWHT_{it} + \beta_8 \log POP_{it} + \varepsilon_{it} \dots\dots\dots (4)$$

Where:

- i: 1,...N (Regions); ε_i: the stochastic disturbance term;
- t: 1,...T (1995/6-2007/08); ε_{it} ~ i.i.d. (0, σ²_ε)

Dependent Variables	
EDUOM= Education outcomes (gross enrollment rate and dropout rate in public schools)	
HEALTHOM= Health outcomes (fully immunized children and infant mortality rate)	
Control variables for Education Outcomes.....Expected Effects	
URBIN: Urbanization.....	(+,-) ^a
DEPNR: Dependency ratio.....	(+,?)
EINC: per capita income.....	(+,-)
EDUEXPP: educational expenditure per pupils	(+,-)
PRVTGER: Private gross enrollment rate.....	(?,?)
POP: Population sizes.....	(+,?)
Control variables for Health Outcomes	
URBIN: Urbanization.....	(+,-) ^b
DEPNR: Dependency ratio.....	(?,+)
EINC: Estimated per capita income.....	(+,-)
HELTHEXPP: per capita public health care expenditure.....	(+,-)
MHC: percentage of maternal health coverage	(+,-)
UNDRWHT: percentage of underweight born	(?,+)
POP: Population sizes.....	(++)
FD: Measures of fiscal decentralization (We'll regress them one by one to avoid Multicollinearity)	
District-Level Decentralization (Dummy Variable).....	[(+,-),(+,-)] ^c
Expenditure decentralization ratio.....	[(+,-),(+,-)]
Revenue Decentralization ratio.....	[(+,-),(+,-)]
Block grant to expenditure ratio.....	[(+,-),(+,-)]
<p><i>a. In the education sector, while the first sign represents the expected effect of the indicated variable on Public Gross Enrollment Rate (PGER), the later represents the expected effects on dropout rate.</i></p> <p><i>b. In the same way, while the first sign represents the expected effect of the indicated variable on percentage of full immunization coverage, the later represents the expected effects on Infant Mortality Rate (IMR) in the health sector</i></p> <p><i>c. While the first parenthesis represents for the Education outcomes, the later is for health outcomes</i></p>	

The main advantage of using panel data estimation techniques is the attenuation of the problem of omitted variables. Panel data models control for individual heterogeneity, that is, inherent

characteristics of the population of interest that are either unobservable or non-measurable (e.g. preferences, managerial skills, institutional capacity) (Baltagi, 1995).

Fixed effects and random effects are the two most usual panel data methods. A fixed-effects model indicates that there are significant regional specific effects that could bias the estimates of the models if not accounted for in the analysis. Thus, a fixed-effects model accounts for regional specific effects, implying that any correlation between the education and health variables and the decentralization variables cannot be attributed to inherent regional characteristics if fixed model is employed in the regression analysis. However, if there are no significant regional specific effects that could bias the estimates of the model from the outset, a random-effects model is appropriate. However, without systematic test, we cannot say any conclusive idea whether fixed or random effects model is appropriate for a given penal data set. Hence, before we provide any remarks in model selection process, we have to conduct formal model test.

For this purpose, the Hausman test is the most common test used to verify whether the fixed effects and random effects estimator are significantly different. Based on these facts, to determine which specific model is more appropriate for this study, we will estimate the models with a fixed-effects model and a random-effects model. We shall then conduct a Hausman specification test to judge whether a random effects or a fixed effects model would be more appropriate to estimate the models with.

Chapter V

5. Results and Discussions

This chapter presents the results from both descriptive and regression analysis into two sections. While the first section deals with descriptive analysis, the second one takes on the econometric results.

5.1. General Descriptive Statistics

Although we have fully assessed the trend of the fiscal decentralization and outcomes in chapter three, it is advisable to reconsider the general trend of those variables before we proceed to the estimation part. Accordingly, Table 5.1 presents the summary statistics of the main variables. The table indicates that while the expenditure decentralization of the regions varies from 3 percent to around 40 percent, the revenue decentralization ranges from 1.2 percent to 100 percent, with mean value of 19.41%. On the revenue decentralization side, while the lowest values belonged to Somalie and Afar, the 100 percent revenue decentralization represents for Addis Ababa city administration. The fact is that the city administration is, most of the time, autonomous in financing its public sector as it collects taxes that cover its expenditure.

Table 5.1: Descriptive statistics of main variables

Measures of fiscal decentralization	Period	Obs	Mean	Std.dev.	min	max
District-Level- Decentralization	1995/6-2007/08	143	.461	.501	0	1
Expenditure decentralization ratio	1995/6-2007/08	143	.195	.097	.03	.394
Revenue Decentralization ratio	1995/6-2007/08	143	.194	.252	.012	1
Block grant to expenditure ratio	1995/6-2007/08	143	.816	.187	0	.956
Outcome Variables						
Public Primary gross enrollment rate	1995/6-2007/08	143	75.6	30.9	8.4	141
Girls' primary Gross enrollment rate	1995/6-2007/08	143	61.14	36.58	6.6	179.7
Public Primary dropout rate	1995/6-2007/08	143	13.93	10.35	3.2	22.4
Gross enrollment rate of Lower secondary school	1995/6-2007/08	143	27.49	24.12	.5	108.2
Full immunization coverage (%)	1995/6-2007/08	143	31.70	22.32	.45	84
Infant mortality rate/1000 live births	1995/6-2007/08	143	103.95	35.74	41	198

Thus, it is apparent to see that the ratio of revenue collected to total expenditure is one for the city for some selected years. Following this fact, the minimum value of the block grant to regional expenditure ratio is 0. But, unlike this, the maximum value for the block grant to regional expenditure ratio is about 96 percent with large mean of 81.6 percent. This clearly indicates that most of the regions have been highly dependent on the block grant distributed from the federal government in financing their public sector over 1995/96-2007/08. This is also verified by the small standard deviation of 18.7 percent, indicating that the block grants to expenditure ratios are concentrating around the mean value of 81.6 percent

Coming to the outcomes' statistical description, Table 5.1 again indicates that while the mean value of overall public primary gross enrollment rate is 75.6 percent, female gross enrollment rate has reached, on average, 61.14 percent over 1995/96-2007/08. This is also accompanied by fair value of completion rate that is evidenced by both lower dropout rate and increasing enrollment rate at lower secondary school (9-10). By the same token, the table indicates that the mean value of the percentages of fully immunized children and infant mortality rate are 31.7% and 103.95 per 1000 lives of births respectively, over the period of 1995/6-2007/08.

However, Table 5.1 does not describe the exact statistical nature of the outcomes alongside of the decentralization process. To do so, Table 5.2 provides average figures before and after District-Level-Decentralization. In constructing the before-after decentralization periods, we use the year 2002 as a benchmark for demarcation. The fact is that it is from this year onwards that massive decentralization of fiscal resources has been devolved to district level. Accordingly, we have divided the total scope of the study period in two broad periods. While the period between

1995/96-2001/02 is termed as pre-district level decentralization, the remaining 6 years period, 2002/03-2007/08, is named as post- district level decentralization.

In view of that, Table 5.2 indicates several interesting results. All the considered outcomes have shown a significant increase after the district level decentralization. To begin with the public primary gross enrollment rate, the mean value of this outcome increased from 56.76 to 93.92 percent. Similarly, girls' primary gross enrollment rate and that of lower secondary school increased across the two periods, from 44.02% to 75.8% and 20.88% to 35.69% respectively. The primary dropout rate also declined dramatically from 15.23 to 7.8 %.

Table 5.2: Statistics Summary of Outcomes in both pre and post decentralization

Total No. of observations 143 (N=143)	Pre-Woreda-level Decentralization (1995/6-2001/2)			Post-Woreda-level Decentralization (2002/3-2007/8)		
Outcomes Variables	Obs	Mean	Std.dev	Obs	Mean	Std.dev
Primary gross enrollment rate	77	56.76	28.46	66	93.92	16.9
Girls' primary Gross enrollment rate	77	44.02	35.22	66	75.81	26.43
Primary dropout rate	77	15.23	15.24	66	7.81	5.05
Gross enrollment rate of Lower 2ndry	77	20.88	26.09	66	35.69	17.40
Full immunization coverage (%)	77	21.25	17.95	66	43.89	20.77
Infant mortality rate / 1000 lives birth	77	125.04	33.46	66	79.34	18.46

With respect to the health sector, there is again a noticeable change in the mean value of health outcomes across the two periods. While the percentage of fully immunized children increased from 21.25 to 43.89 percent, the average value of infant mortality rate declined from 125.04 to 79.34 per 1000 lives of birth in the post-decentralization period.

Likewise, disparity of outcome is getting narrower and narrower in the post district decentralization period. This is evidenced by the relatively high standard deviation of 28.46 percent in public gross enrollment rate, but this has declined to 16.9 percent in the post- distract

level decentralization period. This clearly implies that Woreda level decentralization is associated with narrowing down of disparity in access to social services in the country.

In fact, in order to appreciate the change in education attainment across the regional states, we can have a close look in Table 5.3. Regions such as Afar and Somalie have shown a higher increasing enrollment growth rate than the other regions throughout the district level decentralization period.

