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## A Study of the Impact of Decentralization on Access to Service Delivery

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# **A Study of the Impact of Decentralization on Access to Service Delivery**

**A Dissertation Presented to the Academic Faculty By**

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# **A Study of the Impact of Decentralization on Access to Service Delivery**

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## SUMMARY

This research builds further on the existing conceptual framework of the relationship between decentralization and service delivery and provides a cross-country empirical examination of the core dimensions of decentralization reform on access to two key services: health care and improved drinking water sources. The regression results provide evidence supporting positive and significant effects of fiscal, administrative, and political decentralization, individually, on the variables used to measure access to health care, and improved water provision; although the size and robustness of such effects varies for each dimension of decentralization in relation to each service examined. The results obtained in this study suggest that there is an additional (or “extra”) positive effect coming from the interaction of two decentralization dimensions on access to health care and water services (that is, a mutually-reinforcing effect additional to the individual effect of each dimension of decentralization). The results obtained also support the expectation that developing countries could benefit significantly more from decentralization reforms compared to developed countries. These findings underscore the importance of considering all dimensions of the decentralization process when investigating the effects of this reform on any economic, institutional, or social variable. The policy implications are highly relevant, particularly for developing countries: decentralization implemented only through one dimension may render fewer positive fruits in terms of access to services than a multi-dimensional approach. Moreover, learning more about the most beneficial mutually-reinforcing effects across dimensions of decentralization may also help strategically in how the overall decentralization reform is designed.

## CHAPTER 1

### INTRODUCTION

A key argument supporting decentralization reform is that it can improve public service provision by better matching finances with local needs. This study evaluates the effects of decentralization on access to and intermediate outputs of two essential services that are typically transferred to sub-national governments<sup>1</sup> as a part of the decentralization process: health and water provision. To do so, this study provides an analytical framework to examine the relationships between decentralization and service delivery of health and water, and then provides a cross-country empirical analysis testing these relationships. To account for decentralization in a comprehensive manner, this study measures the fiscal, administrative, and political dimensions of decentralization.

#### *Motivation*

A critical question in development economics is what kind of reforms developing and transition countries should undertake to improve basic service delivery and thereby enhance the standards of living for their people. Decentralization of powers to sub-national governments is one of the key reforms with wide implications on this issue. Despite the fact that most countries have initially pursued decentralization seeking goals different than economic efficiency and improvement in service delivery, this has been one of the supporting rationales for decentralization reform provided by many economists and other experts.

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<sup>1</sup> In this study, “sub-national governments” refers to all state and local governments below the central (or federal) government level.

Aside from the general motivation arising from the importance of evaluating this relationship, particularly for developing countries, the following are specific motivating factors for this study. First, despite a large body of literature on the impact of decentralization on government size, growth, and macro-economic stability, only a few studies have evaluated the effects of decentralization on service delivery.

Second, the few existing studies on this issue examine a single service in a single country. While this approach has the advantage of presenting a more focused and detailed view, it does not help to examine the effects of more or less decentralized systems on service delivery, consequently they tend to fall short in evaluating the effect of a decentralization process as whole on a particular service. Hence, international comparisons and cross-country empirical evidence, as attempted in this research, on the effects of decentralization on service delivery, are very important to shed more light on this issue.

Third, most of the research on this topic evaluates the effects of decentralization on final outcomes of public services. That is, the dependent variables used include infant mortality rates, education completion, student performance, and so on. But while having final outcomes as dependent variables may seem a straightforward way to evaluate effects of decentralization policy it is also highly treacherous. Indeed, services outcomes, such as infant mortality for example, may depend heavily on a variety of geographic, demographic, social, and political factors. Infant mortality rates also depend on other public services aside from health care itself in a country such as quality of water, education, social protection programs and safety nets, which in turn makes extremely complex to argue a direct attribution to any institutional variable or policy change. This

situation raises the need for approaching the analysis of the relationship between decentralization and service delivery in a different way. This research examines intermediate outputs (e.g., coverage of certain services) or “access” as opposed to final outcomes of services as dependent variables. For example, the World Development Report (2004) produced by the World Bank argues that availability of doctors to perform basic services (e.g., pre-natal, birth, and maternal care services), immunization coverage, and other similar intermediate outputs in health care are essential for improving public service in this sector. The same report argues that access to improved drinking water services is essential in developing countries in order to improve service outcomes such as reduced poor health conditions arising from consumption of contaminated water or for raising quality of life in general. Thus, the use of intermediate outputs such as access and availability of certain intermediate outputs (or even inputs as called by the literature in health and education) in service delivery is a more direct route that this study takes with the aim of providing relevant insights about how decentralization is performing regarding the improvement of public services.

Fourth, the empirical literature has analyzed the impact of decentralization on public services from a single dimension (fiscal, administrative, or political) rather than from all three simultaneously. Allowing for interaction of all three dimensions of decentralization in the same analysis can bring more robust evidence on the relationship between decentralization and access to service delivery and hence bring stronger basis for providing policy advice in the future.

Fifth, this research is also motivated by the possibility of bringing, as control variables, other key governance factors that only occasionally are part of the analysis of

this relationship in the literature. Most of the studies have the typical variables to control for socio-economic country characteristics in their empirical models (such as income per capita, growth, demographic aspects, and the like). However, they do not pull into the discussion governance aspects that may be constraining service delivery. Pritchett (1996) argues that one unit of budgeted expenditure, whether it is decentralized expenditure or not, does not necessarily translate into one unit of actual service spending. The latter is also evidenced by Ablo and Reinikka (1998), who found that on average schools in Uganda received only 13 percent of the budgetary allocation for non-wage expenditures, the rest being diluted due corruption or misappropriation to other activity. However, when we review the literature that evaluates the effects of decentralization on service delivery, institutional (governance) factors are often absent in the control variables.

In short, this study tackles key aspects often overlooked in the literature on decentralization, as a way to deepen our understanding of the effects of this reform on key public services.

## CHAPTER 2

### REVIEW OF THE LITERATURE

#### **Introduction**

The literature on decentralization and its effects on socio-economic variables is too vast to review here. Instead, this Chapter discusses the existing literature on the relationship of decentralization and service delivery, with a focus on health care and water provision services. More specifically, this chapter aims to lay down the basis for a more structured analytical framework to examine this relationship in the subsequent chapter. It starts by discussing the literature that examines the vehicles through which decentralization and its three dimensions (fiscal, administrative, and political) can improve service delivery. Then it discusses the literature with specific arguments and evidence on the effects of the three dimensions of decentralization on health care and water provision. Finally, it discusses the literature that argues for the incorporation of institutional-governance variables in the examination of changes in service delivery due to institutional/economic reforms (such as decentralization).

#### **Decentralization and its vehicles for improved service delivery: theory and evidence.**

*How does decentralization create efficiency gains in service provision?*

A premise commonly articulated in the literature on this topic is that many of the anticipated benefits of decentralization flow from bringing decision makers and decision making closer to the people and their needs. Classic descriptions of the benefits of decentralization typically argue along the following lines of reasoning (for example, see Tiebout 1956 and Musgrave 1959): local decision-makers have access to better

information on local conditions than central authorities; this knowledge allows them to better tailor services and public spending patterns to local needs and preferences; this in turn, with other things hold constant, is expected to improve efficiency and quality of services for local constituents.

Economists such as Oates (1972) examine heterogeneity in tastes and spillovers from public goods through models in which local government can adapt outputs to local tastes, whereas central government produces a common level of public goods for all localities. Thus, sub-national governments that are closer to the citizens can adjust budgets to local preferences in a manner that best leads to the delivery of the bundle of public services that is more fitted and responsive to community preferences. Economists commonly assume a better match between local government outputs and local preferences under decentralization, and consequently rate local provision of services as more efficient, unless this situation is outweighed by spillovers or other efficiencies (for example, economies of scale) in central government provision (Oates 1972). Tiebout (1956), argues that decentralization is a vehicle to fulfill highly heterogeneous demand that may arise from different local governments.

Scholars also examine the efficiency argument supporting decentralization from the perspective of consumers' gains due to allocative efficiency and producers' (e.g., government) gains in technical efficiency in delivering goods and services. Allocative efficiency may arise due to a more fitted bundle (i.e., set and composition) of services provided by the local government to their citizens; in other words, through the adjustment that may take place in the proportions of public spending geared to services such as education, health, water provision or others based on local government's response to

local claims in a decentralized context. Faguet (2000) and Arze (2003) provide evidence to this effect (this is later discussed in more detail for specific services). Higher technical efficiency is achieved when larger quantities and quality of goods and services are provided with the same amount of resources (Martinez-Vazquez and McNab 2002). Overall, devolving some of the centralized responsibilities to local levels has been envisaged in most decentralization agendas as a way to improve both allocative and technical efficiency across different public services (Wallich 1994, Ebel 2002).

Several economists have argued that the efficiency gains that could be achieved owing to decentralization could also be outweighed by other efficiency gains arising from central provision such as economies of scale, ability to attract better personnel, and the like (De Mello 2004; Tanzi 1996). This indeed is a valid argument, but other scholars have also argued that those gains arising from central provision may also be overestimated (Oates 1972; Prud'homme 1995, Sewell and Wallich 1995). Nonetheless, the theory that allocative and efficiency gains could be achieved have important implications for improving public service delivery that need to be evaluated, specially in the context of developing and transition countries.

It is also argued that efficiency gains in service delivery have to be examined from the accountability perspective (e.g., Prud'homme 1993; Treisman 2002). For example, Rondinelli (1990) argued that central government ministries rarely have the incentives to perceive citizens as their clients. In the same line, Dillinger (1994) suggested that systems where central ministries concentrate large proportions of expenditure discretion would have more difficulties responding to their national

constituencies' demands. He argues that in those systems, people have fewer channels of communication and expression with the government.

*How does decentralization in each of its dimensions (fiscal, administrative and political) shape the sub-national service provision?*

Sufficient fiscal resources and discretion over them are core components of a decentralized framework of service provision. If local governments are to carry out expenditure responsibilities and provide public services in a decentralized manner effectively, they should be able to have an adequate level of revenues to afford those decentralized functions, either through locally raised revenues, which could bring greater accountability (McLure 2002), through transferred resources from the central government, or through other sources (further discussed below). At the same time, however, local government should be endowed with an adequate level of discretion to make the decisions about how to use those revenues and thus fulfill the public service functions<sup>2</sup> they expected to deliver (Bird 1986).

The intergovernmental fiscal framework typically has a 4 pillar structure: expenditure responsibilities, revenue assignments, transfers, and sub-national borrowing. In other words, within this fiscal framework sub-national governments finance their expenditure responsibilities (goods and services provided) through the following channels: first, self-financing using local tax revenues, user charges, or shared revenues with the central government; second, intergovernmental fiscal transfers, either through general purpose block transfers or earmarked-specific purpose transfers; and third through sub-national borrowing. In the context of service delivery at the local level,

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<sup>2</sup> Local government functions vary from country to country, but they typically include primary and secondary health care, water and sanitation services, primary and secondary education, and public works on local infrastructure, among others.

financing options have also diversified to include public-private partnerships, co-financing or co-production arrangements through which the users participate in providing services and infrastructure through monetary or labor contributions, and other co-participative schemes, all these avenues have also been encouraged by decentralization processes (Litvack and Seddon 1999).

There are, of course, different levels of discretion in the use of fiscal resources that central governments establish. They are geared to assure certain level of spending in specific goods and services provided by sub-national budgets. They depend on a variety of factors such as local capacity to administer resources, fiscal considerations, national goals, political issues, and institutional constraints. From the fiscal dimension the central government typically may be able to control spending allocations through strings attached in shared revenues and transfers to local governments (i.e., earmarked transfers or conditional transfers), through sub-national borrowing controls, or through other fiscal means (Arze and Martinez-Vazquez 2003). The government can also place borrowing controls or even tighten local borrowing to solely raise resources for certain categories of goods and services provided at the local level (World Bank 2007). Because of all these (and other) considerations, measuring fiscal decentralization presents several complexities and limitations when examining it empirically (Martinez and McNab 2001, Bird 2000b, Ebel 2002). The issue of measuring the level of fiscal decentralization is further discussed in the following chapters and it is examined in detail in Appendix A.

Administrative decentralization deals directly with the powers of local officials who are responsible for delivering services in issues such as personnel, service facilities, general management, and other administrative discretion in day-to-day operations.

Rondinelli (1981) offers the most widely used classification of the types of administrative decentralization: de-concentration, delegation, and devolution.

De-concentration gives sub-national governments some responsibilities within a sector, but all relevant decisions are made by the ministerial branches. A typical model is for the central line ministries and agencies to have local representatives that manage services within the sub-national governments but respond hierarchically to their own central office. (Rondinelli 1981 and Wallich and Seddon 1999). Under this type of administrative decentralization, local governments typically can not hire or fire personnel, do not set salary levels, and can not change the structure of the network of service facilities in place (i.e., number, size, and type of facilities). Local branches and representatives in charge of services simply manage day-to-day operations on behalf of the central ministry and under its watchful eye.

Delegation involves the transfer of implementation functions to sub-national entities that deliver services. Through delegation, the central government transfers responsibility for implementation and administration to local governments, including service facilities not completely controlled by central ministries, but ultimately accountable to it (Rondinelli 1981). The “delegation” scheme is a blend between de-concentration and devolution (explained below), thus, the levels of decision-making power vary significantly within that range across countries. In some countries delegation implies some personnel responsibilities passed down, but in others this may not be case (this is discussed in more detail for health care and water services later in this chapter). Overall, the more routine operations are local discretion but more strategic and some personnel decisions remain at the central level.

Finally, devolution is a more complete transfer of administrative decision-making power to sub-national authorities. It empowers them with legal decision-making power and the ability to generate and control resources, including the sub-national public sector employees hiring and firing, career management and pay. Moreover, typically it provides local government with the ability to reallocate resources (including staff) across service facilities within their jurisdiction adapting to local circumstances (World Bank 2007). Often, nevertheless, some central guidelines need to be followed, mainly with the aim of pursuing national objectives in certain areas.

Political decentralization gives citizens through their elected leaders more power in public decision-making. It is often associated with a pluralistic setting and a representative government (Stuti Kemani 2001). The premise is that service delivery policies taken at the sub-national level will be better informed and more relevant to diverse interests in society than those taken only by national political authorities. More importantly, political decentralization may help to strengthen accountability, which is necessary for improved service delivery (WDR 2004). If local elected officials make policy decisions about services that affect citizens, they in turn can hold the local officials accountable and remove them from power in the next local elections.

*What does the literature present in terms of evidence in the relationship between decentralization and service provision?*

As for the argument of allocative efficiency, an empirical study developed in local governments in Colombia (World Bank 1995) presented interesting insights. Using survey data and government expenditure data from 16 municipalities, this study analyzed the match between government provision of services (central and local) *vis a vis* local

preferences. In the study, most respondents to the survey indicated that they trusted local governments' elected officials more than the national government's to deliver goods and services. The findings suggested that the allocation of resources made by local governments was more consistent with community preferences than allocations from the center.

Faguet (2000) performed an in-depth study of fiscal decentralization in Bolivia with the objective of evaluating the influence of this process on changes in expenditure patterns at the local level. His results showed that following Bolivia's fiscal decentralization reform spending patterns changed (through sharp increases in relative funding levels) in favor of education, water and sanitation, water management, agriculture and urban development. Moreover, Faguet's study found that these changes are strongly positively related to real local needs, supporting the argument of allocative efficiency. That is, he found that increased investment in education, water and sanitation, water management, were steeper where illiteracy rates were higher and water and sewerage connection rates lower.

Arze (2003) also finds a change in expenditure composition following higher fiscal decentralization. More specifically, this study finds a sharper increase in health and education spending as a percentage of total spending with more decentralization, with stronger results for developing countries. Developing countries in average spent a smaller share of their budgets in these sectors and have poorer education and health outputs and outcomes. Thus, one could infer that improvements in allocative efficiency may be taking place as result of further fiscal decentralization.