Table 5.3: Comparison of relative achievement in GER1 across regions (%)

Regions	GPER 1995/6	GPER 2001/2	Change 1995/6- 2001/2	Massive District (Woreda) level Decentralization el in 2001/02	GPER 2007/08	Change 2001/2- 2007/08
Tigray	43.7	73.9	69			109.4
Afar	8.4	11.5	37		26.2	222
Amhara	17.9	53.3	198		112.4	110
Oromia	21.2	57.9	173		91.4	58
Somali	11.6	10.6	-9		32.7	208
B/Gumuz	35.4	88.5	150		112.3	26
SNNP	28.8	63.8	122		102.9	61
Gambella	53.9	95.8	78		121.4	27
Harari	53.4	105.3	97		108.4	2.8
Addis Ababa	84.9	118.3	39		11 4.3	-3.4
Dire Dawa	41.0	75.7	85		86 .3	14
National	26.2	57.4	119		95.6	67
Coefficients of variance	61	50	-18		28	-24

Source: Educational statistical abstracts (Compiled from MoE statistics)

In other words, after district level decentralization, the percentage change of growth rate for Tigray, Amhara, Oromiya, B.Gumuz, SNNP, Gambela, Harari, addis Ababa, and Diredawa has decreased from 69 to 48, 198 to 110, 173 to 58, 150 to 26, 122 to 61, 78 to 21, 97 to 2.8 , 39 to -3.3 and 85 to 14 respectively over the fiscal years of 2001/2- 2007/08, while the percentage change of growth rate for Afar and Somali has increased from 37 to 222 and -9 to 208 respectively.

The high percentage changes in enrollment rates, in regions with pastoral and semi-pastoral communities, are achieved basically due to the massive decentralization to Woreda level in the

country. This clearly indicates that District-Level-Decentralization is a pro-poor policy that creates accessible public sector in which remarkable outcomes are achieved in remote areas.

In sum, all the considered outcomes have shown a noticeable change in the post-decentralization period. The changes occurred in a direction that fiscal decentralization improves the performance of social welfare outcomes in a public sector.

Having examined changes in outcomes and decentralization independently, it is now useful to explore how decentralization and outcomes interact. Accordingly, Table 5.4 reports the bivariate correlations between main outcomes variables and the fiscal decentralization variables. For economic of space the general multivariate correlations are indicated in appendix-(Table: A2)

Table 5.4: Fiscal Decentralization and Outcomes: Simple pairwise correlations

Measures of FD	GER1	GGER1	DRPOUT	GER2	IMR(log)	IMMUNZ (%)
District-Level Decentralization	0.659***	0.510***	-0.337 ***	0.4823***	-0.583 ***	0.5075***
Revenue decentralization ratio (lag)	-0.041	-0.035	0.021	-0.1152	0.0900	0.1440*
Expenditure decentralization ratio	0.351**	0.434***	-0.324***	0.4314***	- 0.319 ** *	0.4538***
Block grant to expenditure ratio	0.266***	0.431***	-0.101**	0.3196**	-0.301**	0.3908**

***: **, and *, Significance at 1%, 5% and 10% respectively

These simple correlations provide *prima facie* evidence of a statistical association between the outcomes and fiscal decentralization. A striking fact is that correlations with District-Level-Decentralization, followed by expenditure decentralization ratio, are stronger than with other two decentralization variables. It is apparent to see that revenue decentralization and block grants to expenditure ratio have little correlation with the outcomes. And even revenue decentralization has opposite to the prior expected sign with most of the outcomes. Though it is difficult to

conclude before rigorous analyses, the unexpected sign of the revenue decentralization may come from the fiscal gaps that exist across the regions.

However, these correlations might be misleading because decentralization is correlated with other regional characteristics. These correlations could simply be reflecting of own direct impacts, rather than a sign of the decentralization's impacts on the considered outcomes. Therefore, the statistically significant correlations obtained might reverse into statistically insignificant or even change the associated signs ones as soon as other relevant variables are controlled for in the multivariate regressions that follow. Hence, to conduct a rigorous regression and ascertain the above indicated correlations, we now proceed to the empirics of question.

5.2. Econometric Estimation and Interpretation

The descriptive analysis part of this study has shown that decentralization in Ethiopia is associated with a marked increase in the number of public-school enrollment rate and a radical decline in infant mortality rate. As a result, in order to investigate and ascertain this relationship more rigorously, an attempt is made, applying regression analysis to aggregate (regional-level) panel data set between 1995/96 and 2007/08. Hence, in this sub-section, we complement our descriptive analysis with an econometric assessment.

However, before we proceed into interpretation of the results, we have to say little about the model selection in the regression analysis. We estimate the effects of the policy on the outcomes using fixed effect model. We prefer this to a random effects model for two reasons. Firstly, from the previous analysis, we observed that the regions are characterized by heterogeneous public sector in which access to social services vary greatly among them. There is wide variation in the

institutional structure of the regions. Some regions are naturally more efficient and have better access to administrative and technical knowledge. For example, the accessibility to health centre and basic education is quite different for the two communities who live in Addis Ababa City Administration and Afar regional government. While the first is dominantly urban area, the later is quite pastoralist and semi-pastoralists. This is a good reason why of either variable (education or health outcome) might vary systematically by regions. Hence, there is quite intuitive signal for fixed effects model. Secondly, the Hausman Test shows that fixed effects estimates are consistent (see Appendix-Table A5, for Hausman test). The test is significant enough to reject the random effect model. This test verifies that fixed effect model is appropriate in a country as large and diverse as Ethiopia where institutional differences among regions are historically so high. In light of those facts, only fixed effect regressions' results are reported in estimating the effects of fiscal decentralization on basic education and health outcomes in this study.

Additionally, there is still one caveat to be noted. The specified models are based on the theory that a given level of expenditure will produce improved outcomes when allocated and executed locally rather than centrally. But there is a possibility of endogeneity for some of the decentralization variables. This may happened to the revenue decentralization variable. Local tax does not affect school enrollment and health access directly. Rather local taxes affect those outcomes through decisions made in *local budgeting process*. The fact is that the revenue decentralization should have a high correlation with local expenditures, but no correlation with increases in student enrollment or health access. Hence, to control this endogeneity, we find it convenient to use a one year lag of revenue decentralization in the analysis

5.2.1. Estimated Effects on Education Outcomes

5.2.1.1. Estimated Effects on Public Primary Gross Enrollment Rate

Before we evaluate the impact of fiscal decentralization on the outcomes of interest, we conducted a regression analysis only on the socio-economic and geographic control variables, without including any variable of decentralization. We undertake this intentionally to assess the effects of the control variables on the outcomes before we proceed to the policy variables.

Accordingly, the result of fixed effects model is reported in the first column of Table 5.5. The result shows that the basic equation performs relatively well. Most of the explanatory control variables are significant at 5 percent level with the expected signs.

The first control variable used in the analysis is estimated per capita income. This variable is used to account for household characteristics in a specific region as it is one of the most common control variables in decentralization analyses. The income variable functions as the opportunity cost of primary education: when parents have lower levels of income in a region, they depend more heavily on their children in generating income source. Children from low income households help with farm duties, or even work for family income generation. Therefore, it is expected that higher levels of income are associated with higher levels of enrollment, as students will be less needed outside of school. Accordingly, it can be seen from the table that the estimated regional per capita income has positive and significant effect on public gross enrollment rate. This result implies that education participation rate depends on regional households' economic level in Ethiopia.

Secondly, urbanization (proportion of regional population who are urban residents) is used to account for differential impact of geographical location on enrollment rate. It is widely noticeable

fact that access to social services is quite different for the two residential locations. According to the 2004 Welfare Monitoring Survey, rural households continue to face significant travel times and distances in order to access public services. But, access to these basic services is much better for urban households. For example, while, on average, children in rural areas have a 45-minute walk to primary school, primary schools are less than 20 minutes away in urban areas. Accordingly, in the regression analysis we find that urbanization has, *ceteris paribus*, 16.2% differential and significant effect in explaining public primary gross enrollment rate in Ethiopia.

Additionally, perhaps one of the most interesting result is that public primary enrollment rate rises with the share of students attending private schools, indicating *complementarity* between the public and private education systems. This contradicts the usual impression of substitution between public and private education sectors. Decentralization appears not to improve public schooling at the expense of private schools, but rather to promote the idea of education more generally. Similarly, we also include log of regional primary educational expenditure per primary pupil. We then find positive effect and significant as expected.

Furthermore, we also include dependency ratio as indicator for socioeconomic status and log of population for controlling the size of regional public sector. The effects are estimated to be positive and significant at 5 percentages. The implication is that enrolment rate is also affected by households' size and composition in Ethiopia. In fact, this finding is more or less similar to earlier study by Mulat (1997). As indicated in Tassew W. etal (2005), Mulat (1997) argued that having more children within a family *increases* the probability of enrolment, assuming other factors are held constant, implying that the probability of going to school declines for households with fewer children.

By and large, the supply-side factors and socio-economic characteristics of the population are found to be important determinants of public gross enrollment rate in the analysis.

However, our main interest is not to assess the impact of those variables. The main focus of this paper is rather to see the policy's effects. Thus, in our second step, we include the four measures of decentralization variables in the regression turn by turn. In fact, we have already checked the problems related to collinartiy among independent variables by calculating variance inflating factors (VIF) of each independent variable (see appendix-Table A4). But we did the regression separately fundamentally to evaluate the effects of each decentralization variable in isolation; and probably to avoid any undetected multicollinarity too. In light of this fact, four separate regression analyses are conducted on each of the four measures of education outcomes: public primary gross enrollment rates, public gross enrollment rate of girls, dropout rates, and public gross enrollment rate of junior secondary school (9-10). Note that except for the later one, the same control variables are introduced in each regression analysis in order to maintain consistency throughout the study.