At the same time, many claim that higher public spending in a specific sector, even if this is what the population demands, does not necessarily lead to better final outcomes (Inchauste 2000; Pritchett 1996; Ablo and Reinikka, 1998). For instance, both in Cote d' Ivoire and Haiti per capita health spending fell to below five dollars from the 1980's through the 1990's but with a different result in each of these countries: infant mortality rates worsened severely in the African country and improved in Haiti (WDR 2004). Another example is the big difference in per capita public spending in health between Mexico and Jordan, but with both countries having similar reductions in mortality rates.<sup>3</sup>

Kaufmann et al. (2002) evaluate decentralization effects on access to public services. Using a survey of local agencies, this study found that both local and central service providers in Bolivia were falling short in delivering an adequate quantity and quality of services, but local agencies were more successful in being accessible to citizens<sup>4</sup>, particularly for the poorer brackets of population segments. As decentralization is still an unfolding process (in this country and others), the positive results in access of services to poor people might be an preliminary indication of future improvement in final outcomes such as infant mortality rates, as poor people are the most vulnerable.

The cross-country and country-specific evidence discussed earlier points toward the existence of specific attributes and effects of decentralized service provision in terms of responsiveness and improvement in access to service delivery. However, this is just a first step in identifying the effects of decentralization on public services. The rest of this

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<sup>3</sup> World Bank's World Development Report (2004).

<sup>4</sup> Respondents claimed lower waiting times and lower payments for service in local service providers.

section is devoted to discussing the arguments and evidence provided in the literature regarding decentralization and its impact on two specific services, health care and water provision.

**Decentralization and its effects on the health sector: arguments and evidence.**

The general argument for decentralizing health care is that greater local participation in health policy and local accountability can lead to improved quantity (including coverage) and quality of service. Yet, exactly how these benefits can be realized and the impact of different kinds of reforms is not well understood (Litvack and Seddon 1999). The highly differentiated levels of health provision (i.e., primary, secondary, and tertiary) and several additional aspects of health care, such as family planning, information campaigns, and the training and supervision of personnel, make the effects of decentralization on this service more difficult to understand, particularly when looking at final outcomes.

Moreover, DeMello (2004) stated that decentralization in the health sector tends to be more complex than in other sectors because diseconomies of scale. He argues that these diseconomies of scale tend to discourage sub-national governments in the provision of costly curative treatments and immunization. At the same time, he argues, spillover effects tend to discourage the sub-national provision of preventive health care, particularly immunization and epidemiological controls.

Nevertheless, decentralization of the health sector has become appealing to many researchers, international donors, and policy makers because it raises expectations about several advantages including the following (Mills 1994, p.24):

- A less unified health service that is better tailored to local preferences.

- Improved success in the implementation health programs. That is, day-to-day overlooking and evaluation, which are necessary for implementation, are more likely to succeed under local accountability
- Reduced inequalities between urban and rural areas and between accessible and secluded regions of the country. This is assumed to occur due to proximity and responsiveness of rural local governments and providers to the needs of rural people—typically, in poorer countries rural areas tend to be more underserved than urban areas.
- Lower costs due to better targeted programs. This argument assumes that local service providers would tend to have better information about the local population to better allocate resources to target the poorer income groups.
- Greater community involvement and higher chance of sustainability in the long-run.

Little concrete evidence confirms these potential benefits, however. Few developing countries have long-term experience with health sector decentralization, and its impact on the management of the sector and on the services it delivers has rarely been evaluated (DeMello 2004).

#### *Fiscal decentralization in the health sector*

Many developing countries have decentralized the public health care system in the last twenty years, but little empirical research has been conducted on the effects of these fiscal changes in the health sector (Guilkey and Racelis, 2002). Robalino, Picazo and Voetberg (2001) developed one of the few existing cross-country evaluations of this relationship. This study focuses on the impact of fiscal decentralization on infant

mortality rates, which is a typical final outcome used in the literature to measure policies' impact on health care. Using panel data that includes developing and developed countries from 1970 to 1995, this study finds that countries where local governments manage a higher share of public expenditures tend to have lower mortality rates. Additionally, the authors argue that in their sample of countries, the share of public expenditures managed by local governments was correlated with their level of administrative capacity. Robalino, Picazo and Voetberg (2001) suggest only when local governments have stronger administrative capacity is fiscal decentralization likely to improve health outcomes. This implies the need for evaluating fiscal and administrative decentralization jointly (i.e., in the same model in empirical models).

Cross-country evaluation like the one discussed above has been to a great extent neglected in the evaluation of fiscal decentralization and health outcomes. Rather, specific country case studies (some with empirical analysis) have been used to shed light on that relationship. Schwartz, Guilkey, and Racelis (2002) analyzed audited line-item annual expenditure reports for about 1600 local governments the Philippines before and after the decentralization process started in 1994.<sup>5</sup> The study also combines these data with secondary census and demographic data in order to examine changes in the level and composition of local government health expenditures and the impact of these expenditures on the consumption of public health goods and services before and after decentralization. The results suggest that per capita expenditures in health increased

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<sup>5</sup> The same study has been applied to other countries like Tanzania, Paraguay and Uganda with similar results. These studies were performed under the MEASURE evaluation project (sponsored by USAID) conducted by the North Carolina Population Center between 2000 and 2003 (University of North Carolina at Chapel Hill).

immediately following devolution and continued to increase in 1995 and 1998 compared with per capita expenditure levels of prior years. They state that per capita increases appear to be more pronounced for provincial expenditures than for municipal expenditures, probably because more costly responsibilities in hospitals were devolved to provincial governments. The results also suggest that local governments, which had discretionary authority over unconditional transfers, allocated increasing shares of total resources to health at the expense of other locally provided government services following the decentralization process. This latter finding is in line with that of Arze (2003), who argues that increased shares of spending in health and education follow higher levels of fiscal decentralization across countries.

Nevertheless, even in fiscal matters, local accountability is apparently a key element. A study developed by Khemani (2004) on 30 local governments in Nigeria presented evidence that the design of intergovernmental fiscal relations has an important effect on local accountability and ultimately on health services<sup>6</sup>. This study found a widespread situation of non-payment of public health facilities' personnel, which led to lower quality of service (e.g., higher doctor absenteeism, lower drug availability). Moreover, Khemani (2004) argued that this situation can not be explained solely by lack of financial resources available for health services to local governments but rather by lack of local accountability on those resources. This study suggests that conditional transfers which are the main source of local health spending may be damaging local accountability because the public does not hold local officials accountable for those resources.

#### *Administrative decentralization in the health sector*

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<sup>6</sup> This study is based on a survey undertaken by Das Gupta, Gauri and Khemani (2004) in the Nigerian States of Kogi and Lagos, covering 30 local governments, 252 public primary care health facilities and over 700 health providers.

In the health sector in developing countries, the most common type of decentralization is a combination of de-concentration and delegation (Silverman, 1992; Bronfman, 1998). Analyzing the shift of administrative power from the center to the sub-national levels can be a difficult task. A great variety of elements need to be taken into account: for example, there are a great variety of projects and functions in which sub-national governments participate in coordination with line ministries that make that task complex. Bossert (1998) characterizes the range of powers and responsibilities as the “decision space” given to local governments on issues such as service organization, hospital autonomy, civil service, access rules, and governance rules. Probably the ones that make the biggest difference about how sub-national governments provide a service are the discretion on personnel and decision making power on facilities’ structure (Cohen 2002).

In Colombia, Bossert et al. (2000) examined the effects of increased “decision space”, finding that administrative decentralization increased utilization of health services and health expenditures per capita. For the cases of Ghana, Zambia, Uganda and the Philippines, Bossert and Beauvais (2002) found that the supposedly decentralized health systems allowed only moderate choices over expenditures, fees, contracting, and targeting. In all these countries, local governments were given some administrative authority, but central imposition of salaries seemed to be detrimental to the decision-making process.

Decentralization in health services has reached, in some countries, the hospital level. Although there is not yet hard evidence about the effects of greater hospital autonomy on hospital outputs and performance, case studies and survey-based evaluation

have shed some light on this policy (Sengooba et al. 2002). For the case of Argentina, Gonzales Prieto (2003) examines changes in hospital performance and local accountability as a result of decentralization and autonomy granted to hospitals. His results show that greater hospital autonomy has brought about more accountability in health care responsibilities. However, this study did not find a strong positive effect of decentralization and hospital autonomy on hospital performance.<sup>7</sup> In order to evaluate the effects of greater autonomy on hospital performance and quality of service provided, Sengooba et al. (2002) examined the differences between public hospitals and Private Non-For Profit (PNFP) hospitals in 3 districts in Uganda<sup>8</sup>. This study found that public hospitals consistently had worse performance and drug availability compared to PNFP hospitals.

In the case of the Philippines, Jack (2002) argues if increased administrative responsibility is not accompanied by adequate funding, decentralization may even deteriorate service delivery quality. From these results it can be implied that administrative decentralization (or any other dimension of decentralization) by itself may not be sufficient to generate the expected benefits. Furthermore, this observation supports the argument that each dimension of fiscal decentralization can not be analyzed independently of the others. Along similar lines of reasoning, using data from Brazilian municipalities, Mobarak et al (2006) find that administrative decentralization only provides good results when it is accompanied by good governance.

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<sup>7</sup> Although a positive and significant relationship was not found for the whole sample of 90 hospitals evaluated, when the author grouped the hospitals according to the level of autonomy, the group of hospitals with higher autonomy reported considerable higher performance indicators compared to the rest.

<sup>8</sup> Hospital performance is evaluated through different indicators such as patient workload per doctor and cost and expenditures per patient. To account for quality of the service delivery of hospital they use factors such as drug stocks, availability of equipment and doctors, and patients satisfaction with the quality of health care received.

### *Political decentralization in the health sector*

It is commonly argued that political decentralization brings accountability to the system and may improve health service delivery (World Development Report 2004). This may occur because citizens have a channel to provide input on local decision-making processes and hold local decision-makers accountable for their actions (Khemani 2006). McGreevey (2000) argues that political decentralization, in the context of a decentralized provision of health services, is essential to ensure accountability and improvements in efficiency. He argues that the realization of the benefits of decentralization requires not only devolving financial resources and administrative functions to lower tiers of government but also instituting electoral accountability.

Thus, in improving local accountability in service delivery through the political process, local elections may be a powerful tool for citizens. Betancourt and Gleason (1999), for example, found that in India an increased allocation of nurses to rural districts is associated with higher turnout in local elections. Khemani (2001) found that voters in local elections reward incumbents for local income growth, and punish them for the lack of it and for increased local inequality in their tenure. More interestingly, this research finds that this voting behavior at the local level is more consistent over time than the voting behavior in national elections. These studies highlight the importance of local accountability mechanisms, including political decentralization, in improving service delivery.

Another rationale is that political decentralization allows for a more widespread political representation (Neven 2003), that is, bringing more diverse and often underrepresented groups to participate in decision making about health services. There is

evidence that this has happened in countries such as Pakistan and India, where people of traditionally excluded and vulnerable groups, such as women, farmers in rural areas and indigenous people, now have a role in the political process (World Bank 2005; Raghavendra and Dulfo 2003). In these two countries women and other groups have reserved seats in the legislative bodies of local governments, as a consequence of the political decentralization process. Furthermore, the participation of these groups has already created an impact on how much local governments spend in services such as health. In India, for example, Raghavendra and Dulfo (2003) found that higher participation of women in local governments, through the reserved seats, is associated with a shift in public spending on health care and water provision. While the findings of Raghavendra and Dulfo (2003) highlight the impact of a complex process of local political representation, they nevertheless help to support the argument that widespread political representation would not be possible without political decentralization as a first step.

One of the few existing empirical studies on the effects of political decentralization and health across countries, Khaleghian (2003), evaluates the impact of political decentralization on immunization rates using a panel time-series data set of 140 low- and middle-income countries from 1980 to 1997. He finds that in the low-income group, increased decentralization is associated with higher coverage.

### **Decentralization and its effects on the water provision sector: arguments and evidence.**

Water is increasingly being managed as an economic rather than a social good, and decentralization in its various forms may be a useful tool to support this new approach (Braadbaart and Schwartz 2000). Governments and other reformers are now

trying to link service levels and costs, provide incentives to increase the efficiency of water resource allocation, reduce costs, and increase sustainability of water service systems (Lorrain 1992). In theory, decentralized water services should improve governments' ability to treat water as an economic good. Moreover, as argued throughout this section, a locally accountable provision scheme would help impose user charges that could create incentives for efficient water use as well as for a self financed water provision.

#### *Fiscal decentralization and water provision*

The argument often made that lower-level governments, closer to the beneficiaries, have an advantage in identifying citizens' preferences as well as the flexibility to respond to local conditions seems also to be common in the literature on water provision (McLean 2001). As local governments use this information to improve access, reliability, and higher quality of water, consumers may be willing to pay more for services (Ahmad 2002). These increased user charges can, in turn, be used to finance expansion, improvement, and maintenance of the existing network (Lorrain 1992). Indeed, as Bahl and Linn (1992) argued, the provision of services by municipal governments or other local bodies can be enhanced by the use of revenues raised as user fees to finance maintenance and even capital expenditures.

There is not cross country empirical evidence about the effects of decentralization on water provision and the country case studies bring mostly descriptive and anecdotal experiences. One probable reason for this situation is the lack of data in the field, which in turn is caused by difficulties in measuring the availability, access, and quality of this service. Descriptive evidence from new decentralized approaches points towards the

theory that users are willing to pay for water services if they are tailored to and fulfill their needs. A 1993 World Bank study found this to be true across different income levels. This study showed that low income households in marginal urban areas are willing to pay higher tariffs, if they would obtain an improved access to the service in return. This may be explained by the fact that lower income groups without household connection to water are currently paying higher prices for water than higher income groups in the same countries (with household water connection) (World Development Report 2004).

Although large capital investments are usually financed by central or ministerial branches, user charges are increasingly common for operations and maintenance of feeder systems (Ahmad 2002). The WDR (2004) argues that fiscal decentralization may allow local governments to charge for water services, which in turn can enhance the local policy makers' accountability to citizens. On the opposite case, without access to enough revenues from the clients, the service provider depends on the policymakers for fiscal resources to maintain service provision and in this way the local accountability may be harmed (WDR 2004). In many countries where water provision services depend on transfers from the central government there is lack of predictability on the amount and timeliness of the funding. This situation leaves the provider short in financial resources, which may lead to a vicious cycle of lower quantity and quality of services and even lower local revenues (Ahmad 2002). But the opposite is also argued: Zamman (2002), based on a case study of Indonesia, states that own-funded providers, especially if they have private management, do not commonly have good results and face opposition from local consumers and unions.

### *Administrative decentralization and water provision*

Following the classification of the types of administrative decentralization made by Rondinelli (1981) explained earlier, we can disaggregate water provision into de-concentrated, delegated and devolved schemes. According to Evans (2003), the de-concentrated system of water provision is the most common in the least developed countries. A common approach is to locate staff from the corresponding ministerial branch in units at intermediate and local governments to be responsible for water services delivery. The units develop their operation based mainly on technical considerations such as viability of the water source rather than identifying specific the needs of the population served. Not surprisingly, this approach created few incentives for users to financially assist government in maintaining or financing water services (Ahmad 1996).

Under the delegation model, governments transfer water management to public or even semi-private (public private partnerships) water agencies or management companies. These agencies are responsible for providing services within a specified region and are accountable to central ministerial branches. In the devolution approach, urban and rural units of water supply are fully placed under local tutelage. According to the Ahmad (1996), the degree of responsibilities may vary according to the local government administrative capacity. When local governments are more skilled, they can undertake activities that range from very technical in nature to activities related to community involvement. Local governments that lack technical capacity can still interact with the communities while relying on staff from higher tiers of government for technical support. Most of the literature on this point out that whatever approach is taken would work differently (more or less successfully) depending on country characteristics and

institutional settings. Rosenweig and Perez (1999) argue that each country is sufficiently different so that the solutions and option for water provision will not be the same.

Again, cross country empirical evidence is very scarce on this topic. Bardhan (2002) found some evidence about the relationship of administrative decentralization and water services. He analyzes 121 completed rural water supply projects, financed by various international donor agencies in several countries. His results showed that projects with high participation of local communities in project selection and design were much more likely to have the water supply maintained in good condition. In other words, projects with more decentralized decision making were more likely to be sustainable than projects with centralized decision-making.

More abundant is the single-country based literature that looks at this relationship. In Uganda, water provision projects with bottom-up planning and empowerment of communities were implemented improving local ownership and enhancing sustainability (USAID 2001). In Mexico, after the government transferred the management of irrigation systems to users' associations, recovery of costs increased from 30 percent to about 80 percent (Water and Sanitation Program- World Bank 2003). In Egypt, cropping intensity almost doubled after farmer-managed irrigation systems were introduced (Water and Sanitation Program- World Bank 2003). There is more anecdotal evidence of success from Ghana, Benin, Ecuador, Bolivia, India, and South Africa, particularly in extending the access of the service to relatively secluded rural areas (Castillo 1998).

### *Political decentralization and water provision*

Koppel (1987) argued that user participation and political accountability through this participation is essential for the performance and sustainability of water programs. As in the case of fiscal and administrative decentralization of water provision the existing evidence is mainly descriptive and anecdotal. Based on a case study of Indonesia, Zamaan (2002) argues that water provision can be cheaper and more efficient if water providers are managed with the active engagement of local stakeholders (i.e., water provision cooperatives, consumers, and elected representatives). Moreover, he argues that under this type of scheme, providers are held accountable to consumers and elected representatives. He concludes that better service provision would have a better chance to occur where representatives are democratically elected and structures are in place for citizen-initiated accountability.

An interesting example of citizen engagement in service delivery in democratically elected local governments is the case of the city of Porto Alegre, Brazil. In this city, citizens and neighborhood associations of different regions participate in the city's assembly meetings to discuss with locally elected politicians the local budget allocation for each different service, specific needs of the different districts, and even implementation issues. These joint politician-citizen discussions have generated impressive results. Between 1989 and 1996 access to basic sanitation (water and sewage) nearly doubled, while increasing revenue collection by 48 per cent (Santos 1998). This also highlights the willingness of citizens to pay for services if the services they need are in fact delivered.

## **Other factors to consider when looking at the relationship between decentralization and service delivery**

Governance aspects such as corruption and citizen participation in decision-making have been evaluated as the cause of a variety of socio economic outcomes including significant variance in service delivery outcomes. However, these variables seem to be ignored in most of the literature that evaluates the impact of decentralization on service delivery. Only a few studies like Khaleghian (2003), which has a variable for political rights in the local governments, consider this type of constraining factors<sup>9</sup>.

### *Corruption*

Administrative corruption can be profoundly damaging to the quantity and quality of service delivery across these key sectors. Corruption is often deeply rooted in public administration and leads providers of services to have unethical behaviors. The health sector, for instance, is characterized by a deep interdependence of providers and clients (Pritchett 1996). In this relationship there are factors like asymmetric information, divergence between public and private interests and incentives, and other characteristics that provide fertile ground for corruption (Lewis 1999). Patients, especially the poor, are in a distinctively weak position to counter these difficulties (WDR 2004).

Kaufman et al. (1999) argue that governance factors such as corruption and infant mortality rates have a strong negative correlation. Gupta, Verhoeven, and Tiongson (1999) also find that countries with higher levels of corruption tend to have higher child and infant mortality rates than countries with lower indexes of corruption. Rajkumar and Swaroop (2002) evaluate the links between public spending, governance, and service

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<sup>9</sup> See also Rajkumar and Swaroop (2002), which considers corruption in evaluating sector expenditures and education outcomes.

outcomes. Using data from a cross-section of countries for two periods of time, they found that increasing public spending on primary education is likely to be more effective in increasing primary education attainment but only in an environment where governance (e.g., control of corruption) also improves. One of the main variables to measure good governance was the level of corruption. This study clearly frames the questions of public spending and its effect on education attainment on governance issues. Based on survey data of health care users and health facilities across 105 urban and rural municipalities in Bolivia, Gatti, Gray-Molina and Klugman (2002) examined the determinants of corruption and citizen participation in health services. They found that corruption was significantly associated with longer waiting time to obtain medical care.

Another important issue to consider in corruption is the likelihood of capture by interest groups, particularly in poor countries (Bardhan and Mookherjee 2000a). That is, while local governments may have better local information and generate better accountability, they may be more vulnerable to capture by local elites, who will then receive a disproportionate share of sub-national spending on public goods adjusted to their preferences (Bardhan 2001). Evidence from country experiences signals that this is likely to happen in sub-national governments where civic participation is low (Shah 2002).

#### *Voice and Citizen Participation for Greater Accountability*

As Gatti, Gray-Molina, Klugman (2003) argue, citizen participation in the public policy debate is envisaged as a mechanism to bring more accountability and transparency to the decision making, particularly at the local level. Aside from voting out politicians (in the context of political decentralization) citizens can address their disapproval of

public services by protesting (e.g., through the media or citizens' organizations), through involvement in political affairs, or by finding alternative sources of supply. Thus, citizen and civil society organizations involvement in decisions about how public money is budgeted and spent at the sub-national level has been proposed as a very important tool for accountability.<sup>10</sup> The channels for this participation include the traditional civic involvement in political affairs (i.e., electoral participation), freedom of speech, political rights, the formation of civic groups, and the use of the media (Kaufmann et al. 2003).

There is growing country-case based evidence about the effects of citizen participation resulting in improvements in service delivery within the context of decentralization. In Mexico, over 22,000 health committees were created by 1998 to oversee health provision and participate in health campaigns and training with positive initial results (World Bank 1999). Evidence from Colombia and Bolivia show that citizens/constituents oversight can be a force in pushing local governments to improve their capacity and responsiveness (Faguet 2000; 2005). Thus, regular and clean elections, and citizen participation can increase the pressure on local leaders to turn citizens' demands into outputs. Indeed, civic engagement can importantly influence how governments allocate resources, especially if local government budget information is available and disseminated to citizens (Keefer and Khemani 2004).

The city of Porto Alegre, Brazil, for example, is a widely cited example of how civic involvement in budgeting can enhance resource allocation as well as contribute to democratic governance. In this city, budgets are of public domain and informal preparatory meetings are held to discuss demands of various community associations (unions, cooperatives, mothers' clubs, etc.) for investment across service sectors and total

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<sup>10</sup> Hirsman (1970); Gray-Molina et al (1999); Kaufmann (2002)

budget availability (Santos 1998; World Bank 2001). These demands are then ranked and aggregated for budget allocation by needs and population size. Since 1989, the workers party has won three consecutive municipal elections in Porto Alegre. Between 1989 and 1996, the percentage of households with access to water services and municipal sewage system rose from 80 percent to 98 percent and from 46 to 85 percent, respectively. During the same period, the number of children enrolled in public schools doubled and city revenues increased by nearly 50 percent.<sup>11</sup> In this case, the level of participation extends beyond information sharing and consultation. Citizens and civil society organizations propose spending projects, set priorities, and help decide which projects should be funded. There appears to be a direct link between increased civic participation in municipal budgeting and service delivery outcomes, including increases in infrastructure investment and education expenditures in poor areas (WDR 2004). Citizen participation guarantees legitimacy to decisions, and objective budgeting ensures a higher degree of fairness in an otherwise arbitrary process that is always subject to local elite capture.

There is also some empirical evidence about the influence of citizen and community participation in improving accountability and service delivery. In a study of Bolivia's citizen participation under a newly decentralized system of health care service provision, Gray-Molina et al. (1999) found that informal payments and longer wait times for service in municipal health providers, were less prevalent in cities and towns where local citizens participated in health boards. A follow up study on the former developed by Gatti, Gray-Molina and Klugman (2003) found that wait times for medical treatment and

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<sup>11</sup> This information has been drawn from World Bank (2001).

informal payments in the health sector were reduced were OTBs, the grass root organizations created by the decentralization law, were more active.<sup>12</sup> This later study also found that exit options (i.e., private health care facilities) do not help to reduce the situation of informal payments and waiting times for medical treatment. Also in Bolivia, Kaufmann et al. (2002) based on a survey of central and local government agencies found that citizen's voice and participation variables were statistically significant in improving public sector performance<sup>13</sup>. Moreover, they found that citizen voice was more important for government performance in delivering services than public management tools such as higher salaries or rule enforcement. This may be evidence to support Dillinger's (1995) statement about urban service delivery; he argued that public service delivery performance seemed an issue that hardly could be addressed only through the organizational context. Rather, this issue should be addressed by observing and taking into account other factors that affect the relationships between governments and their constituencies.

## **Conclusion**

This chapter discussed in a focused manner the literature that articulates the linkages between decentralization policy and public service delivery, particularly for services such health care and water provision. Moreover, it highlighted the studies that provide some evidence of the impact of decentralization (through each of its dimensions, namely fiscal, administrative, and political) on different aspects of public service

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<sup>12</sup> OTBs or *Organizaciones Territoriales de Base* were created by the Decentralization Law of Bolivia (Ley de Participación Popular) as the grass roots committees in charge of communicating the voice and the desires of the communities to their local governments regarding how the budget should be spent. Gatti et al. (2003) found no significant correlation between voter turnout or the number of OTB and informal payments and wait times. However, there was an effect when OTB were active in their local governments.

<sup>13</sup> Citizen's voice was measured through variables such as the existence of clearly defined mechanisms to ask users about their needs and preferences; and the existence of mechanisms to address users' complaints, among others.

delivery, including quantity and quality of services. However, this focused review also showed that only fewer studies provide cross-country examination of the effects of this policy on public services, which enables the evaluation of the effect of different levels decentralization. Moreover, the discussion in this chapter captured the rather fragmented treatment of the decentralization process in the literature, that is, the evaluation of the effects of decentralization (on socio economic variables) looking at a single dimension of this policy. The next chapter articulates the case for looking at decentralization in a more comprehensive way and discusses the basis of a framework to examine this policy and its effects on service delivery.

## CHAPTER 3

### AN ANALYTICAL FRAMEWORK FOR EXAMINING THE RELATIONSHIP BETWEEN DECENTRALIZATION AND SERVICE DELIVERY

This chapter provides a framework of the relationship between decentralization and service delivery by discussing selected aspects of this relationship, and by examining the process and implications of providing services at the local level. This chapter also serves as a preamble to the empirical analysis undertaken in Chapter 4, by informing the construction of empirical models that involve the analysis of decentralization reforms.

This chapter is organized as follows: first it discusses the causes of decentralization as a way to examine issues such as exogeneity in the models that contain this reform as an explanatory variable; then it discusses the relevance of the three core dimensions of the decentralization process (i.e., fiscal, administrative and political) in evaluating the depth of this reform; and finally it discusses a simple framework to examine service delivery in the local context.

#### **Why are decentralization reforms initiated?**

Decentralization processes are often initiated for and driven by political factors rather than with the objective of improving economic efficiency. These political factors are commonly related to a country's population and institutional characteristics and legacies. This argument has been discussed extensively and is widely acknowledged, and while it is not the central issue of this research, it is important to briefly discuss it because understanding why decentralization processes were initiated helps to grasp the context in

which this policy interacts with (and affects) other economic, social, and institutional variables.

Moreover, understanding why decentralization reform is initiated is also essential for constructing econometric models to evaluate empirically the effects of this reform. For example, considerations about causality in the relationships examined can be first approached by understanding properly the origins and triggers of the evaluated reforms in the right hand side of the regression.

The literature of fiscal federalism of the 1950s, 1960s, and 1970s already recognized that decentralization processes were prompted by political considerations and historical legacies (Oates 1972). In many federations (e.g., United States, India, and Germany) colonies and strong self-acknowledged jurisdictions existed before the countries themselves existed. Thus, maintaining or re-initiating decentralization processes was a way to hold together nations within a larger nation. Similarly, even in some unitary countries in Western Europe, historical legacies fostered a system with decentralized authorities: Spain, for example, is an agglutination of kingdoms and territories, and the historical legacies embedded in this situation are central for understanding the demands for decentralization in this country (Lopez-Laborda, Martinez-Vazquez, and Monasterio 2006).

Powerful triggers for decentralization are regional, cultural, ethnic, and religious tensions often seen within developing countries but also in transition and developed countries (Fox and Wallich 1997; Van Houten et al 1993; Leon 2001). Bird (2003), for example states the following: “Canada, Russia, Nigeria, Indonesia, Macedonia, Switzerland, South Africa, China, Belgium, Bosnia-Herzegovina, Spain, Uganda, the

Philippines, Tanzania, India, Rwanda, Sri Lanka, the United Kingdom, Ethiopia, Turkey, Serbia, Algeria, Sudan, Moldova, Morocco, Cameroon, even France... What can such a diverse set of countries (and many others) have in common? The answer is that each contains within its boundaries a significant territorially-based group of people who are (or consider themselves to be) distinct and different – in ethnicity, in language, in religion, or just in history.... ” (pp. 1).

In many countries of Africa, South Asia, and East Asia and the Pacific, those regional conflicts along ethnic, linguistic, or religion lines frequently induce powerful demands for greater autonomy. In the most extreme cases, where conflicts and grievances are so strong that they threaten peace and the existence of the country as such, relinquishing some powers from the center to the regions is seen as one of the few solutions for stability and peace. In those extreme cases, Posen (2003) argues that people feel that only a decentralized (or federal) structure may insulate ethnic groups from predatory (ethnic) politics. Overall, under lower and higher level of regional tensions, the decentralization process itself is seen by leaders, politicians, and external stakeholders as a tool for stabilizing and attempting to resolve those political demands and grievances.

In the Latin American context, while some argued that structural reforms of the 1980's and early 1990's reduced the role of central government and consequently prompted decentralization (Ames 1999), the reality is that in most countries decentralization reforms ran almost parallel to (and in some cases ahead of) core structural reforms. The same is true for many transition economies in Eastern Europe and Central Asia. A number of scholars have also suggested that decentralization presented an avenue to pass-down fiscal deficits, and this is indeed factually true, but that was not

the prime reason for starting the reform process (Bird and Vaillancourt 1998; see also Wallich 1994). Rather, and as Montero and Samuels (2004) find after exhaustive country case studies in Latin American countries, political choices played a major role in prompting decentralization. Case by case, the research of these authors show that it is either an “electoralist” goal (where political parties initiate decentralization to reinvigorate or improve their political bases) or regional pressures and tensions (originated by historical legacies) and in some cases both, that induce the initiation (or re-initiation) of a decentralization reform. These authors conclude that there is little evidence that promoting efficiency was the objective behind decentralization reforms in Latin America.

In post-socialist countries, democratization and devolution of some fiscal, administrative, and political power seems the most plausible reason for initiating decentralization during the transition period. The collapse of the socialist regimes in Central and Eastern Europe, for example, came with strong hopes of redistributing power that was so highly concentrated previously. Illner (1999), in a study examining the transfer of power of local government across Central and Eastern Europe argues that government decentralized some functions and resources after the transition in order to support their legitimacy in the midst of the political instability. He also argues that decentralization served as an emblem of the widely hoped democratization.

With focus on the relationship between decentralization and service delivery Treisman (2002) argues that: “It is hard to see how the rate of infant inoculations, the availability of improved water sources, sanitation facilities, or essential drugs, or the youth illiteracy rate could themselves affect decentralization, except perhaps via their

effect on national income.” But a counterpoint could be inferred, to some extent, from Bahl and Martinez-Vazquez (2005) when responding to the question of “why decentralization” they argue that “decentralization is usually introduced as a policy to offset a problem that has caused dissatisfaction with the present system of governance.” These authors note that further pressures for decentralization may be increased when citizens are dissatisfied by the performance of the government, and one could infer that performance of government also includes the performance of public services it delivers.

### **The Relevance of the Three Dimensions of Decentralization**

As discussed earlier, the decentralization process has three main dimensions: fiscal, administrative, and political. Due to limited data availability, the empirical literature has mainly focused on the first dimension and has used that aspect as proxy for the overall process. Moreover, many studies focusing on fiscal decentralization seem to overlook the fact that the political and administrative aspects of the process are intrinsically related to the fiscal one, and do not even comment about these inter-linkages while drawing conclusions from their empirical analyses. This omission in empirical examinations might be leading to biased results. See also Appendix A for a detailed discussion on assessing properly fiscal decentralization, and the difficulties of measuring properly this multi-faced dimension of the decentralization in the context of a multi-dimensional reform.

Accounting for all three dimensions of decentralization in an empirical model is critical for the several reasons. First, each individual dimension of decentralization is likely to have an individual effect on the dependent variable, and thus omitting one

dimension might overstate the effect of the dimension of decentralization actually used or underestimate the effect of the decentralization reform as whole.