Following this fact, results based on four different types of indicator of fiscal decentralization are presented in Table 5.5. The first measure of decentralization variable that we include in the regression is the dummy variable which is termed as District Level-Decentralization. As we have already mentioned in the methodology part, the decentralization process has two major phases. While the first phase is decentralization to regions in 1994/5, the second phase is massive decentralization of fiscal resources to districts in 2002/03.

Accordingly, the second column of Table 5.5 indicates the results obtained from the fixed effect model. As expected we find a positive effect for the dummy variable and statically significant at 1% level. Quantitatively, *ceteris paribus*, the District-Level-Decentralization is, on average, associated with 29.36% jump in public primary gross enrollment rate. The justification is that the migration of fiscal resources and responsibility from the center to regions and further to woredas, have significant effects on public primary school enrollment rate. The fact is that efficiency and effectiveness are most likely to be improved under decentralization when service providers at schools level, local governments, or regional governments-are held *accountable for results*. Accordingly, this result confirms the hypothesis that fiscal decentralization significantly contributes to enrollment rate.

Table 5.5: Regressions of Public Primary Gross Enrollment Rate on FD and Control Variables

Fixed Effects Model	Public Primary Gross Enrollment Rate: Dependent Variable				
Control Variables	(1)	(2)	(3)	(4)	(5)
• primary educational expenditure Per primary pupil(log)	7.402*** (.0185)	6.093*** (.1841)	5.349*** (1.935)	6.087*** [1.018]	4.218** (2.547)
• Urbanization ratio	0.162** (.0569)	0.134*** (.012)	0.097*** (.034)	0.101 2* (.0672)	0.0839** (.048)
• Estimated Per capita Income(log)	1.443 *** (.0217)	1.362*** (.389)	1.627** (.812)	1.891*** (.612)	1.126** (.581)
• Dependency ratio	0.0896** (.0392)	.0874*** (.019)	0.1021** (.654)	.0787** (.032)	.0354 (.045)
• Private Gross enrollment rate	0.0372 *** (.01076)	0.0378** (.0109)	0.041 ** (.0211)	0.054* (.031)	0.0262* (.019)
• Population sizes(log)	1.299*** (.1673)	1.322*** (.2099)	2.819*** (.3427)	2.425*** (.362)	3.543*** (.4321)
• Constant	-18.47*** (2.312)	- 18.81** (2.969)	-17.67*** (1.458)	-8.675 *** (.5372)	0.4897*** (.0193)
Measures of Fiscal Decentralization					
• District-Level Decentralization (Dummy)		0.2936*** (.03134)			
• Expenditure decentralization			0.0839*** (.0069)		
• Revenue decentralization (lagged)				-0.032 ** (.0115)	
• Block grant to expenditure ratio					0.0459* (.0271)
Within R ²	0.7579	0.758	0.732	0.749	0.717
Hausman tests[chi ² (6 or 7)] ^{Ho}	93.05	49.16	132.52	151.65	68.22
Prob > chi2	0.000	0.000	0.00	0.000	0.000
F(6,126) or F(7,125)	65.75	55.93	57.54	62.98	54.19
Prob > F	0.000	0.0000	0.0000	0.0000	0.0000
Number of Observation	143	143	143	142	143
Number of groups	11	11	11	11	11

Note:

- Value in Parenthesis are standard errors
- ***, ** and * are Statistically significant at 1%, 5%, and 10% level respectively
- Ho: Hausman Test rejected Random Effect Model

Next to the District-Level-Decentralization, we add expenditure decentralization in to the analysis. The third column of the table again shows positive effects of this fiscal variable and statistically significant at 1% level. Given the linear functional form used in the estimation and *holding others constant*, a one percent increase in expenditure decentralization would increase the gross enrollment rate by 8.39%. The implication is that when the expenditure decentralization increases, all regions will have wider opportunity to allocate their expenditure to their most priority sectors. Constitutionally, regions and districts are given broader ranges to trade-off in resources allocation among sectors. This gives them the chance to allot significant amount of funds to basic education so as to create conducive schooling environment in remote and underserved areas of the country.

Likewise, the third measure of fiscal decentralization that we include in the analysis is revenue decentralization. However, by contrast, the coefficient of this variable is negative and significant at 5% level. Though it is difficult to give any conclusive reason as to why the impact of this variable is opposite to the expected sign. Perhaps, this effect may come basically from the existing fiscal imbalance across the regions. As we saw in the descriptive analysis, the revenue decentralization does not match with the expenditure decentralization. We observed a situation where central transfers shaped a large part of total regional revenue source. This central transfer may create unpredictable future revenue for the regions. Such uncertainties discourage fiscal planning and effective budgeting, which in turn causes public enrollment rate to fall.

The last fiscal variable that we include in the analysis is the ratio of block grant to regional expenditure. The coefficient for this variable is positive and statistically significant at 10 percent [see column (5)] of the table. Holding others constant, a one percent increase in block grant to expenditure ratio would increase the public gross enrollment rate by 4.59 percent. In this regard, regression results reveal that block grant as a determinant of public enrollment rates- essentially with inter-regional equity effects across the regions.

5.2.1.2. Estimated Effects on Public Gross Enrollment Rate by Gender at Primary Level

In addition to the general access impact of the policy on public primary gross enrollment, we also regressed separately by gender in order to assess the gender-equity effects. In our descriptive part, we have seen that the gender parity index has reached to a level of 91% by 2007/08.

This is confirmed in the analysis by regressing separately girls' gross enrollment rate on the measures of fiscal decentralization and control variables. Table 5.6 shows the launched decentralization policy is not only effective in mass gross enrollment, but it has also played a significant role in creating pro-female school environment.

Numerically, the table in its first column indicates, after the introduction of District- Level- Decentralization, girls gross enrollment rate is 31.24% higher than its previous value (in 2001/02). This clearly indicates that the impact of decentralization is more pronounced in girls' enrollment than the total one (see Table 5.5). The justification is that the shift of fiscal resources to local governments, making fiscal resources available closer to the service users, have created a conducive public sector structure in which females are *relatively* more beneficiary from the

education system. This phenomenon implicitly indicates that fiscal decentralization has an intrinsic value by which it creates a pro-poor public sector at the grassroots level.

The same is true for the other measures of fiscal decentralization. The table in its second and third columns indicates when each of expenditure decentralization and financial autonomy of the regions increase by one percent, *holding others constant*, girls' gross enrollment rate increases by about 5.32% and 1.25% respectively.

Table 5.6: Regressions of Girls' Gross Enrollment Rate on FD and control Variables

Fixed Effects Model	Public Gross enrollment rate- Girls: DV			
Control Variables	(1)	(2)	(3)	(4)
• primary educational expenditure Per primary pupil(log)	8.389*** (2.809)	3.674*** (1.729)	4.412* (2.992)	3.681 (2.847)
• Urbanization ratio	.1074*** (.0191)	0.0699** (.0273)	0.0544*** (.0254)	0.0412** (.0121)
• Estimated Per capita Income(log)	1.26*** (.1029)	1.465*** (.3921)	1.391** (.617)	1.536*** (.5065)
• Dependency ratio	0.0554* (.0355)	0.0456** (.0285)	0.0385 (.0194)	0.041* (.023)
• Private Gross enrollment rate	0.0651*** (.0975)	.0616* (.0394)	0.042** (.018)	0.0699** (.0213)
• Population sizes(log)	1.389*** (.1868)	1.458*** (.5645)	1.185*** (.1615)	1.513*** (.373)
• Constant	-19.201*** (2.641)	-15.613 (3.482)	-3.567*** (1.052)	-2.462** (.9837)
Measures of Fiscal Decentralization				
• District-Level-Decentralization(Dummy)	0.3124*** (.0149)	_____	_____	_____
• Expenditure decentralization	_____	0.0532**	_____	_____
• Revenue decentralization (lagged)	_____	(.02514)	0.0125 (.01521)	_____
• Block grant to expenditure ratio	_____	_____	_____	0.0379*** (.0091)
Within R ²	0.687	0.673	0.639	0.617
Hausman tests[chi ² (7)] ^{Ho}	51.39	62.83	58.42	73.22
Prob > chi2	0.000	0.000	0.000	0.000
F(7,125)	86.39	76.02	57.19	81.24
Prob > F	0.000	0.000	0.000	0.0000
Number of Observation	143	143	142	143
Number of groups	11	11	11	11

Note:

- Value in Parenthesis are standard errors
- ***, ** and * are Statistically significant at 1%, 5%, and 10% level respectively
- Ho: Hausman Test rejected Random Effect Model

In the same way, it is obvious to see from the last column when the percentage share of block grant to total regional expenditure increases by one percentage, girls' gross enrollment rate

increases by 3.79 percentages, *holding others constant*. This indicates that girls' enrollment rate is highly responsive to the intergovernmental transfer, suggesting that block grant has played a significant role in reducing both regional and gender disparities in education attainment in Ethiopia.

5.2.1.3. Estimated Effect on Public Primary Dropout Rate

The previous regression analyses on public primary gross enrollment rate reveal us only half of the story. That is, they show us only the equity and access impacts of the decentralization. They do not take into account the efficiency effects of the policy such as effects on drop-out rate, repetition rate, completion rate and survival rate etc. It is commonly known fact that leaving a school (dropout) before completing a particular cycle or level of education is wastage of resources. Thus, it is advisable to evaluate effect of the policy on efficiency. Taking this situation in to consideration, we have conducted another set of regressions on public primary dropout rates to test the efficiency effects of the policy.

As the result of this, the results of fixed effect model are presented in Table 5.7. As expected and indicated in the first column of the table, district level decentralization has a negative and significant effect on dropout rate. In quantitative terms, *ceteris paribus*, after launching of DLD, the public primary dropout rate is, on average, 8.75% lower than its pervious points. The result indicates that soon after the regions instituted district-level decentralization, districts have been equipped well to manage and finance schools that enable them to retain a significant number of students across all regions in the country.

In the same way, the effect of expenditure decentralization is indicated in column (2) of the table. The effect is as expected and significant at 10 percent. By the same token, the impact of the share

of local taxes to total expenditure is indicated in column (3). However, the indicated positive effect is not expected. The result shows that dropout rate increases by around 0.45% when revenue decentralization rises by one percentage, *after controlling for observable characteristics*. This is surprising effect since we expect to see the opposite; but the possible reason for this situation could be that when the overall decentralization has significant impact on gross enrollment rate, and if the revenue decentralization is not sufficient enough to cover the expenditure decentralization to implement effective school management at the grassroots level, it may possible to get the reverses effects.

Table 5.7: Regressions of Primary Dropout Rate on FD and control Variables

Fixed Effects Model	Public Primary of Dropout Rate: Dependent Variable			
Control Variables	(1)	(2)	(3)	(4)
• Primary educational expenditure per primary pupil(log)	-3.234*** (.8753)	-1.2786** (.6137)	-0.9862** (.4872)	-0.8641** (.3543)
• Urbanization ratio	-0.133*** (.0251)	-0.043* (.0264)	-0.045** (.016)	-0.0417** (.0247)
• Estimated Per capita Income(log)	-0.0993** (.0282)	-0.085*** (.0255)	-0.0573* (.033)	-0.023* (.0142)
• Dependency ratio	-0.0404* (.0266)	-.0399*** (.011)	-0.045** (.013)	-0.0456* (.2194)
• Private Gross enrollment rate	-0.0795* (.0641)	-.038* (.016)	-0.053* (.0371)	-0.0591* (.0266)
• Population sizes(log)	0.1051*** (.0068)	0.124* (.0726)	0.0732* (.0592)	0.0831 (0.7564)
• Constant	12.748*** (2.246)	18.25** (6.25)	11.796** (3.941)	9.376*** (2.552)
Measures of Fiscal Decentralization				
• District-Level-Decentralization (Dummy)	-0.08752** (.02719)	_____	_____	_____
• Expenditure decentralization	_____	-0.0293*** (.0062)	_____	_____
• Revenue decentralization (lagged)	_____	_____	0.0045 (.0149)	_____
• Block grant to expenditure ratio	_____	_____	_____	-.0175*** (.00543)
Within R ²	0.564	0.592	0.430	0.617
Hausman tests[chi ² (7)] ^{Ho}	67.07	95.54	58.42	73.22
Prob > chi2	0.000	0.000	0.000	0.000
F(7,125)	78.00	82.27	59.85	68.27
Prob > F	0.000	0.000	0.000	0.0000
Number of Observation	143	143	142	143
Number of groups	11	11	11	11

Note:

- Value in Parenthesis are standard errors
- ** *, ** and * are Statistically significant at 1%, 5%, and 10% level respectively
- Ho: Hausman Test rejected Random Effect Model

We also find the effect of block grant to expenditure ratio is negative and significant at 1% level. As we can see from the last column of the table, when the block grant to expenditure ratio increase by one percentage, the dropout rate declines by about 1.75%, *other variables remain constant*. Those results verify that local governments have been performing well in minimizing efficiency loss of educational resources. In general, consistent with the previous two regression analyses, this regression analysis has also a satisfactory explanatory power in explaining the effects of the policy on the dropout rates at public primary education level.

Furthermore, even though we intended at first to assess the impact of the policy on the public primary completion rate, we could not find series data for the whole period from the Ministry of Education (MoE). The need to evaluate the effect of the policy on completion rate arise from the fact that, besides the net enrolment rate, primary completion rate is, an internationally, established measure of educational outcomes in assessing the indicators for the MDGs (World Bank, 2008).

As the result of this, to accomplish this part we employed data from the lower secondary school. The rationale in employing data from gross enrollment rate of lower secondary school is because the *inputs* of the lower secondary school are nothing, but the *output* of the primary education level. Thus, increasing enrollment rate at the lower secondary education demonstrates the improvement of completion rate at primary level.

Based on this fact, the subsequent regressions demonstrate the impact of the decentralization on the gross enrollment rate of lower secondary school to cross check the performance of primary completion rate- *at least in part*.

5.2.1.4. Estimated Effects on Public Gross Enrollment Rate at Lower Secondary School

As we did in the primacy school level, before we fully discuss the impact of the decentralization, it is imperative to assess the effects of the resource availability and socio-economic factors. Accordingly, as expected it is evident to see from Table 5.8 that dependency ratio, population, urbanization and regional per capita income affect the enrollment rate positively. It is also apparent to see the private sector school has kept its *complimentarity* in the lower secondary school. That is, each of the sub-sectors feeds each other. The implication is that fiscal decentralization creates an encouraging public sector in which the private education sector fosters to complement the public education sector in the development efforts of the country.

However, oddly, the per capita expenditure variable is insignificant in most of the regression and even negative in the third column of the table. This offers new evidence that raising gross enrollment rate is not a simple question of increasing the size of the educational expenditure, but rather depends on other factors related to the quality of spending, and allied decision-making in the public sector at grassroots level.

Coming back to the fiscal decentralization variables, the results from the analyses at lower secondary gross enrollment rates are similar to that of primary school level. When we look at the first column of Table 5.8, the differential impact of District-Level Decentralization is positive and significant at 1% level. The finding is that DLD is, on average, associated with about 17.42% raise in public gross enrollment rate at lower secondary school.

Table 5.8: Regressions of gross enrollment rate (Lower 2nd School) on FD and control Variables

Fixed Effects Model	Public Gross Enrollment Rate in Lower 2 nd School(9-10)			
Control Variables	(1)	(2)	(3)	(4)
• secondary education expenditure Per secondary pupils(log)	2.343 (1.458)	1.875 (1.932)	-0.9341 (.7673)	1.696 (.1381)
• Urbanization ratio	0.2431*** (.0344)	0.1732** (.8291)	0.0676* (.0412)	0.0937** (.0475)
• Estimated Per capita Income(log)	3.456** (1.098)	2.195* (1.378)	1.349** (.6021)	1.954*** (.3766)
• Dependency ratio	.06051** (.0291)	0.0097* (.0043)	0.0428* (.0274)	0.2245* (.0997)
• Private Gross enrollment rate in 2 nd school (9-10)	0.0429* (.0284)	0.0514** (.01372)	0.02213 (.02177)	0.0671* (.0382)
• Population sizes(log)	4.453* (2.611)	2.0952** (.0912)	1.094* (.0673)	1.113** (.4942)
• Constant	-12.57*** (2.159)	-6.391*** (1.271)	-2.087*** (.0321)	0.345** (.0125)
Measures of Fiscal Decentralization				
• District-Level-Decentralization(Dummy)	0.1742*** (.0543)	_____	_____	_____
• Expenditure decentralization	_____	0.0676* (.0395)	_____	_____
• Revenue decentralization (lagged)	_____	_____	0.0197** (.0087)	0.0395** (.0179)
• Block grant to expenditure ratio	_____	_____	_____	_____
Within R ²	0.734	0.722	0.551	63.23
Hausman tests[chi ² (7)] ^{Ho}	54.00	36.19	23.93	34.72
Prob > chi2	0.0011	0.000	0.0078	0.0013
F(7,125)	87.00	79.07	85.67	951.82
Prob > F	0.000	0.000	0 0.00	0 0.000
Number of Observation	143	143	142	143
Number of groups	11	11	11	11

Note:

- Value in Parenthesis are standard errors
- ***, ** and * are Statistically significant at 1%, 5%, and 10% level respectively
- Ho: Hausman Test rejected Random Effect Model
-

Similar findings are obtained for the other three fiscal variables. As we can see from the last three columns of the table, the effects of those variables are positive, but expenditure decentralization is significant only at 10% level. To state the estimates numerically, ceteris paribus, while a one percent increase in expenditure and revenue decentralization increase the gross enrollment rate by 6.76% and 1.97% respectively, a one percent increase in block grant to expenditure ratio is accompanied by 3.95 % rise in gross enrollment rate. In general, like in the primary school level, the fixed effects regression analyses shows that fiscal decentralization has also a positive and

statistically significant effect on public gross enrollment rate of lower secondary school in Ethiopia.

In sum, from the those empirical analyses, we can infer that fiscal decentralization appears to reap the benefits of the accountability framework by reducing the distance between citizens and policymakers to expand access to education with special emphasis in rural and undeserved areas of the country. The implication is that decentralization of fiscal resources along with real decision making power to local governments, schools or school councils is significantly able to increase fiscal and social accountability; and community participation at school level to promote access, efficiency; and inter-regional and gender equity in the primary education level of the country.

However, as both education and health outcomes are the two faces of the same coin in this study, we have not completed the scope of the study yet. That is, while evaluating the effect of the policy on educational outcomes represent only one part of the study, the remaining part of the study belongs to health outcomes. Thus, to complete the scope of the study, we are going to evaluate the effect of the policy on health outcomes in the following sub-section.