Second, oftentimes one dimension decentralizes faster and deeper than the others. Furthermore, sometimes one of the dimensions might not experience any decentralization at all. This situation has consequences on the effects that the overall decentralization reform may have on any given socio-economic or institutional variable. This is a widespread occurrence in most countries with this reform, but it is particularly common in developing and transition economies. For example, in Poland, administrative and political decentralization were initiated with a “big bang” approach with the purpose of spreading democracy and democratic values in the early years of the transition but finances still do not match the same level of administrative and political responsibilities and consequently local governments are still struggling to cope with overwhelming financial mandates (Regulski 2003). In Bolivia, municipal governments increasingly have more autonomy over a larger amount of financial resources; however, all the administrative decisions regarding personnel are taken still at the central level (World Bank 2005). Pakistan has recently experienced an important reform regarding political and administrative devolution.<sup>14</sup> However, its sub-national governments remain fiscally dependent on the federal government<sup>15</sup> (World Bank 2005). In each of the examples provided, the overall effect of decentralization reforms would depend on the cumulative effect generated by each individual dimension.

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<sup>14</sup> Administrative devolution is particularly significant at the provincial level. However, from the provincial to the local levels there are still different degrees of administrative decentralization. In many cases provinces have kept much of the administrative decision making (World Bank 2005).

<sup>15</sup> Local governments are heavily dependent on the provincial governments through which transfers from the center flow downwards (World Bank 2005).

Third, cross-country comparisons countries from a single decentralization perspective present important caveats. Indeed, considering the mismatches described earlier one wonders how two countries can be compared in terms of decentralization from only one dimension. In the examples above, how can it be argued that Poland is more decentralized than Bolivia or that Pakistan is more centralized than Poland? Considering only one dimension is like analyzing only one third of the picture.

Fourth, the interaction or inter-linkages between two dimensions (or more) dimensions of decentralization could generate an additional or “extra” effect on given dependent variable; in other words, the whole can be larger than the sum of the parts. This effect may be the result of mutually reinforcing aspects of the decentralization dimensions. For example, it could be argued that higher local fiscal autonomy (i.e., higher fiscal decentralization) could generate additional positive results on local service delivery (that is, more efficiency due to a better match of public spending with local needs) when administrative decentralization grants power to local governments on decision-making over personnel delivering those services, or when political decentralization pushes local officials to be accountable to local needs on public local spending. That is, while each dimension of decentralization reform might have an independent effect in its own right, the reinforcing aspects of having more than one dimension could produce an additional value.

These reasons for accounting for all dimensions of decentralization are obviously interconnected and at the end they amount to one key argument: the threat of model misspecification and the potential of misleading results.

## A Simple Framework

This section provides a basic framework to examine the relationship between decentralization and service delivery by discussing selected aspects of this relationship and by examining the process of providing services at the local level. This discussion also aims to inform the construction of the empirical models used in Chapter 4 of this study.

### *The Choice of Dependent Variable: Outputs (Access) vis a vis Final Outcomes In Service Delivery*

Most of the cross-country research conducted on the effects of different institutional reforms on service delivery evaluate the impact of the institutional reform ( $i$ ) on a final outcome of a public service ( $fo$ ) (for example infant mortality rates or education performance), assuming broadly the following function:

$$fo_{sj} \approx f(e_{sj}, i_{sj}, c_{sj}) \quad (3.1)$$

Where  $e_{sj}$  represents expenditures in service  $s$ , within country  $j$  and  $i_{sj}$  is typically measured as a discrete variable to quantify the presence of institutional reform;  $c_{sj}$  is a set of control variables that may also have an effect on  $fo$ .

The key problem examining service outcomes is that the function above (3.1), or any function framing the relationship of an institutional reform (including decentralization) and final outcomes of service delivery, is that it can not realistically contain all the relevant variables that may impact significantly a final outcome ( $fo$ ). Demographic factors, geographic and weather conditions, political environment, and cultural issues, all need to be considered. More importantly the quantity and quality of other public (or private services) can have a large impact as well. For example, infant mortality rates may be impacted by poor health condition in mothers, which is caused by

the lack of access to water provision and the quality of water consumed. Infant mortality rates may also be affected by a large concentration of mosquitoes under poor sanitary conditions which exacerbates malaria prevalence rates in mothers and other care giver, or by the lack of education of parents, which is an impediment for them to take precautionary measurements in their children health. In the case of education, better nutrition and better health care may help children to achieve better results at school (WDR 2004). Household income, cultural factors, and parents' level of education may affect student completion rates and performance in standardized tests, and so on (Fuchs and Woessmann 2004).

Moreover, all these independent factors may be interacting at the same time in ways we do not fully understand. Uphoff (1992), for example, argues that the effects of government policies in service delivery are subject to many uncontrollable external and cross-sectoral influences and thus final outcomes are usually a fuzzy indicator of specific service problems and achievements. Thus, while recognizing that complete of full model specification is virtually impossible, all these omitted (and unobserved) factors, spurious effects, and interactions make the examination of institutional reforms (such as decentralization) and final service outcomes very difficult, leaving ample space for under or over statement and spurious effects and attribution problems.

Therefore, a better aim is to step back and provide a more robust and direct approach to evaluate the effects of decentralization reform on service delivery. This study proposes the use of intermediate outputs, namely variables that measure access to services, rather than final outcomes, so the effect is more direct. In most countries, intermediate outputs and access are at the center of the problems with public service

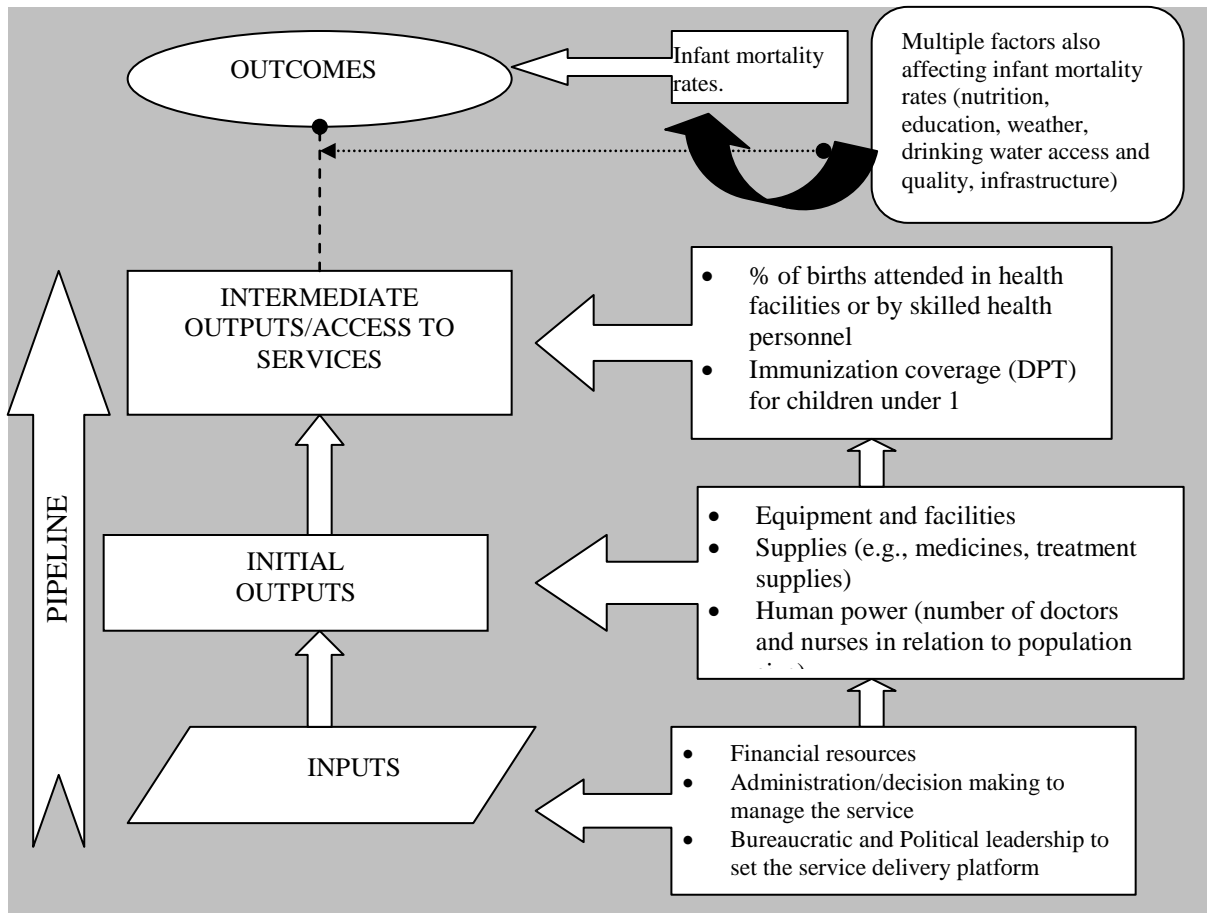
delivery. In the case of health care, intermediate outputs (or access variables) are basically availability of doctors, access to medical facilities and medical personnel to receive basic health care services, and immunization treatment coverage, among others. In the case of water provision, an intermediate output is access to improved sources of drinking water, through household connection to running water or other nearby reliable access to drinking water.

#### *A Traditional Service Delivery Structure*

A graphic scheme of service delivery can also lend itself to illustrate the influence of decentralization reform in outputs of service delivery. Figure 3.1 shows a pipeline in the production of a specific service  $s$  (in this case health care). This figure succinctly shows the upstream pipeline of delivering a service, which starts with inputs such as financing, management, and decision making (including political power to do so) in setting the service delivery platform. These inputs allow the production of a service by paying salaries for doctors and nurses (and other relevant personnel), purchasing needed supplies for treatments, providing maintenance, acquiring medical equipment, and improving facilities.

These initial outputs, in turn, help directly in the production of some intermediate outputs of the service that are closely related to access such as immunization coverage, access to birth delivery services, maternal care, etc. At the end of the pipeline this should lead to outcomes related to improved health status for the population such as lower rates of infant mortality (as shown in the example of Figure 3.1). But (as argued earlier in this section) this latter step is not fully a direct consequence of a proper production of a specific service or health program because there are a number of variables also affecting

that final outcome that are related to health care provision itself (see Figure 3.1). Note that the basic production of a service could take place in a centralized or decentralized framework, but this study would move to that discussion later in this chapter.



Source: Author based on modified service program structures from WHO and the World Bank

**Figure 3.1: A service delivery pipeline: The case of health care**

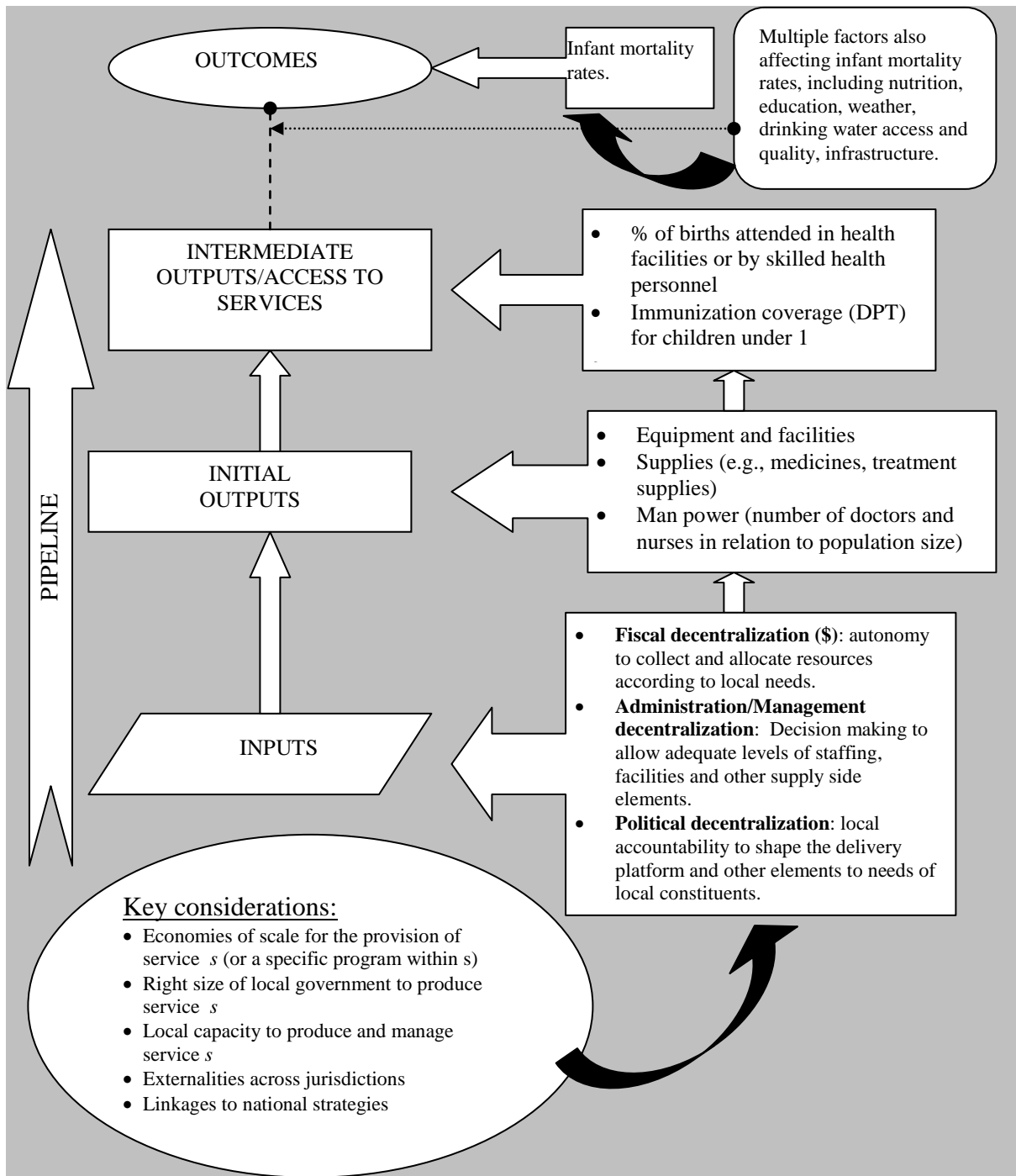
*A traditional Service Delivery Structure, Decentralization and Key Considerations*

Building on the last sub-section, Figure 3.2 connects decentralization reform to the initial inputs of the traditional way to look at the delivery pipeline of a service (shown in Figure 3.1). While, Figure 3.2 is not a representation of service delivery in a decentralized context (which is addressed later in this chapter) but rather introduces the

idea that each of the key initial inputs to produce services can be significantly influenced by the three dimensions of decentralization reform.

Indeed, fiscal decentralization can change the way in which financial resources are allocated across service sectors and within sectors, with potential implication to the levels of technical and allocative efficiency (as discussed in Chapter 2). Administrative decentralization can change how staffing and other supply side resources are re-allocated to increase or decrease the size of a specific service in each sector. Finally, political decentralization has the potential to increase accountability by improving responsiveness and responsibility of officials, bureaucrats, and service providers. The importance of the multidimensional approach to evaluate the effects of decentralization on service delivery and other socio-economic variables is further discussed below.

There are, however, key considerations regarding service provision in a decentralized framework that need to be discussed up front. In most countries, local governments have a role in delivering key services. When setting the expenditure responsibilities among levels of local government, a number of aspects and questions need to be examined. For example, what is the balance between economies of scale in providing a service  $s$  (that is, to help achieving technical efficiencies in service  $s$ ) and properly tailoring services to local needs (that is, allocative efficiency)? Other critical questions are: what is the right size of local government in a particular country to produce service  $s$ ? what is the local government capacity to produce and manage effectively and efficiently service  $s$ ? what are the externalities of such provision across jurisdictions? What are the national priorities in specific sector and service (See Beasley and Coate 2003; Bird et al. 2003; Lockwood 2002)



Source: Author based on a modified service program structure from WHO and the World Bank.

**Figure 3.2: Decentralization and Its Effect on Inputs on a Traditional Service Delivery Pipeline**

The answers to these, and other questions, would help policy makers to decide at what level of government a specific service should be provided. Each specific service is likely to require a different level of government for its delivery. For example, primary health care requires immediate proximity to the patients and delivers less specialized health care services, and thus, it might be located at the smallest size of local government, secondary and tertiary health care, which have a higher level of specialization in treatments might need an intermediate or higher level of government to allow enough resources and serve with economies of scale to a larger population group. This situation further challenges our ability to model service delivery in a decentralized context.

#### *Service Delivery and the Multidimensional Decentralization Reform Context*

The vast majority of the research related to decentralization and service delivery focus on a single dimension of this reform. Expanding on the function 3.1 and assuming a symmetric level of decentralization across jurisdictions in a country, consider the following function:

$$ao_{sj} \approx f \left[ \left( \frac{L_{Fsj} F_{sj}}{F_{sj}} \right), \left( \frac{L_{Asj} A_{sj}}{A_{sj}} \right), \left( \frac{LP_j}{P_j} \right), ci_j \right] \quad (3.2)$$

Where  $ao$  is an intermediate output of (or a measure of access to) service  $s$  in country  $j$ ;  $F$  represents public budget resources devoted to service  $s$ ;  $A$  represents administrative or managerial powers in handling the delivery of service  $s$ ;  $P$  represents broad political and legislative powers in the country; and  $c$  accounts for variables that shape the economic and institutional context of country  $j$ . In the case of financing resources,  $L$  can be interpreted as the local share of financing ( $F$ ) (that is,  $0 \leq L_{Fj} < 1$ ) over which a local government has fiscal autonomy or strong discretion either in how

resources are collected or in how they are spent (Appendix A provides a detailed discussion of how to assess fiscal autonomy at the country level). Note that a local government may have specific financing sources to cover a specific service  $s$ , or it may have a broad allocation of resources (from different sources) to cover a mandated basket of various services, or as in most countries, a mix of both. Thus, the function 3.2 is a

generalization. In the econometric models presented in Chapter 4  $\left( \frac{L_{Fsj} F_{sj}}{F_{sj}} \right)$  is called

fiscal decentralization or *FD* (Appendix A also introduces some of the challenges measuring fiscal decentralization due to its multi-faced structure and the complexities that may be involved in its design). In the case of administrative decision-making powers ( $A$ ),  $L$  denotes one or several key administrative power that allow local governments more autonomy and flexibility in deciding over staffing, resources, and levels of

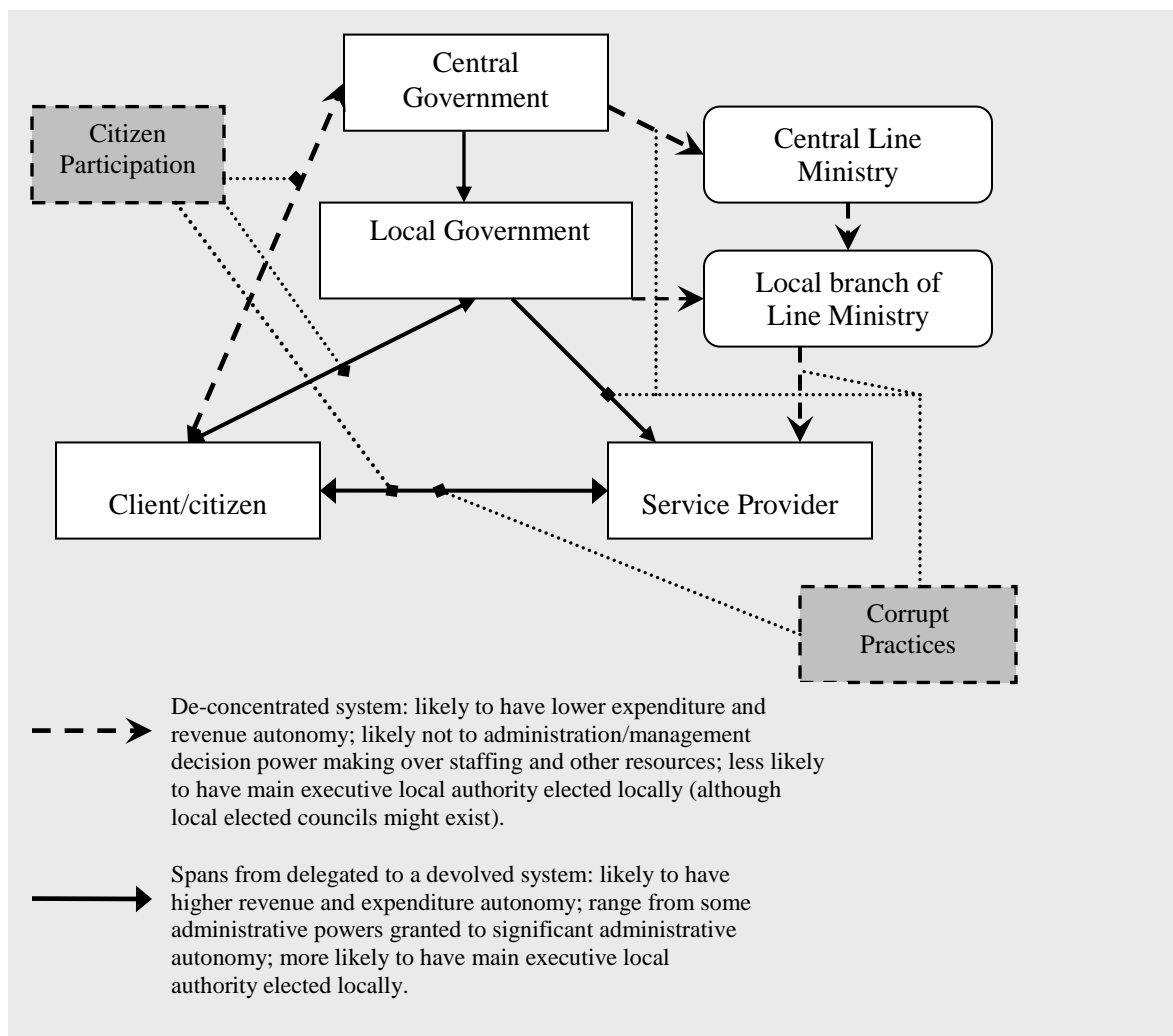
provisions that match their needs in service  $s$ . Commonly,  $\left( \frac{L_{Asj} A_{sj}}{A_{sj}} \right)$  can be sector

specific (e.g., administrative decisions of staffing in health care for an specific service assigned to a local government) or functional (e.g., staffing decision across all responsibilities assigned to a local government); in the econometric models presented in Chapter 4 this is called administrative decentralization or *AD*. In the case of political power ( $P$ ),  $L$  simply denotes a key element that would allow local political power and consequently certain level of local political accountability; such as having locally elected leaders that would consider local preferences (of their constituents) to shape service delivery policy accordingly. in the econometric models presented in Chapter 4 this is called political decentralization or *PD*

Additionally, the control variables  $c$  for country  $j$  could be further sub-divided into two groups: (i) specific economic conditions and country characteristics; and (ii) institutional characteristics that may influence service delivery outputs such as the level of corruption and the level of citizen participation to enhance accountability.

*Relationship of Fiscal, Administrative, and Political Decentralization with Service Delivery in Decentralized vis a vis Centralized Frameworks*

Figure 3.3, which is a modification of the service delivery framework used by the World Bank's World Development Report (2004), illustrates accountability relationships among the key actors in a centralized *vis a vis* a decentralized system of service provision. As Ahmad et al. (2005) argue only understanding the relationships between central policy makers, local governments, service providers, and citizens policy makers can fully understand why decentralization reforms can, and sometimes cannot, lead to better service delivery.



Source: Author's modified version of the World Bank's World Development Report 2004—service delivery framework.

**Figure 3.3: Accountability lines in more and less decentralized service delivery systems.**

Moreover, Figure 3.3 illustrates the importance of each dimension of decentralization in delivering public services. In this figure, Rondinelly's (1981) three decentralized modes (de-concentration, delegation, and devolution --discussed in chapter 2) are merged into two: a de-concentration mode, and a mode that goes from delegation to devolution. Moreover, these modes of decentralization are aimed to reflect how central and local policy makers, service providers, and citizens are inter-linked under the three

broad dimensions of decentralization: fiscal, administrative, and political. For example, local governments may have some degree of fiscal decentralization, but if they do not have the autonomy to manage its human resources (for example, the ability to hire and fire personnel is not a power of the local government but rather one that belongs to a central line ministry) they may be unable to tailor services to local preferences in an efficient manner.

Further, if local officials are not democratically elected by their local constituents, there could be a weak link of accountability to local citizens, since appointed officials are accountable to the center, and thus they may pursue different preferences from those of local constituents. On a different case, if political decentralization is in place, but local governments do not have the necessary resources or administrative autonomy to take decisions, local officials may lose credibility and citizens would not have an incentive to pay taxes to be spent on improving local public services. Thus, theoretical rationales of allocative efficiency, technical efficiency, and local knowledge of preferences and needs arising from a decentralized framework may suffer as a consequence.

The accountability relationships shown in Figure 3.3 are central to the theory that decentralized frameworks can produce better quantities and quality of services. If authorities performing functions at the local level are not accountable to their constituents, at least to some degree, fiscally (through the revenue or expenditure side), administratively and politically, the expectation that decentralized provision would lead to better services might be partly eroded.

The relations between central policy makers and citizens vis a vis local policy-makers and citizens could also be portrayed in the following way: because national

constituencies are so large and heterogeneous, they may be unable to hold national policy-makers accountable for their very specific preferences; in other words, heterogeneous national constituencies might make the process of accountability harder as there is much more divergence in their preferences. At the same time, central policy makers may not be able (or willing) to address all the different constituencies' problems in a way that satisfies local needs, as they only need to pursue selected policies to keep themselves in power. In a decentralized system of service provision local governments' policy makers are accountable to smaller constituencies, which allows for clearer links between a limited number of policies and responsibilities, delivery of those responsibilities and results that locally perceived; that is, clearer or more direct accountability lines (see Figure 3.3 above).

Bardham and Moherkee (1998;2000a; 2000b) offer an important caveat in this regard. They argue that knowledge of local needs coupled with decentralization powers might allow increased efficiency in service delivery but only if local government authorities want to use that knowledge for improving services. In the case of "elite capture" of local governments, they argue those efficiency gains may not be likely. This implies that even locally elected authorities may not deliver the expected quantities and quality of services if they instead decide to personally rent from the resources received for delivering services.

This in turn means that a model involving decentralization and service delivery should also include some control variables related to institutional environment, for example those in Figure 3.3, related to the level of corruption and the level of citizen participation in policy making. The level of corruption would be associated with local

elites capturing power for rent-seeking purposes, which can change priorities of policy making toward privileging small groups as oppose to the majority of the citizens' needs in the jurisdiction. Moreover, aside from the supply side of accountability, that is, the obligation of elected officials to be responsible for delivering public services (Przeworski and Stokes, 1999), other means of demand-side accountability may have an influence in improving service delivery (Ahmad et al. 2005). Demand-side accountability is basically that generated through the power of constituents who elect (and change) periodically their leaders, but also refers to citizen participation and opinion in public matters, through free media, or through mechanisms such participatory budgeting, published score cards, and so on (Ahmed et al 2005, World Bank 2007)

## **Conclusion**

The components of a framework to examine the relationship of decentralization reform and service delivery discussed above are, to some extent, complex and multi-faceted. But all of them: the multi-dimensional context of decentralization reform, the element that pertains to defining what we want to measure in service delivery, and the inter-linkages between the actors in decentralized or centralized framework of service delivery are extremely relevant to undertake research in this field. Within the context of this analytical framework the next chapter attempts an empirical examination of the effects of decentralization policy on access to health care and water provision services.

**CHAPTER 4**

**AN EMPIRICAL ANALYSIS OF THE RELATIONSHIP OF  
DECENTRALIZATION AND ACCESS TO SERVICES: THE CASES OF  
HEALTH AND WATER PROVISION**

This chapter examines the effects of decentralization on access to public services using cross-country panel data from 1990 to 2002.<sup>16</sup> More specifically, this chapter evaluates the effects of all three dimensions of fiscal decentralization on variables that account for access to services in health care and water provision.

**Hypotheses**

Based on the arguments and the framework provided in Chapter 3, the following three hypotheses would be tested: (1) Increased fiscal, political, and administrative decentralization have a positive effect on access to health care and improved water sources for the population; (2) higher levels of (and changes toward higher) fiscal decentralization have a stronger positive effect on access to health care and improved water provision for the population in developing countries than in developed countries; and (3) the inter-linkages of at least two of the dimensions of decentralization (fiscal, administrative, and political), if they are in place in a country, generates an extra positive (that is, beyond each individual dimension) effect on access to services of this reform.

**The General Models**

This study evaluates the effects of decentralization on access to health care and water provision services. For hypotheses 1 and 2 the following general regression is used:

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<sup>16</sup> During this time span, four points in time 1990, 1995, 2000, and 2002 are used due to the data characteristics and availability.

$$A_{kit} = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 PD_{it} + \alpha_3 AD_{it} + \alpha_4 \phi + \chi'_{it} \beta + u_{it} \quad (4.1)$$

Where the dependent variable  $A$  represents a measure of access to health care or access to improved drinking water provision services for country  $i$  for time  $t$  (in the subsequent sections  $AS$  would be disaggregated into access to health care and water provision variables). The independent variables  $FD$ ,  $PD$ , and  $AD$  are measures of fiscal, political, and administrative decentralization, respectively; these variables are aimed at testing Hypothesis 1.

Developed countries tend to be more decentralized than developing countries. At the same time, developed countries have a higher level of access to services. In regression analysis this can be depicted by creating a simple dummy for developed countries, which would show a higher intercept. To test hypothesis 2 this analysis takes a step further by creating an interaction term between the fiscal decentralization variable and a simple dummy generated for developed countries. This interaction term is represented by  $\phi$  (in 4.1 above), more specifically:  $\phi = \varpi * \psi$ , where  $\varpi$  is a representation of the level of decentralization (for simplicity using only fiscal decentralization  $FD$ ) and  $\psi$  is a dummy variable that denotes country group as in developed ( $D$ ) or in transition ( $T$ ) (former socialist block). The purpose of this interaction term  $\phi$  is to examine if changes in  $\varpi$  have different effects on access to services in developed countries compared to developing countries, and in transition countries compared to all other countries.

Additionally,  $\beta$  is the set vector of parameters arising from  $\chi$ , which represents a set of control variables that include: (i) country institutional environment such as the level of corruption and the availability of channels for citizen participation in policy making, (ii) economic conditions and cycles such as per capita GDP and GDP growth,

and (iii) country characteristics such population density and population living in rural areas;  $u$  is the error term.

To test hypothesis 3 the following general regression is used:

$$A_{kit} = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 PD_{it} + \alpha_3 AD_{it} + \alpha_4 \lambda_{it} + \chi_{it}' \beta + u_{it} \quad (4.2)$$

Where  $\lambda$  is an interaction term that contains at least two different dimensions of the decentralization process (out of the three  $FD$ ,  $PD$ , and  $AD$ ). That is, the model tests the following interactions combinations: (i)  $FD*PD$ ; (ii)  $FD*AD$ ; and (iii)  $PD*AD$

As discussed in more detail in the next section  $PD$  and  $AD$  are dummy variables, but dummy variables that vary in time. That is, in  $t=0$ ,  $PD$  may have a value of zero when a measure of political decentralization such as having locally elected leaders is not in place but this may change in  $t=2,3$ , or  $4$ . The same situation applies to  $AD$ . The dataset spans from 1990 through 2002 (using four observations in time for each country), a time frame that was very rich in decentralization reforms throughout the world.

### **Choice of Variables and Data**

This research uses a cross country unbalanced panel dataset that includes 110 developing, developed, and transition countries and four points in time for each country (1990, 1995, 2000, 2002). The panel is unbalanced because some countries in the dataset have missing values for one year for some of the independent variables, which eliminates the whole observation under some specifications of the models. The dataset was constructed using several data sources briefly described throughout this section.<sup>17</sup>

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<sup>17</sup> See Appendix 1 for a detailed list of all variables (and their sources) used in the empirical analysis.

### *Dependent Variables*

The case made in Chapter 3 as regards to using output and access measures related to service provision instead of final outcomes as dependent variables when evaluating the effects of decentralization (or any other institutional independent variable) was followed in selecting the variables described below.