5.2.2. Estimated Effects on Health Outcomes

In analyzing the impact of fiscal decentralization on health outcomes, panel regressions are conducted against infant mortality rate and percentage of fully immunized children across all the regions. But unlike in the education outcomes, the outcomes in the health sector do not make any distinction between public health outcome and private health outcomes; even there is no any separate data documented for those outcomes in the Ministry of Health (MoH). Thus, caution should be taken while interpreting the effect of the policy on health outcomes- it includes the participation of private, NGOs and other health practitioners in the analyses.

With respect to model selection, we also estimated the effects by employing a fixed effect model, basically for reasons mentioned in the previous sub-section. In fact, employing fixed effect model is more convincing in the health sector than the education sector. The reason is because, unlike the education sector, the health sector is full of asymmetric information accompanied by wide ranges of externalities that vary systematically across all the regions.

Additionally, this intuition was supported by the Hausman Test. The test was significant enough to reject the random effect model in all the panel regressions. Thus, the specification of fixed-effects model implies that the immunization coverage and mortality rates have specific regional characteristics – the mortality rates in underserved regions are inherently different from the mortality rates in the other (accessible) regions. Accordingly, to accommodate these regional heterogeneities in the health outcomes, we have only presented the results of fixed effect model in the following ways.

5.2.2.1. Estimated Effects on Full Immunization Coverage

To proceed to the interpretation of the results, we begin with evaluating the impact on fully immunization children under age one. The first column of Table 5.9 indicates the parameter estimate for the dummy variable. The effect is large and statistically significant at 1% level in explaining immunization coverage. *Other things being equal*, District-Level-Decentralization is, on average, associated with a 23.19 percent *increase* in fully immunization coverage (against Polio, Diphtheria-Pertussis-Tetanus (DPT), and Measles etc) in the country.

Table 5.9: Regressions of Fully Immunized Children on FD & control variables

<i>Fixed effect Models</i>	<i>Fully Immunized children(%): Dependent Variable</i>			
Control Variables	(1)	(2)	(3)	(4)
• <i>Urbanization</i>	0.0501** (.017)	0.033* (.019)	.0328* (.0129)	0.027*** (.0019)
• <i>Dependency ratio</i>	0.003** (.0011)	-0.0058 (.0423)	0.0019 (.041)	0.0023 (.051)
• <i>Estimated Per capita income(ln)</i>	0.021** (.009)	0.0271*** (.0043)	0.147** (.068)	0.323 (.312)
• <i>per capita Public health expenditure(log)</i>	-0.005 (.002)	0.045** (.023)	0.036 (.045)	0.019 (.0397)
• <i>Maternal health coverage</i>	0.0055 (.0006)**	0.0611*** (.0064)	0.0601*** (.0064)	.056*** (.0049)
• <i>Population sizes(ln)</i>	0.355*** (.111)	0.478*** (.092)	0.482*** (.093)	.349** (.123)
Constant	-5.32** (1.597)	-6.95** (1.31)	-7.00** (1.32)	-5.42** (2.41)
Measures of Fiscal Decentralization				
• <i>District-Level Decentralization (Dummy)</i>	0.2319*** (.0744)	-----	-----	-----
• <i>Expenditure decentralization</i>	-----	0.0126* (0.0074)	-----	-----
• <i>Revenue decentralization (lagged)</i>	-----	-----	-0.00702* (.0037)	-----
• <i>Block grant to expenditure ratio</i>	-----	-----	-----	0.0681** (.0348)
Within R ²	0.877	0.874		0.871
Hausman tests(chi2(8)) ^{Ho}	57.54	20.13	0.872	38.11
Prob > chi2	0.000	0.0099	33.72	0.000
F(8,122)	127.00	121.25	0.000	125.82
Prob > F	0.000	0.000	118.54	0.000
Number of Obs	143	143	142	143
Number of groups	11	11	11	11

Note: .Value in Brackets are standard errors

- *** , ** and * are Statistically significant at 1%, 5%, and 10% level respectively
- Ho: Hausman Test rejected Random Effect

The justification is that decentralization has created a favorable health sector in allocating sufficient health inputs across all the regions, backed by community involvement and mobilization. It is also believed that the already introduced decentralization has also stimulated a higher level of local government accountability. This improvement in accountability in turn has contributed millions of children in all regions to have equal access to full immunization coverage.

The magnitude and direction of the coefficients of the other fiscal decentralization variables are almost similar to the effects of the dummy variable. In column (2), we find that expenditure decentralization is positive and significant at 10% level. The result shows that, *holding others*

constant, percentage of full immunization coverage of children increases by about 1.26 percentage points when expenditure decentralization increases by one percent.

However, with respect to revenue decentralization as indicated in column (3) of the table, quite unexpectedly, the impact of this variable is negative and significant at 10%. Although, it is difficult to give exact explanation why this has happened given the fact that protecting and promoting health status is one of the main aims of the decentralization, perhaps, one may argue that this is a reflection of the fact that local governments are relying on grants from the central governments to finance their health sectors' spending.

Accordingly, unlike the revenue decentralization, the effect of block grant to expenditure ratio is positive and significant at 5% level. The implication is that the block grants given from federal government to regions and from regions further to woredas have access and equity impact in all regions and districts in the country.

Overall, most of the measures of fiscal decentralization are positive and significant in explaining immunization coverage, but lower in size than in education, implying that decentralization has larger effects in the education sector on a relative basis.

To say little about the control variables, in all the panel regressions analysis, most of the control variables have the predicted signs. Maternal health coverage (antenatal, postnatal) is significant at 1% and positive, as one would expect. That is, when maternal health care increases, mothers develop awareness to take their children to nearby health center or post to get their children immunized on time. Additionally, most of the socioeconomic and geographic control variables reflect a finding similar to that of education: immunization coverage rises with the per capita

income and urbanization, dependency ratio and populations, implying that distance and income level affect access to immunization in rural areas of the country. To be precise, communities who are in remote rural areas and with lower income level have low response to immunize their children.

However, there is one interesting result from the control variables that we have to explain precisely: regional per capita expenditures in health care are essentially insignificant and even negative in the first column of the table, implying that increasing immunization coverage is not simply a matter of increasing health expenditure. It rather highly depends on the quality of spending and accountability of local governments or health agents in mobilizing the community at the grassroots level.

5.2.2.2. Estimated Effects on Infant Mortality Rate

To assess furthermore the impact of the decentralization on health outcome, we have also chosen infant mortality rate as other best health indicators. By doing so, the first column of Table 5.10 indicates that DLD is statistically significant at 1% level in explaining infant mortality rate. It is estimated that, *ceteris paribus*, the DLD is, on average, associated with an 18.9 percent decline in infant mortality rate. According to the various policy documents [HDSO (I-III)], the close relationship between local governments and the communities; and the developed fiscal accountability at the grassroots level are the main drivers for the gained outcomes.

Table 5.10: Regressions of Infant Mortality Rate on FD and Control Variables

<i>Fixed effects Models</i>	<i>Infant Mortality Rate (log): Dependent Variable</i>			
Control Variables	(1)	(2)	(3)	(4)
• <i>Urbanization ratio</i>	-0.0106** (.00361)	-0.013* (.006)	-0.014* (.006)	-0.007** (.002)
• <i>Dependency ratio</i>	0.0014** (.00053)	0.0012 (.0009)	0.0012 (.0009)	0.0009 (.0007)
• <i>Estimated Per capita income(log)</i>	-0.99*** (.038)	-0.081*** (.023)	-0.091** (.038)	-0.076*** (.021)
• <i>per capita Public health care expenditure(log)</i>	0.0068 (.0153)	-.0038 (.012)	-0.0002 (.001)	-0.0019 (.006)
• <i>Maternal health coverage (%)</i>	-0.0034 ** (.0019)	0.0039*** (.00198)	-0.004*** (.002)	-0.0027*** (.001)
• <i>Underweight children (%)</i>	0.009*** (.0036)	0.014*** (.0035)	0.013*** (.003)	0.0878** (.023)
• <i>Population sizes(log)</i>	2.47*** (.295)	1.66*** (.241)	-1.854*** (.257)	0.782*** (.0319)
Constant	41.26 (4.36)***	36.42*** (3.58)	36.68*** (3.64)	34.29*** (2.81)
Measures of Fiscal Decentralization				
• <i>District-Level Decentralization(Dummy)</i>	-0.1896*** (.042)	----- -----	----- -----	----- -----
• <i>Expenditure decentralization</i>	----- -----	-0.0252*** (0.006)	----- -----	----- -----
• <i>Revenue decentralization (laged)</i>	----- -----	----- -----	-0.0471 (.022)	----- -----
• <i>Block grant to expenditure ratio</i>	----- -----	----- -----	----- -----	-0.0167 (0.010)
<i>Within R²</i>	0.832	0.836	0.843	0.821
<i>Hausman tests[chi²(9)]^{Ho}</i>	77.68	117.14	118.55	73.81
<i>Prob > chi²</i>	0.000	0.0000	0.0000	0.000
<i>F(8,122)</i>	132.00	143.72	134.02	139.74
<i>Prob > F</i>	0.000	0.000	0.00	0.000
<i>Number of Obs</i>	143	143	142	143
<i>Number of groups</i>	11	11	11	11

Note:

- Value in Brackets are standard errors
- ***, ** and * are Statistically significant at 1%, 5%, and 10% level respectively
- Ho: Hausman Test rejected Random Effect Model

For the results shown in column (2), infant mortality rate is regressed against expenditure decentralization; the coefficient for this variable is negative and significant at the 1% level, implying that for every one percent increase in expenditure decentralization, mortality rate decreases by 2.52 %, *ceteris paribus*. Similarly, column (3) shows the regression analysis of infant mortality rate against revenue decentralization. As we expected a priori, the coefficient for revenue decentralization is negative and significant at 5% level. The interpretation is that, *holding other variables constant*; a one percent increase in financial autonomy causes a 4.71 % decline in infant mortality rate. Furthermore, the model where mortality rate is regressed against block grant to total expenditure ratio is indicated in column (4), the coefficient for this measure of decentralization is also negative and significant at 10 percent level. For every one point

increase in block grant to total expenditure ratio, the mortality rate decreases by 1.67 percent. This kind of fiscal decentralization variable has once again confirmed its inter-regional equity impact in the health sector of the country.