In the case health care, the following variables were selected: (i) the percentage of births attended in health facilities, (ii) the percentage of births attended by skilled (trained) personnel<sup>18</sup>, and (iii) the immunization coverage for diphtheria, pertussis, tetanus (DPT) (in percent). The first two variables listed above measure primary health services and provide a good account of relative access to an essential health care service. These variables come from the country databases of the World Health Organization (WHO) for various years, and the United Nations Millenium Indicators database. The third variable is a critical output of preventive health care and also embeds a straightforward sense of access. This variable comes from the World Development Indicators (WDI) produced annually by the World Bank.

Table 4.1 below provides a summary of statistics of the dependent variables used to account for access to health care services. Additionally, Table 4.2 shows that all the selected dependent variables related to health care access are highly (and positively) correlated with each other, which allow some flexibility and more option in selecting model specifications.

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<sup>18</sup> Includes certified midwives.

Table 4.1: Summary Statistics of Access to Health Care Variables

Dependent Variables	Obs (n)	Mean	Std. Dev.	Min.	Max.
% of birth attended in health facilities	427	0.7130	0.3019	0.01	1
% of birth attended by skilled personnel	426	0.7708	0.2815	0.02	1
Inmunization coverage for DPT (%)	440	0.8153	0.1838	0.18	1

Table 4.2: Correlation Matrix for Variables Measuring Health Care Access

	% of birth attended in health facilities	% of birth attended by skilled personnel	Inmunization coverage for DPT (%)
% of birth attended in health facilities	1		
% of birth attended by skilled personnel	0.9323	1	
Inmunization coverage for DPT (%)	0.6175	0.6663	1

For the dependent variable that accounts for access to water provision the following variables are considered: (i) the percentage of a country’s population with access to improved drinking water sources, (ii) the percentage of a country’s rural population with access to improved drinking water sources, and (iii) the percentage of a country’s urban population with access to improved drinking water sources. These variables come from the United Nations Millenium Indicators database and the World Development Indicators of the World Bank. These sources (as well as WHO) define improved drinking water sources “in terms of the types of technology and levels of services that are more likely to provide safer drinking water than unimproved technologies. Therefore, improved water sources include household connections, public standpipes, boreholes, protected dug wells, protected springs, and rainwater collections; and unimproved water sources are unprotected wells, unprotected springs, vendor-

provided water, bottled water (unless water for other uses is available from an improved source) and tanker truck-provided water”.<sup>19</sup>

These variables are the quintessential measures of access in water services. Table 4.3 below provides a summary of statistics of the dependent variables used to account for access water provision. Table 4.4 shows that all the selected dependent variables related to access to water provision services are highly and positively correlated.

Table 4.3: Summary statistics of variables related to access to water services in the database

Dependent Variables	Obs (n)	Mean	Std. Dev.	Min.	Max.
% of total population with access to improved water sources	424	0.8218	0.2028	0.2	1
% of rural population with access to improved water sources	409	0.7378	0.2427	0.1	1
% of urban population with access to improved water sources	418	0.9158	0.1325	0.32	1

Table 4.4: Correlation Matrix for Variables Measuring Access to Water Provision Services

	% of total population with access to improved water sources	% of rural population with access to improved water sources	% of urban population with access to improved water sources
% of total population with access to improved water sources	1		
% of rural population with access to improved water sources	0.9104	1	
% of urban population with access to improved water sources	0.8368	0.7213	1

<sup>19</sup> See World Health Organization [www.who.org](http://www.who.org) and the United Nations Millenium Indicators database at [www.un.org](http://www.un.org)

### *Core Independent variables*

As discussed earlier, decentralization is a complex multi-dimensional process that involves fiscal, administrative and political aspects. Moreover, each of these dimensions is multi-faceted. The cross-country empirical literature has measured fiscal decentralization as shares/ratios of sub-national fiscal resources (revenues or expenditures) to total public fiscal resources, using primarily the data of the Government Finance Statistics (GFS) Dataset of the International Monetary Fund (IMF). While these measures can be criticized for being too rough in measuring the actual degree of fiscal decentralization in a country, they remain the preferred alternative as they rely on data with consistent definitions across a large number of countries and over time. As Huther and Shah (1998) argue, comparable and meaningful cross-country data are essential in order to learn about the decentralization policy. Moreover, it has become clear that detailed data with information about all main aspects of fiscal decentralization and local fiscal autonomy, that is comparable across countries, are not attainable in the near future.

This study, as others in the decentralization empirical literature, uses the following measures as a proxy for fiscal decentralization ( $FD$ )<sup>20</sup>: the ratio of sub-national expenditures to total expenditures ( $FD\ ed$ ) and the ratio of sub-national revenues (net of transfers) to total revenues ( $FD\ rd$ ). These measures are compiled from the International Monetary Fund Government Finance Statistics (GFS) for the years 1990, 1995, 2000, and 2002. The caveats of using these rough measures of fiscal decentralization are substantial. Appendix A raises key factors behind measuring appropriately the level of fiscal decentralization and puts forward a framework (for discussion) to support future detailed

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<sup>20</sup> Other variables considered are explained in Appendix 2.

data collection of the multi-faced aspects of fiscal decentralization and fiscal autonomy. Appendix A aims at fostering discussion and building consensus on an appropriate framework for measuring fiscal decentralization as necessary step before more comprehensive data is collected uniformly across countries.

Administrative decentralization is also multi-faceted in nature since it refers to different aspects of local decision-making power to deliver services. They include: personnel management, ownership and management of service facilities, management of other material resources in the sector, and administrative discretion over day-to-day operations.<sup>21</sup> To proxy administrative decentralization, this study uses one of the core administrative functions that could be decentralized to local governments: personnel management. Most practitioners in the field would agree that this is perhaps the core administrative function in relation to service delivery at the local level. To do so, a dummy variable that indicates whether sub-national governments have autonomy to hire and fire people is used. This dummy variable is time-variant, that is, it may take values of zero or one for the same country in different points in time ( $t$ ). For example, in  $t=0$ ,  $AD$  may have a value of zero when a country ( $j$ ) does not have the administrative discretion to hire and fire, but this may change in  $t=2,3$ , or  $4$  if legislative changes take place allowing such discretion. This dummy variable is generated combining the database of Political Institutions DPI (World Bank 2002), Treisman (2002), WB-OECD dataset on local autonomy (2004), and World Bank Development Policy and Country Reports.

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<sup>21</sup> It is important to point out, however, that guidelines and rules on how the health care services should be performed, quality standards of health facilities and procedures, or quality standards of water are and should be typically set at the central level of government. All other functions are distributed between central and sub-national levels depending on the level of decentralization.

There are also different facets to the political decentralization process. It can be examined by looking at whether sub-national authorities are locally elected; or by looking at what authorities are elected at the sub-national levels: executive local authorities or local legislative bodies. To complicate things more a country typically has more than one level of sub-national government, and political devolution of power to these levels might be different. Finally, political decentralization can also be examined by looking at certain institutional arrangements such as the voice and vote power of sub-national governments in changes to national legislation (on issues that might affect local government) at the central level. The latter is also linked to how sub-national constituents are represented in the national parliament.

To account for political decentralization this study uses two main variables. The first variable used “political decentralization at the municipal (local) level” (*PD le*) indicates if municipal executive leaders are locally and democratically elected or not. This dummy variable will take the value of 1 if both a local elected assembly and the executive head of local government are locally elected. Further, countries may have rural and urban local governments at the same level of local government, so the dummy variable takes a value of 1 if at least one local of local government (e.g. cities) has a locally elected council and locally executive head of local government. The second variable used “political decentralization at the state level” (*PD se*) indicates if state/province/regional leaders and their legislature are democratically (and locally) elected or not. In this case, the dummy variable takes the value of 1 if the state, province, or region has either an elected council or an elected head of the executive province (or region) government, or both.

Similarly to the dummy used for administrative decentralization, the two dummy variables used to account for political decentralization vary in time, that is, they may take values of 0 or 1 for the same country in different points in time. This is because in many countries in the sample, the political decentralization setting changed over the time span of our dataset. These variables were generated using the Databases of Political Institutions DPI (World Bank) and Treisman (2002), background data of the World Development Report 2000, and World Bank Development Policy Reports and Country Reports. Table 4.3 displays summary statistics for all the decentralization variables used in this study.

Table 4.5: Summary statistics of decentralization variables

Dependent variables (Decentralization)	Obs (n)	Mean	Std. Dev.	Min	Max
Revenue					
Decentralization	418	0.191	0.131	0	\$0.608
Expenditure					
Decentralization	396	0.211	0.150	0.008	\$0.890
Administrative					
Decentralization	424	0.203	0.403	0	1
Political					
Decentralization at the municipal level	398	0.603	0.490	0	1
Political					
Decentralization at the state level	424	0.453	0.498	0	1

Additionally, Table 4.6 presents some correlation patterns among the decentralization variables. While the measures of fiscal decentralization, revenue decentralization (FD rd) and expenditure decentralization (FD ed) are highly correlated, measures across different dimensions of the decentralization process are much weakly correlated. The latter supports a chief argument made throughout this study, that is, since each dimension may decentralize at a different speed and level, it is critical to look more comprehensively at this reform when doing empirical analyses.

Table 4.6 Correlation Among Decentralization Variables

	Fiscal Decentralization (Revenue Deentralization) FDrd	Fiscal Decentralization (Expenditure Deentralization) FDed	Administrative Decentralization (AD)	Political Decentralization at the local level (PDle)	Political Decentralization at the state/province level (PDse)
Fiscal Decentralization (Revenue Deentralization) FDrd	1				
Fiscal Decentralization (Expenditure Deentralization) FDed	0.8064	1			
Administrative Decentralization (AD)	0.2757	0.2257	1		
Political Decentralization at the local level (PDle)	0.1886	0.122	0.3898	1	
Political Decentralization at the state/province level (PDse)	0.3528	0.2796	0.3311	0.5957	1

This study also generates a dummy variable called “D” that takes the value of 1 for developed countries (and an interaction term using D and fiscal decentralization—discussed earlier in this chapter) to examine differences of the effects of decentralization on services in developed countries vis a vis and developing and transition countries. This study does the same for a dummy variable called “T” that takes the value of 1 for transition countries. As pointed out earlier, developed countries tend to be more decentralized across all dimensions and tend to have higher levels of access to service due their more advance income situation. This can be clearly observed from the data of this study by applying a simple two-sample t-test as shown in Table 4.7a,b,c,d,e, using the dummy variable “D” against all three dimensions of decentralization and selected variables on access to health care and water provision services.

Table 4.7a: Developed countries vs developing and transition countries as regards to levels of fiscal (revenue) decentralization.

Fiscal decentralization (revenue decentralization)	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
Group					
0	342	0.165	0.006	0.116	0.152 0.177
1 (developed countries-- D)	76	0.312	0.015	0.131	0.282 0.342
combined	418	0.191	0.006	0.131	0.179 0.204
difference		-0.147	0.015		-0.177 -0.117

Table 4.7b: Developed countries vs developing and transition countries as regards to levels of administrative decentralization.

Administrative decentralization	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
Group					
0	348	0.144	0.019	0.351	0.107 0.181
1 (developed countries-- D)	76	0.474	0.058	0.503	0.359 0.589
combined	424	0.203	0.020	0.403	0.164 0.241
diff		-0.330	0.048		-0.425 -0.235

Table 4.7c: Developed countries vs developing and transition countries as regards to levels of political decentralization (at the local level).

Political Decentralization (local)	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
Group					
0	326	0.531	0.028	0.500	0.476 0.585
1 (developed countries-- D)	72	0.931	0.030	0.256	0.870 0.991
combined	398	0.603	0.025	0.490	0.555 0.651
diff		-0.400	0.061		-0.519 -0.281

Table 4.7d: Developed countries vs developing and transition countries as regards to access to health care (% of births attended in health facilities).

% of birth attended in health facilities	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
Group					
0	351	0.654	0.016	0.302	0.622 0.686
1 (developed countries-- D)	76	0.986	0.002	0.014	0.982 0.989
combined	427	0.713	0.015	0.302	0.684 0.742
diff		-0.332	0.035		-0.400 -0.263

Table 4.7e: Developed countries vs developing and transition countries as regards to access to water provision

% of total population with access to improved water sources	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
Group					
0	348	0.784	0.011	0.205	0.762 0.805
1 (developed countries-- D)	76	0.996	0.001	0.012	0.993 0.999
combined	424	0.822	0.010	0.203	0.802 0.841
diff		-0.212	0.024		-0.259 -0.166

### *Control Variables*

Following up on the case made in chapter 3 regarding institutional aspects in service delivery, this study uses two variables to account for the institutional environment of the country: “control of corruption” and “voice and accountability.” Both are extracted directly from the dataset “Governance Matters” of the World Bank, which contains data from 1996-2006.<sup>22</sup> This study uses data for 1996 (which were collected from sources dated in 1995), 2000, and 2002. The variable “*Control of corruption*” depicts the level of corruption in the country through an aggregated index of dozens of corruption measurements reported by multilateral agencies, watch dogs agencies, public and private think tanks and other organizations (e.g., Transparency International, regional development banks, the Heritage Foundation, Gallup International) that include perception of corruption of government officials of several sources, perception of nepotism, patronage in key policy makers, frequency of bribery in the economy, frequency on bribery to connect to public services and public utilities. The methodology to construct these aggregate measures and a detailed desegregation of each index by source can be found in Kaufmann, Kray, and Mastruzzi (2004).

<sup>22</sup> Governance Matters III is a dataset developed at the World Bank by Kaufman et al. (2003).

The variable “*voice and accountability*,” also from the Governance Indicators of the World Bank, depicts the level of citizen participation in policy making and to some extent accountability in the country through a composite index of dozen of variables related to channels of communication between citizens and the government, and social interaction among citizens aimed to overlook government activities. The variables in this index include: voter turnout in national and local elections, civil liberties (i.e., freedom of speech, freedom of association, freedom of press), independence of the media, political rights, perception on the accountability of public officials, transparency of government policy.

The authors of these composite measures of corruption and voice and accountability acknowledge that individual measures based on perceptions always carry a problem of measurement error. However, they also argue that the aggregation and cleaning process of outliers that they undertake generates an aggregate measure that is likely to be better than any individual measure inside the index. Kaufmann, Kray, and Mastruzzi (2004, 2006, 2008) provide detailed discussion on the reliability of their aggregated measures.<sup>23</sup> These two measures show that better control of corruption is correlated with higher levels of voice and accountability as shown in Table 4.7 below (additionally summary statistics for these variables are available in Appendix B).

For control variables related to the economy of a country, per capita income in constant U.S dollars of 2000, and per capita GDP growth are used. Controlling for the level of per-capita income in a country is important since countries at higher levels of income tend to have better and higher quality service delivery systems (including access

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<sup>23</sup> Further discussion can also be found at [www.worldbank.org](http://www.worldbank.org).

and intermediate outputs in service delivery). These controls variables come from the World Development Indicators produced annually by the World Bank.

In several models this empirical analysis also controls for the level of public spending through the ratio of public expenditure in health to GDP and for the overall level of per capita expenditure in health care provision. However, it is also important to point out that these variables are highly correlated with the level of per-capita income in a country (see Table 4.8), and thus not all controls are used in all model specifications. The variables are also extracted from the World Development Indicators dataset of the World Bank. (summary statistics for the variables described above are available in Appendix B)

Table 4.8: Correlation Matrix of Control Variables

	Voice and Accountability	Control of Corruption	Public Expenditures in Health as % of GDP	Per capita expenditures in Health	Per capita GDP (in constant 2000 USD)
Voice and Accountability	1				
Control of Corruption	0.8442	1			
Public Expenditures in Health as % of GDP	0.7102	0.736	1		
Per capita expenditures in Health	0.689	0.8083	0.763	1	
Per capita GDP (in constant 2000 USD)	0.7113	0.8292	0.7255	0.9751	1

### Estimation Methods and Econometric Issues

For the two general models highlighted earlier, this study applies three different econometric estimation methods: (i) Ordinary Least Squares (OLS) with Fixed Effects, (ii) first differencing, and (ii) system general method of moments (System GMM). The fixed effects and first-differencing methods have a similar purpose, namely controlling for country specific invariant effects. The aim of doing first-differencing in parallel to

fixed effects is to check the robustness of the coefficients for our independent variables of interest as these methods employ different methodological approaches. First-differencing places a harder strain on the data (i.e., variables) and model specifications, which helps in that objective.

This section discusses how these econometric estimation methods fit the hypotheses and models we discussed earlier given the nature of the data and variables in this research.

### *Fixed Effects*

Given the cross-country nature of the dataset used in this research, there is a strong rationale for choosing fixed effects estimation to account for potential unobserved differences across countries. The use of fixed effects estimation is quite common in the literature that examines cross-country variables. In its most basic shape the fixed effects estimation can be represented in the following way:

$$y_{it} = \alpha_1 x'_{it} + c_i + u_{it} \quad (4.3)$$

Where  $x'_{it}$  are a set of  $k=1, \dots, 6$  set of independent variables that change in time ( $t$ ).  $c_i$  represents unobserved or omitted variables such as country specific characteristics that are time invariant. By subtracting  $\bar{y}_i$  from  $y_{it}$  in (4.3) for each period of time  $t$ ,  $c_i$  can be eliminated (Wooldridge 2002). Here it is important to point out that under strict exogeneity assumption (that is,  $E(y_{it} / y_{it}, c_i) = \alpha x'_{it} + c_i$ ) on the explanatory variables ( $x'_{it}$ ) the fixed effect estimator is unbiased. Nevertheless, the fixed effect estimation allows for arbitrary correlation between  $c_i$  and the set of variables  $x'_{it}$  (Wooldridge 2002, Greene 2000)

Applied to our general models and further elaborating, we would have the following equations representing our original (4.1) and (4.2) equations, respectively:

$$A_{kit} = \alpha_1 FD_{it} + \alpha_2 PD + \alpha_3 AD + \alpha_4 (FD_{it} * \psi_i) + \chi'_{it} \beta + \sum_{j=1}^N \alpha_j ct_{j,it} + \sum_{s=1}^T \gamma_s td_{s,it} + \varepsilon_{it} \quad (4.4)$$

$$A_{kit} = \alpha_1 FD_{it} + \alpha_2 PD + \alpha_3 AD + \alpha_4 (\lambda_{it}) + \chi'_{it} \beta + \sum_{j=1}^N \alpha_j ct_{j,it} + \sum_{s=1}^T \gamma_s td_{s,it} + \varepsilon_{it} \quad (4.5)$$

Note that country individual and time dummies are applied. The  $N-1$  individual country dummies  $cd_{j,it}$  equal 1 if  $i=j$ , and equal zero otherwise. The  $T-1$  time dummies  $td_{s,it}$  equal 1 if  $t=s$ , and zero otherwise.

Key to the fixed effects estimator is to the assumption of *homoskedasticity* of the  $u_{it}$ . Furthermore, checking for the problem of *serial correlation* in a panel time series such as the one used here is critical to the efficiency of the estimators. Thus, following the procedure described in Wooldridge (2002) and Cameron and Trivedi (2005)—which is in turn is based on White (1980) and Eicker (1967)—the standard errors for models (4.3) and (4.4) were estimated using a panel *robust* estimate of the asymptotic variance matrix which controls for both serial correlation and heteroskedasticity.

### *First Differencing*

Another way to control for country specific differences and other omitted variables (represented as  $c_i$  in equation (4.3)) is to perform *first-differencing*. As discussed earlier, this method put an increased stress on the variables and models. This method basically does the following transformation to eliminate the unobserved time invariant country effects of our data:

$$\Delta y_{it} = \Delta x_{it} \alpha + \Delta u_{it} \quad (4.6)$$

Where  $\Delta y_{it} = y_{it} - y_{i,t-1}$ ; the same is done for the independent variables and the error term. Applying this method to the general models (4.1) and (4.2) we would have the following:

$$\Delta A_{kit} = \alpha_o + \alpha_1(\Delta FD_{it}) + \alpha_2(\Delta PD_{it}) + \alpha_3 AD_{it} + \alpha_5(\Delta(FD_{it} * \psi_i)) + (\Delta \chi'_{it})\beta + \Delta \varepsilon_{it} \quad (4.7)$$

$$\Delta A_{kit} = \alpha_o + \alpha_1(\Delta FD_{it}) + \alpha_2(\Delta PD_{it}) + \alpha_3 AD_{it} + \alpha_5(\Delta \lambda_{it}) + (\Delta \chi'_{it})\beta + \Delta \varepsilon_{it} \quad (4.8)$$

where  $\Delta A_{kit} = A_{kit} - A_{ki,t-1}$ ;  $\Delta \chi_{it} = \chi_{it} - \chi_{i,t-1}$ ;  $\Delta \varepsilon_{it} = \varepsilon_{it} - \varepsilon_{i,t-1}$ ;  $i=1, \dots, N$ ;  $t=2, \dots, T$

Since we have a small T (i.e., T=4) and a relatively large N, the difference in the efficiency of estimators between the ones generated by the fixed effects and the first-differencing methods would basically depend on the level of serial correlation in the idiosyncratic errors (Wooldridge 2002). Thus, if on one extreme  $u_{it}$  are serially uncorrelated then the fixed effect estimator would be more efficient; and if on the other extreme  $u_{it}$  follows a random walk then the first-differencing estimator would be more efficient. Since there is only a very mild serial correlation in the errors, both fixed effects and first differencing estimators are performed and reported later.

To control for both serial correlation and heteroskedasticity, the standard errors for the first-differencing models, which results are presented and discussed in the next section, were computed using a panel robust estimate of the asymptotic variance matrix—described in Wooldridge (2002) and Cameron and Trivedi (2005) (see also White 1980).

#### *System Generalized Method of Moments (System GMM)*

The issue of *endogeneity* is sometimes raised when looking at the effect of institutional reforms on some development indicators, particularly when the left hand side

variable in the regression is a measure of economic growth. However, this is not common in the literature related to the effects of decentralization on different variables related to service delivery using cross-country analysis (Treisman 2002)(see also literature review in Chapter 2 for a discussion of the most typical relationships evaluated in the literature of this topic). As Chapter 3 discusses, understanding why decentralization reform is initiated is important, and while a significant portion of the literature suggests that decentralization reform is exogenous to service delivery, the issue remains unresolved since a counterpoint could also be made (see Chapter 3). The rationale that can be articulated against exogeneity is straightforward: documented international experience shows that decentralization processes in most countries did not start with the objective of improving public services and economic efficiency, but rather they were initiated owing to political reasons (regional tensions, power sharing agreements, and other of similar kind). The counter argument is that under-provision or regional inequality in service provision could be part a reason for regional tensions or a reason for deepening decentralization reforms already in place.

Thus, to provide a more complete examination, this study addresses the possibility of *endogeneity* through the use of the System GMM estimation method. Good “external” instrumental variables that, in a way, can reflect the trends of the decentralization process and are readily available for use, do not exist. The situation is even worse if we look for suitable time variant instrumental variables for each dimension of the decentralization process. The only way is to use “internal” instruments, thus, to deal with the issue this research uses an estimation method called system generalized method of moments or simply “system GMM”. This is a modified version of the

“difference GMM” method developed by Arellano and Bond (1991)<sup>24</sup> widely used to deal with *endogeneity* issues in panel (time series) data through the use of lagged variables and a sophisticated construct with a number of properties as briefly explained below.

The original Arellano and Bond (1991) “difference GMM” treats the regression model as a system of equations, one for each  $t$ . The predetermined and suspect endogenous variables in first differences are instrumented with suitable lags of their own levels. Strictly exogenous regressors, as well as any other instrumented variables (i.e., suitable lags of existing independent variables), and are lumped into a matrix using first differences, with one column per instrument. Both GMM estimators (that is, “difference GMM” and the newer “system GMM”) were designed for dynamic panels that have “small T and large N” (that is, few periods in time and many individual observations), a linear relationship; a dependent variable that is dynamic, independent variables that are not strictly exogenous, fixed individual effects (in our case country effects), and heteroskedasticity and autocorrelation within individuals (Roodman 2007; see also STATA 10 manuals 2007).

As articulated by Bond (2002) and Blundell and Bond (1999) the problem with the original “difference GMM” estimator is that lagged levels can sometimes be weak instruments when using first-differenced estimators, and more so for series that are highly persistent (that is, those that follow close to a random walk). Moreover, these estimators can also be subject to large finite sample biases (Blundell 2002)

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<sup>24</sup> The difference GMM draw on the original Generalized Method of Moments first introduced by Hansen (1982)

The “system GMM” estimation we use in this research was developed by Arellano and Bover (1995) and Blundell and Bond (1998). A simple way to differentiate this innovation from the original method (i.e., difference GMM) is provided by Roodman (2006) who states that while the “difference GMM” instruments differences (or orthogonal deviations) with levels, the system GMM instruments levels with differences. Indeed, Arellano and Bover (1995) and Blundell and Bond (1998) add transformed equations in levels to the system, helping to increase the efficiency of the estimators, particularly for panels with small number of time periods (i.e., small T) (see Monte Carlo simulations supporting this point in Bond 2002 and in Blundell and Bond 1998). In these added equations, suspect endogenous variables in levels are instrumented with suitable lags of their own first differences. All the assumptions and workings for this procedure are articulated in detail in Blundell and Bond (1998) (see also Roodman 2006).<sup>25</sup>

The proposed estimation applied to our original models would be as follows:

$$\Delta A_{kit} = \alpha_o + \alpha_1(\Delta A_{ki,t-1}) + \alpha_2(\Delta FD_{it}) + \alpha_3(\Delta PD_{it}) + \alpha_4 AD_{it} + \alpha_5(\Delta(FD_{it} * \psi_i)) + (\Delta \chi'_{it})\beta + \Delta \varepsilon_{it} \quad (4.9)$$

$$\Delta A_{kit} = \alpha_o + \alpha_1(\Delta A_{ki,t-1}) + \alpha_2(\Delta FD_{it}) + \alpha_3(\Delta PD_{it}) + \alpha_4 AD_{it} + \alpha_5(\Delta \lambda_{it}) + (\Delta \chi'_{it})\beta + \Delta \varepsilon_{it} \quad (4.10)$$

The regression ran using "system GMM" offered consistent estimates since error terms between panels are not correlated (e.i.  $\Delta \varepsilon_{it}$  is not correlated with  $\Delta \varepsilon_{i-1,t}$ ). Standard errors for this model were estimated using Windmeijer's (2000 and 2005) finite-sample correction in order to correct for possible bias in the two-step estimator covariance matrix (see also Roodman, (2006))

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<sup>25</sup> While the operationalization of the “difference GMM” in a STATA command has been in use for many years, the command for the “system GMM” for STATA is rather recent (developed by Roodman 2006).

## **Discussion of Results**

### *Hypotheses 1 and 2*

The regression results obtained through three different estimation methods (fixed effect, first differencing, and system GMM) generally provide evidence supporting hypotheses 1 and 2. Under most specifications of the general model 4.1 (discussed earlier in this chapter) the results show a positive and statistically significant effect of fiscal, administrative, and political decentralization on the variables used to measure access to health care and improved water source provision. These relationships are independently discussed below.

#### *Decentralization and health care access*

Table 4.9 show two sets of specification models each run through the three estimation methods selected (discussed earlier). Models specifications 1, 3 and 5 use the percentage of births attended in health facilities as dependent variables; and models 2, 4, and 6 use the percentage of births attended by skilled personnel as dependent variables.

As regards to hypothesis 1, the regression results show that the effects of fiscal decentralization and administrative decentralization across most model specifications are statistically significant and with the expected (positive) signs. More specifically, estimations roughly predict that 1 percent increase in fiscal decentralization (that is, 1 percentage point more in sub-national revenues over total revenues) may increase the percent of births in health facilities in a country by a range of 0.22 percent to 0.5 percent depending on the specification in the OLS fixed effects model. Fiscal decentralization (particularly revenue decentralization) is highly significant across specifications and model estimations, even at 1% significance level in some cases. Administrative

decentralization also has a positive and significant effect in the regressions (including at the 1% level in several specifications), although not in all model specifications.

The effect of political decentralization is significant only in one specification in Table 4.9 and in other specifications shown in Appendix C, but clearly the significance of this variable is not robust across specifications (a number of additional regression results and model specifications for this relationship can be found in Appendix C)

These results strengthen the case argued through this research about the importance of accounting for all dimensions of the decentralization process when investigating the effects of this reform on any economic, institutional, or social variable. The broad policy implications of these results are highly relevant. As discussed in this research, decentralization reform implemented only through one dimension may render fewer positive fruits in terms of access to services than a multi-dimensional approach. Moreover, the specific results presented in Table 4.9 it also show the strength and importance of fiscal and administrative decentralization processes for improving access to basic health care services.

Table 4.9: Estimation results on decentralization effects on health care access-  
Hypotheses 1 and 2

Dependent Variable =====>	% of births attended in health facilities (model specifications 1, 3, 5) % of births attended by skilled personnel (model specifications 2,4,6)					
Estimation method ----->	Fixed Effects		First Differencing		System GMM	
Model Specification	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables /1						
Fiscal (revenue) Decentralization (FD rd)	0.499 [2.73]***	0.224 [1.81]*	0.48 [2.62]**	0.334 [2.18]**	-0.029 [0.28]	0.739 [2.01]**
Political Decentralization (local/municipal) (PD le)	0.013 [0.66]	0.036 [2.01]**	0.030 [1.36]	0.016 [0.60]	0.035 [0.64]	-0.014 [0.29]
Administrative Decentralization (AD)	0.044 [2.75]***	0.037 [1.92]*	0.027 [1.70]*	0.044 [2.76]***	0.061 [3.02]***	0.013 [0.41]
Developed Countries Dummy (D)	0.122 [1.86]*		0.000 [.]		0.000 [.]	
(D*FDrd)	-0.525 [2.70]***		-0.46 [2.47]**		-0.256 [1.05]	
Transition Countries Dummy (T)		0.801 [30.96]***		0.000 [.]		0.000 [.]
(T*FDrd)		-0.053 [0.22]		0.082 [0.28]		-0.469 [1.09]
GDP per capita /2	0.0009 [2.99]***	0.0010 [2.36]**	0.0018 [2.39]**	0.0020 [0.32]	0.0006 [1.93]*	0.0008 [0.51]
Voice and Accountability	-0.013 [1.00]		0.013 [0.82]		0.092 [2.41]**	
Control of Corruption		-0.015 [0.96]		0.014 [0.84]		0.135 [2.33]**
Per capita health expenditure /2	0.021 [0.73]	0.022 [1.27]	0.012 [0.16]	0.014 [0.47]	0.025 [1.23]	0.022 [2.62]***
Constant	0.776 [13.90]***	0.021 [1.30]	0.00 [0.23]	-0.001 [0.20]	0.281 [5.26]***	0.615 [4.62]***
Observations	286	280	148	150	216	224
R-squared	0.99	0.99	0.32	0.29		
Number of panels					94	98

Panel robust t and z statistics in brackets  
\* Significant at 10%; \*\* Significant at 5%; \*\*\* Significant at 1%  
1/ Country and time dummies, as well as lagged executed Y and T variables from the GMM are omitted in the table  
2/ Units transformed (in thousands)

To test Hypothesis 2, recall that an interaction term between the fiscal (revenue) decentralization variable (*FDrd*) and a dummy created for developed countries (*D*) was generated (that is, *FDrd \* D* –see discussion of this term earlier in this chapter). This interaction term is aimed at depicting a different slope in the effect of fiscal decentralization on access to health care services for developed countries as opposed that effect for non-developed countries (i.e., developing and transition countries). The same

was done for a second dummy created for transition countries ( $T$ ) (with the interaction term  $T * FDrd$ ). Again the objective was to check if changes in fiscal decentralization have a different effect on access to health care in transition countries compared to the rest.

The results obtained for this vector (i.e., negative sign) support the expectation of Hypothesis 2 that developed countries would benefit less from increased decentralization perhaps given their already higher level institutional and economic consolidation. The results are highly significant in model 1 and 3 in Table 4.9.

These results imply that developing countries could benefit significantly more from decentralization than developed countries. Thus, the policy implications are important for reforms in the developing countries. If indeed a decentralization process can produce larger positive effects on access to basic health services in these countries, designing adequate decentralization frameworks could help significantly in increasing the quality of life of their citizens through better access to services, which would, together with other aspects, contribute to improve health outcomes of the population. This research pursued a similar approach to observe different effect for transition countries, but the results were rather inconclusive.