Coming to the control variables, similar to the previous regressions analysis, except the per capita health expenditure most of the control variables have the expected impacts on IMR. While dependency ratio, size of population and percentage of children born under weight affect IMR positively, other variables such as per capita income, urbanization, and maternal health coverage affect IMR negatively. Especially, maternal health coverage (antenatal, delivery, postnatal) is found to be significant at 1% level. The intuition is that, as one would expect, the health care that a mother receives during her pregnancy and at the time of delivery is essential for her and her child's survival and well-being.

In addition, this study contrasts with other studies on the determinants of health, where per capita public health expenditure is found to be statistically insignificant in explaining IMR. This offers additional evidence that dropping down infant mortality rate is not a simple question of increasing the size of the health expenditure, but rather depends on other factors related to the quality of spending, and allied decision-making about health sector policy in line with the fiscal decentralization policy.

Overall, panel regression analyses demonstrate that the impacts of fiscal decentralization on health outcomes are very similar to those of education. Accordingly, this study advocates that given the level of heterogeneity of preferences to public goods provision in the country, local governments are in a better position to achieve developmental goals at grassroots level. In other words, fiscal decentralization is found to be a powerful instrument in improving health and educational service delivery by improving efficiency, inter-regional and gender equity; and

preventing inefficient behaviors at local level in realizing poverty reducing activities in the country.

Chapter VI

6. Conclusions and Recommendations

6.1. Conclusions

Fiscal decentralization has formed an important component of recent institutional innovation, being widely adopted in both developing and developed countries. The goal of such kind of decentralization is to allocate efficient and equitable fiscal resources; to empower local communities; and then to assure improvement in the delivery of key services, such as education and health care. Yet, despite its obvious importance, relatively little is known about the overall impact of fiscal decentralization policies on poverty reduction outcomes. That is, the decentralization literature has not seriously tackled the nature and effects of fiscal decentralization on a number of important policy goals empirically. Accordingly, this study brings together the current state of knowledge of how fiscal decentralization –including the assignment of expenditure responsibilities, the assignment of revenue sources to local governments, and intergovernmental fiscal transfers, can affect poverty levels with special emphasize on basic education and health outcomes in Ethiopia.

To materialize the study, we thoroughly assessed the origin and trend of the Ethiopian fiscal decentralization. We examined in the study that the fiscal decentralization drive in Ethiopia has preceded in two phases. While the first wave of decentralization is centered on creating and empowering regional governments with fiscal resources and hence is termed as mid-level decentralization, the second wave of decentralization is named as Woreda (District)-Level-Decentralization. This has been accompanied with massive fiscal resources shift so as to deliver effective basic social services at the grassroots level.

After reviewing the decentralization process in the country, we have provided an empirical evaluation of the impact of the decentralization on basic education and health outcomes. The evidence implies that one of the most powerful and frequently cited arguments in the literature—that fiscal decentralization can improve the efficiency and equity of public services, and hence the flow of benefits to citizens – held true for the case of Ethiopia.

The results of the panel regression analyses advocate that fiscal decentralization has had remarkable and statistically significant effects on public primary gross enrollment rate, completion rate, immunization coverage and infant mortality rate. Quantitatively, controlling for regional educational and health supply-side factors; household socioeconomic characteristics and geographical residence, results from panel regression analyses of fixed effect model indicate that District-Level-Decentralization is, on average, associated with 29.36% jump in public primary gross enrollment rate. Similarly, fiscal decentralization is also responsible in narrowing down the gap in both inter-regional and gender disparities of educational attainment across the regions. For instance, the effect of District-Level-Decentralization is more pronounced in girls' gross enrollment rate than the overall access to school environment. Numerically, *ceteris paribus*, District- Level- Decentralization is, on average, associated with 31.24% leap in girls' gross enrollment rate. Furthermore, in addition to this equality of opportunity, inter-regional variability in access to basic social services between previously underserved and better-off regions is remarkably reduced. This is evidenced by the coefficient of variance in primary education attainment across regions which declined from 0.62 in 1995/96 to less than 0.28 in 2007/08, suggesting that fiscal decentralization has been a pro-poor policy.

Additional analysis also indicates that decentralization has created a complementary private education sector to the public education sector. As the result of these combined effects, the primary gross enrollment rate surged up to 95.6 percent in 2007/08 from 22 percent in 1991/2. This is an impressive result of the decentralization, which opens a door for the country to achieve one of its MDGs by 2015.

The effects are also same on the selected health outcomes, although to a smaller extent than in education. District-Level-Decentralization is statistically significant at 5% level in explaining infant mortality rate and immunization coverage. It is estimated that, *ceteris paribus*, District-Level-Decentralization, *on average*, is associated with 18.9 % decline in infant mortality rate; and 23.4% raise in full immunization coverage.

Next to the District-Level-Decentralization which is binary variable, to gain additional insight into the interactions between fiscal decentralization and the chosen outcomes, we regressed the considered outcomes on other three fiscal decentralization indicators [expenditure decentralization, revenue decentralization, block grant to total expenditure ratio] along with the control variables. Except for revenue decentralization, most of the regressions verify the above results in both sectors, indicating that results are robust to alternative measures of fiscal decentralization in the analysis.

In sum, the empirical results of the study indicate that fiscal decentralization is generating accountability in local governments throughout much of Ethiopia. The provisions of basic health and education responsibility to local governments have initiated them to develop local ownership and enhance fiscal accountability for improving service delivery in these areas. As the result, this

study contradicts common claims that local governments are too corrupt, institutionally weak, or prone to interest-group capture to improve upon central government's allocation of public resources (Prud'homme, 1995). Unlike this view, this study finds that fiscal decentralization appears to be an attempt to implement and reap the benefits of the accountability framework by reducing the distance between citizens and policymakers in the public sector. Thus, we can conclude that it is the close relationship between local governments and the communities; and the developed fiscal accountability at the grassroots level that derived the momentum of outcomes during the massive decentralization of fiscal resources in Ethiopia.

6.2. Policy Recommendations

To accelerate the achievement of basic education and health outcomes, several aspects of the fiscal decentralization and service delivery need to be improved. Accordingly, the following are recommendations that are consistent with the findings in this study.

- Although the empirical findings indicate positive effects of the decentralization on the considered outcomes, the Ethiopian fiscal decentralization has still been characterized by some kind of vertical and horizontal fiscal imbalance. The fact is that expenditure and revenue decentralization do not match to each other. The expenditure responsibility given to lower tiers of government exceeds the responsibility to raise local taxes. This is demonstrated in the regression analyses. While the expenditure decentralization has positive and significant effects on public gross enrollment rate and negative on infant mortality rate, revenue decentralization shows insignificant effects and even unexpected signs on some of the outcomes. The implication is that the revenue decentralization is not sufficient enough to be effective at the grassroots level. Hence, though the adopted new grant distribution formula of 2007/08; and the Unit Cost Approach of 2008/09 have inherently a fiscal equalization nature and need based assessment, it would be still advisable to relax some kind of taxes to local government. These findings are particularly important at a time when decentralizing of health and education expenditures to the regions is severely threatened as a result of macro-economic imbalances in the country. If such actions could be accompanied by increased revenue collection at regional and woreda level, this might have positive and more pronounced effects on the poverty reduction outcomes to a better extent than the current estimated effects.

- Align sector policies with fiscal decentralization policies to improve impact on service delivery. In the regression analyses, we found that increasing access to basic social services is not a simple question of providing more expenditure. This is verified by the insignificant effects of per capita health and education expenditures on some of the regression. Therefore, to accelerate the outcomes, sector policies such as the Health Sector Development Program and Education Sector Development Program have to be designed and implemented in line with the pattern of the existing fiscal decentralization.
- Since real decentralization is a long and evolutionary process, fiscal decentralization in Ethiopia is still young. This is obviously seen in its local institutions where they are still evolving. Local governments' institutions are not fully matured and have acute shortage of qualified man power. Many *woredas* lack skilled personnel and have been filled by untrained personnel with limited capacity. Thus, the study identified that better institutional capacity is a critical for continued progress. Thus, there is a need to improve local government capacity to increase the use of fiscal resources for better service delivery at the grassroots level.
- Similar to the capacity improvement there is a need to cultivate a culture of accountability for outcomes and good stewardship of resources throughout the decentralization process. In fact, the study identified that the level of accountability is showing improvement and is a positive one, but it still is at its infantile stage. So, there is an urgent need to institute social and fiscal accountability mechanisms at local governments across all the regions to improve efficiency and effectiveness of service delivery to a better extent. Accordingly, to do so, the idea of involving the community in matters like identifying problems, planning and closely monitoring school and health related activities must be given more attention.

- Above all, decentralization is not a means of weakening of the center and diverging the regions; rather it is an instrument to make them effective and efficient in all dimensions of economic life. So, there should be both vertical and horizontal communication; and experience sharing across all tiers of government for better outcomes. In this regard, information and communication technologies (ICTs) can play key role. Accordingly, government has to introduce information communication technologies to the local governments in line with fiscal decentralization for better service delivery
- Finally, Ethiopia is currently undergoing a far-reaching decentralization process. It is apparent to see that massive fiscal resources, political power and administration aspects are all migrating downward to lower tiers of government. But, no systematic attempt has been made to evaluate many of these power and resources shifts to understand what works well and what does not. Therefore, an important lesson is that it is not sufficient, just to look at any decentralization type, such as fiscal decentralization, in isolation, when decentralization's effects for the poor shall be assessed. Rather all political, administrative and fiscal decentralization need to be considered simultaneously in analyzing the impact of policy at the grassroots level. Therefore, this issue is left to future research orientation.

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Appendices: Additional Tables

Table A1: Regional Government ID and their Population Distribution: 1994 and 2007

Regional ID ¹	Region	1994		2007	
		Number	%	Number	%
1	Tigray	3,136,267	5.9	4,314,456	5.8
2	Afar	1,060,573	2.0	1,411,092	1.9
3	Amhara	13,834,297	25.9	17,214,056	23.3
4	Oromia	18,732,525	35.0	27,158,471	36.7
5	Somale	3,198,514	6.0	4,439,147	6.0
6	Bs.Gumuz	460,459	0.9	670,847	0.9
7	SNNP	10,377,028	19.4	15,042,531	20.4
8	Gambella	181,862	0.3	306,916	0.4
9	Harari	131,139	0.2	183,344	0.2
10	Addis Ababa	2,112,737	4.0	2,738,248	3.7
11	Dirre Dawa	251,864	0.5	342,827	0.5
	Special Enumeration		0.0	96,570	0.1
	Country Total	53,477,265		73,918,505	100

Source: Population and Housing Census Report 2008, Ethiopia

Table A2: Descriptive Statistics

Variables	Period	Obs	Mean	Std.dev.	min	max
Public Primary Gross Enrollment Rate	1995/6-2007/08	143	75.6	28.9	8.4	141
primary education expenditure Per primary pupils(log)	1995/6-2007/08	143	5.221	.9212	1.232	11.23
Public primary Gross enrollment(Girls)	1995/6-2007/08	143	61.14	36.58	6.6	179.7
Public Primary dropout rate	1995/6-2007/08	143	13.93	10.35	3.2	22.4
Primary Gross enrollment in Private schools	1995/6-2007/08	143	23.1	.123	1.2	62.1
Public Gross enrollment rate of Lower 2ndry.	1995/6-2007/08	143	27.49	24.12	.5	108.2
Secondary education expenditure Per secondary pupils(log)	1995/6-2007/08	143	5.85	.688	4.16	8.25
Estimated Per capita income(log)	1995/6-2007/08	143	7.175	.342	5.005	9.48
Urbanization (%)	1995/6-2007/08	143	30.08	30.82	.194	100
Dependency ratio (%)	1995/6-2007/08	143	80.12	22.09	27.6	161.9
Population sizes (log)	1995/6-2007/08	143	14.46	1.68	11.81	17.12
Infant mortality rate(log)	1995/6-2007/08	143	4.58	.340	3.71	5.28
Full immunization coverage (%)	1995/6-2007/08	143	31.70	22.32	.45	84
Maternal Health coverage (%)	1995/6-2007/08	143	39.43	23.57	3.45	92.3
Underweight born (%)	1995/6-2007/08	143	38.77	11.57	11.34	56.65
Per capita Health Expenditure(log)	1995/6-2007/08	143	5.32	.826	3.76	7.25
Measures of Fiscal decentralization						
Expenditure decentralization	1995/6-2007/08	143	.095	.097	.03	.394
Revenue Decentralization ratio	1995/6-2007/08	143	.194	.252	.001	1
Block grant to expenditure ratio	1995/6-2007/08	143	.793	.187	0	.946
District-Level- Decentralization	1995/6-2007/08	143	.461	.501	0	1

¹ Regional Government ID(1-9) is directly taken from the FDRE Constitution, 1995

Table A3: Pairwise correlation of variables utilized in Regression Analysis

Pair wise correlation of variables utilized in education outcome at primary level

	a	b	c	d	e	f	g	h	I	j	k	l	m
Public Primary Gross Enrollment Rate =a	1.0000												
Urbanization (%) =b	0.4136	1.0000											
Dependency ratio (%) =c	-0.1843	-0.6918	1.0000										
Estimated Per capita income(log)= d	0.1201	0.3917	-0.3529	1.0000									
primary education expenditure Per primary pupils(log)=e	0.1322	0.3027	-0.3342	0.2783	1.0000								
Public Primary dropout rate =f	0.7699	0.7398	-0.4858	0.3683	0.3573	1.0000							
Primary Gross enrollment in Private schools= g	-0.1427	-0.3660	0.1823	-0.1508	-0.1003	-0.3272	1.0000						
Public primary Gross enrollment(Girls)= h	0.9271	0.5473	-0.3207	0.2404	0.2178	0.8824	-0.2686	1.0000					
Population sizes (log) =I	0.2455	-0.3906	0.2776	-0.0903	-0.1782	-0.2803	-0.0045	-0.1871	1.0000				
Block grant to expenditure ratio= j	0.2667	-0.7351	0.5100	-0.3208	-0.1345	0.1014	0.3373	0.4310	-0.1401	1.0000			
Revenue Decentralization (lagged)= k	-0.0418	0.7648	-0.4989	0.3076	0.1674	0.0214	-0.3376	-0.0357	0.1412	-0.9550	1.0000		
Expenditure decentralization ratio= l	0.3513	-0.2407	0.2119	-0.1062	-0.1339	-0.3241	0.0204	0.4341	0.8404	-0.1491	0.1917	1.0000	
District-Level- Decentralization(Dummy) =m	0.6591	0.0219	-0.0846	0.3024	0.2635	-0.3376	-0.1008	0.5107	0.0506	0.0242	-0.0388	0.0015	1.0000

Pair wise correlation of variables utilized in education outcome at Lower 2^{dry} School (9-10)

	n	b	c	d	o	p	I	j	k	l	m
Public Gross enrollment rate of Lower 2ndry= n	1.0000										
Urbanization (%) =b	0.7398	1.0000									
Dependency ratio (%) =c	-0.4858	-0.6918	1.0000								
Estimated Per capita income(log)= d	0.3683	0.3917	-0.3529	1.0000							
Secondary education expenditure Per secondary pupils(log) =o	0.1814	-0.0408	0.0740	0.0754	1.0000						
Gross enrollment in Private schools(9-10)= p	-0.0162	-0.1872	0.2004	-0.2335	-0.0584	1.0000					
Population sizes (log) =I	-0.2803	-0.3906	0.2776	-0.0903	0.5591	-0.3143	1.0000				
Block grant to expenditure ratio= j	0.3196	-0.7351	0.5100	-0.3208	-0.1618	0.3257	-0.1401	1.0000			
Revenue Decentralization (lagged)= k	-0.1152	0.7648	-0.4989	0.3076	0.1928	-0.2668	0.1412	-0.9550	1.0000		
Expenditure decentralization ratio= l	0.4314	-0.2407	0.2119	-0.1062	0.6417	-0.0492	0.8404	-0.1491	0.1917	1.0000	
District-Level- Decentralization(Dummy) =m	0.4823	0.0219	-0.0846	0.3024	0.3152	-0.1086	0.0506	0.0242	-0.0388	0.0015	1.0000

Pairwise correlation of variables utilized in Health Outcome Estimation

	r	s	t	u	c	b	d	I	v	j	k	l	m
Infant mortality rate(log) =r	1.0000												
Full immunization coverage (%) =s	-0.5480	1.0000											
Maternal Health coverage (%)= t	-0.6313	0.9224	1.0000										
Underweight born (%)= u	0.6856	-0.5411	-0.6496	1.0000									
Dependency ratio (%) =c	0.4264	-0.1649	-0.3016	0.5651	1.0000								
Urbanization (%) =b	-0.4187	0.4044	0.5445	-0.8225	-0.6918	1.0000							
Estimated Per capita income(log)= d	-0.4641	0.2456	0.2964	-0.4457	-0.3529	0.3917	1.0000						
Population sizes (log) =I	0.1312	0.1052	-0.0260	0.3792	0.2776	-0.3906	-0.0903	1.0000					
Per capita Health Expenditure(log)=v	-0.3167	0.2772	0.3191	-0.4984	-0.3071	0.4039	0.1734	-0.7678	1.0000				
Block grant to expenditure ratio= j	0.3011	0.4538	-0.5576	0.5789	0.4909	-0.7442	-0.3108	-0.1327	0.0599	1.0000			
Revenue Decentralization (lagged)= k	0.0900	0.1440	0.0640	0.0855	0.0757	-0.1099	-0.0276	0.5390	-0.2917	-0.1520	1.0000		
Expenditure decentralization ratio= l	-0.3011	0.4538	0.5576	-0.5789	-0.4909	0.7442	0.3108	0.1327	-0.0599	-1.0000	0.1520	1.0000	
District-Level- Decentralization=m	-0.5829	0.5075	0.4333	-0.3365	-0.0846	0.0219	0.3024	0.0506	0.2271	0.0136	0.0507	-0.0136	1.0000

Table A4: Variance-inflating factor (VIF)² of variables used in the regression estimation

² As r rule of thumb, if the mean of value of the average VIF of the variables exceeds 10, the variables are said to be highly collinear. However, as we can see in three of the above VIFs results, the mean value of each VIF is each less

Primary school Level			lower 2 nd school level			health outcome		
Variable	VIF	1/VIF	Variable	VIF	1/VIF	Variable	VIF	1/VIF
Population sizes (log)	9.81	0.1019367	Block grant to expenditure	9.54	0.104812	Population sizes (log)	12.18	0.082086
Block grant to expenditure	9.78	0.102300	Expenditure decentralization	8.23	0.121506	Full immunization	10.92	0.091536
Expenditure decentralization	8.13	0.122927	urbanization	7.88	0.126983	Per cap Health Expenditure	10.12	0.098828
urbanization	6.43	0.155520	Population sizes (log)	7.27	0.137468	Expenditure decentralization	10.05	0.099454
Private Gross enrollment 1	2.92	0.168847	Revenue Decentralization	6.38	0.156686	urbanization	10.01	0.099860
Revenue Decentralization	2.37	0.4219409	Private Gross enrollment 2	5.39	0.1855287	Maternal Health coverage	9.97	0.100316
Dependency ratio	2.21	0.451484	secondary education expenditure	4.89	0.204538	Block grant to expenditure	9.87	0.101365
primary education expenditure	1.77	0.566437	Dependency ratio	2.24	0.447314	Underweight born	5.53	0.180760
Per capita income	1.43	0.697684	Per capita income	1.45	0.692006	Dependency ratio	2.18	0.457972
District-Level- Decentralization	1.42	0.704541	District-Level- Decentralization	1.44	0.696420	District Level Decentralization	2.06	0.484694
-----+-----			-----+-----			-----+-----		
Mean VIF 	4.33		Mean VIF 	5.47		Mean VIF 	7.15	

Table A5: Hausman's Specification Test

Table A5.1: Regression of public primary gross enrollment rate on Control variables

	---- Coefficients ----			
	(b) fixed	(B)	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
• primary educational expenditure Per primary pupil(log)	7.40212	8.23855	-.0189897	.011432
• Urbanization ratio	.1602915	.191626	-.0313345	.0463722
• Estimated Per capita Income(log)	1.443458	1.45957	-.015412	.0304765
• Dependency ratio	.0896876	.1047308	-.0150433	.0298348
• Private Gross enrollment rate	.03702425	.015869	.02115525	.037005
• Population sizes(log)	1.29986	-.0008048	1.300665	.1654321

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

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(6) &= (b-B)[(V_b-V_B)^{-1}](b-B) \\ &= 93.05 \\ \text{Prob} > \text{chi2} &= 0.0000 \\ (V_b-V_B &\text{ is not positive definite} \end{aligned}$$

Conclusion: we reject the null hypothesis i.e; FE is the appropriate estimating procedure

than 10. So in our regression analysis we should not worry much for multi collinearity, but to avoid for any unseen multi collinearity we regressed all the measures of fiscal decentralization one by one with the dependent variables.

Table A5.2: Regression of public primary gross enrollment rate on DLD & Control variables

	---- Coefficients ----			
	(b) fixed	(B)	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
• primary educational expenditure Per primary pupil(log)	6.0935648	6.1047197	-.0111549	.0100679
• Urbanization ratio	.13486512	.08769322	.0471719	.0514913
• Estimated Per capita Income(log)	1.3627659	1.34226409	.0201253	.0279125
• Dependency ratio	.0874448	.1641377	-.0766929	.0615283
• Private Gross enrollment rate	.03735888	.08454478	-.0471859	.0533507
• Population sizes(log)	1.322496	-.0122219	1.334718	.2085919
• District-Level Decentralization (Dummy)	.29366421	.2439607	.0496814	.0046632

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(7) = (b-B)[(V_b-V_B)^{-1}](b-B) = 49.16$$

$$\text{Prob}>\text{chi2} = 0.0000$$

(V_b-V_B is not positive definite)

Conclusion: we reject the null hypothesis i.e; FE is the appropriate estimating procedure

Table A5.3: Regression of public primary gross enrollment rate of girls on DLD & Control variables

	---- Coefficients ----			
	(b) fixed	(B)	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
• primary educational expenditure Per primary pupil(log)	8.389893	8.39613385	-.0062445	-.0157815
• Urbanization ratio	1.0748521	2.478641	-1.403802	.4934076
• Estimated Per capita Income(log)	1.267897	1.2790161	-.011261	.0218401
• Dependency ratio	.0554377	.085622	-.0468755	.0467401
• Private Gross enrollment rate	.6501462	1.126796	-.4766497	.0429864
• Population sizes(log)	1.389223	.0094072	1.379816	.285768
• District-Level Decentralization (Dummy)	.31248565	.1993235	.1131643	.0907549

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(7) = (b-B)[(V_b-V_B)^{-1}](b-B) = 86.39$$

$$\text{Prob}>\text{chi2} = 0.0000$$

(V_b-V_B is not positive definite)

Conclusion: we reject the null hypothesis i.e; FE is the appropriate estimating procedure

Table A5.4: Regression of public primary dropout rate of girls on DLD & Control variables

	---- Coefficients ----			
	(b) fixed	(B)	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
• primary educational expenditure Per primary pupil(log)	-3.234879	-3.236677	.0017982	.0056859
• Urbanization ratio	-1.13346982	-.1806452	.0471754	.488108
• Estimated Per capita Income(log)	-.09937245	-.1021113	.0027389	.0069724
• Dependency ratio	-.0400434	-.0946271	.0541931	.0395644
• Private Gross enrollment rate	-.0795917	-.0540768	-.0255149	.063566
• Population sizes(log)	.10514587	.16539507	-.0602492	.1800584
• District-Level Decentralization (Dummy)	-.08752458	-.0938636	.00633908	.021761

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

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(7) &= (b-B)[(V_b-V_B)^{-1}](b-B) \\ &= 67.07 \\ \text{Prob}>\text{chi2} &= 0.0000 \\ (V_b-V_B &\text{ is not positive definite}) \end{aligned}$$

Conclusion: we reject the null hypothesis i.e; FE is the appropriate estimating procedure

Table A5.5: Regression of public gross enrollment rate in lower 2^{ry} school(9-10) on DLD & Control variables

	---- Coefficients ----			
	(b) fixed	(B)	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
• secondary education expenditure Per secondary pupils(log)	2.3435987	2.345987	-.0002631	.
• Urbanization ratio	.24314521	0.2322434	.0109018	.004553
• Estimated Per capita Income(log)	3.4562656	3.4584285	.0021627	.0145779
• Dependency ratio	.0605117	.0117496	.0487621	.0286001
• Private Gross enrollment rate in 2 nd school	.042561321	.04256132	-.0018376	.0005473
• Population sizes(log)	4.45321254	5.452124	-.896855	.1498652
• District-Level Decentralization (Dummy)	.17425785	.1536675	.02020590	.0214643

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

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(7) &= (b-B)[(V_b-V_B)^{-1}](b-B) \\ &= 54.00 \\ \text{Prob}>\text{chi2} &= 0.000 \\ (V_b-V_B &\text{ is not positive definite}) \end{aligned}$$

Conclusion: we reject the null hypothesis i.e; FE is the appropriate estimating procedure.

Table A5.6: Regression of Fully immunized children (%) on DLD & Control variables

	---- Coefficients ----			sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B)	(b-B) Difference	
• <i>Urbanization</i>	.0501627	.0555665	-.0054038	.0026282
• <i>Dependency ratio</i>	.0032782	.014307	-.0110288	.0000314
• <i>Estimated Per capita income(ln)</i>	-.0051435	.000079	-.0052225	.0027471
• per capita Public health expenditure(log)	.0055903	.0067087	-.0011184	.
• Maternal health coverage	.0200437	.0150031	.0050406	.0000512
• <i>Population sizes(ln)</i>	.3557956	.0407912	.3150044	.1021742
• District-Level Decentralization (Dummy)	.2319237	.2773663	-.0454426	.0104771

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\chi^2(6) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 57.54$$

$$\text{Prob} > \chi^2 = 0.0000$$

(V_b-V_B is not positive definite)

Conclusion: we reject the null hypothesis i.e; FE is the appropriate estimating procedure.

Table A5.7: Regression of Infant Mortality rate on DLD & Control variables

	---- Coefficients ----			sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B)	(b-B) Difference	
• <i>Urbanization ratio</i>	-.010645	.0046935	-.0153386	.0066003
• <i>Dependency ratio</i>	.0014862	.0021505	-.0006645	.0000034
• <i>Estimated Per capita income(ln)</i>	-.0998088	-.0925447	-.007264	.0006439
• per capita Public health expenditure(log)	.006878	.0054701	.0014079	.
• Maternal health coverage	-.0034441	-.0085667	.0051264	.0000195
• Under weight children(%)	.0096278	.0207485	-.0111207	.0002498
• <i>Population sizes(ln)</i>	-2.472611	-.0409377	-2.431673	.2931282
• District-Level Decentralization (Dummy)	-.1890681	-.037339	-.226407	.2152465

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\chi^2(9) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 77.68$$

$$\text{Prob} > \chi^2 = 0.0000$$

(V_b-V_B is not positive definite)

Conclusion: we reject the null hypothesis i.e; FE is the appropriate estimating procedure.

Note: similar tests were conducted for the specification of other measures of fiscal decentralization Variables (Expenditure decentralization, Revenue decentralization and block grant to expenditure Ratio). However, the results did not change and hence not reported here