Some of the control variables for institutional environment also produced interesting results (see table 4.9 and Appendix C), although not across all specifications. In some models, positive changes in the variable representing accountability and citizen participation and control of corruption had a positive impact on access the health care variables.<sup>26</sup> That is, showing that improving the level of citizen engagement in policy

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<sup>26</sup> The models regressed contain only one of these institutional variables in each specification. As discussed earlier the two variables used (control of corruption and voice and accountability) are highly correlated.

making and social interaction among citizens aimed to overlook government activities (—or accountability) and improving control over corrupt practices increases access to basic health care services. As expected the control variable for level of income was also significant across most specification in Table 4.9. This was expected because in higher income countries the population tends to have higher levels of access to basic services, as discussed earlier in this chapter. Fewer specification models showed per capita expenditures in health as statistically significant, especially in the presence of the income variable. This perhaps occurred because the income variable absorbed most of the explanatory power in our specification models.

#### *Decentralization and Access to Improved Water Sources*

As in the case of health, the results support the strategy of using all three dimensions of decentralization in the same model to have a clearer picture of decentralization reform effect on access to services. Table 4.10 shows the results of this reform on access to improved water source. Even though we see statistical significance for all three dimensions in several specifications (see also Appendix C), the decentralization dimension that shows more robustness is political decentralization at the local (municipal) level (PDle). The size of the coefficients attached to fiscal decentralization are smaller in the case of access to improved water source than in the case of health care, though still statistically significant across most specifications. Administrative decentralization also seems to play a key role in delivering a better access to this service, although this variable was not significant in all specifications.

Overall it seems that having locally elected municipal leaders and councils matter a great deal for improving access to improved sources of drinking water. This somewhat

contrasts with the case of health care, where political decentralization seemed less important. One could explain this by relating it to the structure of governments and how they are organized to provide public services. That is, health care has a well-established central line ministry in each country with significant non-discretionary spending (wages, utilities and other recurrent spending), and changes in fiscal and administrative arrangements, if properly done through local governments, may have the potential of increasing efficiency and access in services provided (as discussed earlier). In contrast, water provision, which is typically provided locally, is commonly dependent in more than one line ministry (or several central agencies) for its provision. Moreover, water provision enhancement projects are mainly driven by discretionary investments, which in turn are more commonly subject to political bargaining and patronage. The latter also implies that strong and locally elected politicians at the local level (where this service is delivered almost in its entirety) may be needed to generate positive changes. This finding is very much in line with the country studies and related literature reviewed in Chapter 2, which points heavily towards the importance of local politicians in improving water services.

Table 4.10: Estimation results on decentralization effects on access to improved water source - Hypotheses 1 and 2

Dependent Variable	% of people with access to improved water source (model specifications 1, 3, 5) % of rural people with access to improved water source (model specifications 2,4,6)					
Estimation method	Fixed Effects		First Differencing		System GMM	
Model Specification	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables /1						
Fiscal (revenue) Decentralization (FD rd)	0.444 [1.20]	0.021 [0.61]	0.16 [2.09]**	0.132 [1.80]*	-0.061 [0.39]	0.033 [0.29]
Political Decentralization (local/municipal) (PD le)	0.025 [2.50]**	0.053 [3.71]***	0.027 [2.71]***	0.034 [3.21]***	0.058 [2.05]**	0.06 [2.15]**
Administrative Decentralization (AD)	-0.005 [0.38]	0.014 [1.06]	0 [.]	0.021 [2.20]**	0.027 [1.14]	0.03 [0.87]
Developed Countries Dummy (D)	-0.167 [0.81]		0 [.]		0.057 [0.92]	
(D*FDrd)	0.72 [0.89]		-1.552 [2.96]***		-0.059 [0.37]	
Transition Countries Dummy (T)		0.246 [11.02]***		0 [.]		0.115 [0.89]
(T*FDrd)		-0.157 [1.61]		-0.135 [1.41]		0.123 [0.25]
GDP per capita /2	0.0018 [0.69]	0.0012 [0.06]	0.0012 [0.93]	0.0007 [0.68]	0.0021 [1.96]**	0.0026 [0.66]
Voice and Accountability	0.003 [0.23]	-0.016 [0.82]	0.001 [0.10]	-0.018 [1.05]	0.002 [0.06]	0.007 [0.19]
Constant	0.256 [10.65]***	0.677 [29.51]***	0.005 [0.65]	0 [0.14]	0.323 [3.83]***	0.326 [2.96]***
Observations	272	279	136	146	219	219
R-squared	0.96	0.98	0.40	0.26		
Number of panels					96	96
Panel robust t and z statistics in brackets						
* Significant at 10%; ** Significant at 5%; *** Significant at 1%						
1/ Country and time dummies, as well as lagged executed Y and T variables from the GMM are omitted in the table.						
2/ Units transformed (in thousands)						

The results obtained for the interaction term created to test hypothesis 2 once more yielded a negative sign and showed significance but only in few model specifications (one of them in Table 4.10). As in the case of access to health care, the negative sign for developed countries here means that developing countries gain more in relation to access to improved drinking water sources from changes toward higher levels of fiscal decentralization. These results (as well as the ones discussed earlier) have important policy implications. As discussed in several parts of this research access to

drinking water is a core developmental issue in poorer countries, and possibly a basic pillar to improve living standards in general. This is particularly evident in the poorest countries in Africa and Asia where safe drinking water impacts people's health and education outcomes (including mortality rates) and overall living conditions (WDR 2004).

For countries where water access is an acute problem a deeper political decentralization process might help (as a component of a broader reform agenda) to resolve the bottlenecks in the system that prevent improvement in access to improved sources of drinking water. As argued throughout this research, improving access to services may not be just an issue of financing. Thus, if decentralization has the potential of improving access to this service, its multi-dimensional design acquires further urgency and importance in the framework of institutional reforms.

### ***Hypothesis 3***

The regression results obtained through three different estimation methods (fixed effect, first differencing, and system GMM) provide some evidence in support of hypothesis 3, though it is not as robust compared to that obtained for hypothesis 1. One explanation for this may be that the way in which administrative and political decentralization variables are measured, that is, with dichotomous variables that change over time. This situation does not allow for sufficient variation in estimation methods such as the ones used here which put significant strain on the data.

Nevertheless, under several specifications of the general model 4.2 (discussed earlier in this chapter) the results show an additional positive and statistically significant effect of the interaction of two decentralization dimensions on access to health care and

water services, that is, a positive effect in addition to the statistically significant and robust positive effect of each decentralization variable individually measured in the regressions. Recall that the aim of these interaction terms is to examine if, in addition to each dimension independently measured, the interaction between two dimensions (whichever they may be) would create an additional (or extra) positive effect on access to services such as health care and water provision. These relationships are discussed below.

#### *Decentralization and health care access*

As in the other regressions discussed so far, the variables accounting for fiscal decentralization, political decentralization, and administrative decentralization show, individually, a positive and statistically significant effect on health care access. Table 4.11 shows regression results using the percentage of births attended in health care facilities and the immunization coverage (percentage) of DPT as dependent variables that measure health care access (additional regression results and model specification for this relationship can be found in the Appendix C).

Among the possible interaction terms between two dimensions of fiscal decentralization, four specific interactions showed to be positive and statistical significant at the 10 percent and 5 percent significance level, and in one case; these are the interactions between: (i) fiscal decentralization (revenue decentralization) and political decentralization (officials elected at the municipal level); (ii) fiscal decentralization and administrative decentralization (relative autonomy to hire and fire personnel); and (iii) administrative decentralization and political decentralization.

Table 4.11: Estimation results on decentralization effects (with interactions) on health care access- Hypothesis 3

Dependent Variable	% of births attended in health facilities (model specifications 1, 3, 5) Immunization coverage (%) for DPT (model specifications 2,4,6)					
Model Specification	Fixed effects		First Differencing		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables /1						
Fiscal (revenue) Decentralization (FD rd)	0.06 [0.39]	0.231 [2.02]**	0.298 [2.26]**	0.12 [2.05]**	0.1 [0.41]	0.745 [2.50]**
Political Decentralization (local/municipal) (PD le)	0.053 [2.28]**	0.035 [1.99]**	0.046 [2.04]**	0.045 [3.84]***	0.025 [0.59]	-0.004 [0.09]
Administrative Decentralization (AD)	0.057 [2.76]***	0.045 [1.86]*	-0.009 [0.54]	0.043 [2.21]**	0.17 [1.65]*	0.115 [2.10]**
(FDrd*AD)		0.047 [2.04]**		-0.121 [1.67]*		0.0504 [1.88]*
(AD*PDle)	0.077 [2.76]***		0.036 [1.66]*		0.015 [1.75]*	
GDP per capita /2	0.0020 [2.06]**	0.0092 [0.92]	0.0026 [0.18]	0.0099 [0.36]	0.0017 [0.93]	0.0084 [1.45]
Voice and Accountability		-0.016 [1.03]		0.011 [0.72]		0.082 [1.78]*
Control of Corruption	-0.019 [0.88]		-0.017 [1.59]		0.158 [3.14]***	
Public health expenditure as % of GDP	0.035 [1.57]		0.06 [0.09]		0.048 [1.65]*	
Per capita health expenditure /2		0.004 [0.64]		0.003 [1.42]		0.005 [2.17]**
Constant	0.864 [16.99]***	0.809 [17.34]***	0 [0.05]	-0.002 [1.76]*	0.346 [3.69]***	0.58 [5.89]***
Observations	284	280	139	283	220	224
R-squared	0.94	0.99	0.37	0.3		
Number of panels					96	98
Panel robust t and z statistics in brackets						
* Significant at 10%; ** Significant at 5%; *** Significant at 1%						
1/ Country and time dummies, as well as lagged executed Y and T variables from the GMM are omitted in the table.						
2/ Units transformed (in thousands)						

The rationales behind these results (and behind the interaction between dimensions of decentralization) have been discussed in detail in Chapter 3, but in short, these results provide some support for the argument that additional positive value arises from the cross-linkages between decentralization dimensions, which goes beyond the individual contribution of each dimension. In our analysis, this added value manifests itself as better access to health care, and potentially it works its way through several

avenues, including: (i) higher autonomy in the decision making on how to use public resources and thus better match between local public spending in local needs, as theoretically expected; (ii) better match between local needs and local public spending due to local accountability; and (iii) local autonomy in decision making of resources supported by the legitimacy of locally elected officials.

From the results discussed it is clear that all three dimensions of decentralization are important individually. Moreover, there seems to also to be an extra value added (aside from the positive effect of each individual dimension) arising from the inter-linkages and mutually reinforcing effects of having more than one dimension of decentralization in place. This, in turn, implies that by not having a multi-dimensional approach to decentralization reform countries may be losing out on positive effects on access to health care services. A second key corollary policy implication is that decentralization results depend heavily on reform design. Design issues, including those within each dimension (recall that each dimension also embeds several facets), are at the forefront when decentralization processes are evaluated in detail (See Appendix C for a detailed discussion on assessing the different facets of fiscal decentralization). Finally, a third implication is that decentralization reform is a process in itself and might gain over time from added dimensions and the deepening of the dimensions implemented over time.

#### *Decentralization and Access to Improved Water Sources*

The variables accounting for fiscal decentralization, political decentralization, and administrative decentralization (individually) show positive and statistically significant effects on access to improved water source, although similarly to the discussion on this

relationship for hypotheses 1 and 2, political decentralization is the most robust variable across specifications (see Table 4.12 and Appendix C). The results shown in Table 4.12 as regards to the interaction terms suggest that three interactions between dimensions of decentralization seem to matter. The interaction between fiscal decentralization (revenue decentralization) and political decentralization (officials elected at the municipal level) and fiscal decentralization and administrative decentralization show significance only at the 10% confidence level (and not so robustly across model specifications). The interaction between, administrative decentralization and political decentralization in several model shown in Appendix C shows significance but not across model specifications. Also, these results are not robust across estimation methods.

Table 4.12: Estimation results on decentralization effects (with interactions) on access to improved water source - Hypothesis 3

Dependent Variable	-----> % of people with access to improved water source					
Model Specification	Fixed Effects		First Differencing		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables /1						
Fiscal Decentralization (FD rd)	0.16 [2.20]**	0.14 [2.08]**	0.16 [2.47]**	0.12 [2.05]**	0.251 [1.91]*	-0.035 [0.25]
Political Decentralization (PD) le	0.056 [3.28]***	0.041 [3.47]***	0.065 [3.63]***	0.045 [3.84]***	0.093 [2.28]**	0.024 [0.57]
Administrative Decentralization (AD)	0.022 [1.74]*	0.048 [2.23]**	0.021 [1.90]*	0.043 [2.21]**	0.024 [1.07]	0.021 [0.46]
(FDrd*PDle)	-0.093 [1.25]		0.121 [1.66]*		-0.179 [1.26]	
(FDrd*AD)		0.132 [1.60]		0.19 [1.67]*		0.101 [0.67]
GDP per capita /2	0.0021 [0.76]	0.0018 [0.67]	0.0012 [0.56]	0.0007 [0.38]	0.0028 [0.74]	0.0021 [1.88]*
Constant		0.886 [47.31]***	-0.002 [1.64]	-0.002 [1.76]*	0.239 [2.24]**	0.241 [3.10]***
Observations		383	283	283	285	285
R-squared		0.98	0.3	0.3		
Number of panels					97	97
Panel robust t and z statistics in brackets						
* Significant at 10%; ** Significant at 5%; *** Significant at 1%						
1/ Country and time dummies, as well as lagged executed Y and T variables from the GMM are omitted in the table.						
2/ Units transformed (in thousands)						

Note that political decentralization is present in both interactions, which is consistent with the results obtained earlier for this variable. The policy implications are quite similar to those articulated earlier for the case of decentralization and access to healthcare, and thus reiteration would be redundant. But perhaps one important variation in the relation between decentralization and access to improved drinking water source, that is, the political decentralization dimension continues to be the variable that matters most for increasing access to improved water source for citizens. Therefore, in countries where access to improved water sources is thought to be the most acute problem, reformers may have to consider an “authentic” and deep political decentralization as the

core pillar of the decentralization process<sup>27</sup>, while accompanying the process with administrative and fiscal measures to strengthen local accountability.

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<sup>27</sup> Recall from Chapter 3 that countries tend to advance more one dimension of decentralization than the other two. This seems rather a natural process that depends on country conditions, characteristics, and political environment.

## CHAPTER 5

### CONCLUSIONS

While most countries have initially pursued the process of decentralization of powers to local governments seeking political and regional stabilization and changes in governance through power sharing, improved service delivery has been cited as an argument for continuing and deepening this reform. Many of the anticipated benefits of decentralization are based on the premise that this policy would bring local decision-makers closer to their constituents and their needs. Thus, and along the reasoning of the fiscal federalism literature, local decision-makers would be able to better tailor services and public spending patterns to local needs improving access, efficiency, and quality of services.

This research builds further on the existing conceptual framework of decentralization and service delivery and provides an empirical examination of the effects of decentralization reforms on access to two key services: health care and improved drinking water sources. This study is particularly motivated by four factors. First, a critical question in development economics is what kind of institutional reforms developing and transition countries should undertake to improve basic service delivery; and decentralization is commonly discussed as one of such reforms. Second, despite the existence of a large body of literature on the impact of decentralization on government size, growth, and macro-economic stability, there are fewer studies that have evaluated the effects of decentralization on service delivery across countries. Third, most of the research conducted on this relationship evaluates the effects of the decentralization on

final outcomes of public services (e.g., infant mortality), which presents a number of attribution and spurious effects problems, instead this research uses access to services or intermediate outputs to establish a more direct link. And fourth, the vast majority of empirical literature in this topic has analyzed decentralization from a single dimension, that is, either: fiscal, administrative, or political; but not from all three dimensions simultaneously, which seems to be critical and it is attempted in this study.

The following three hypotheses were evaluated: (1) changes toward higher levels of fiscal, political, and administrative decentralization (all) help to increase access to health care and improved water sources for the population; (2) changes toward higher levels of fiscal decentralization have a stronger positive effect on access to health care and improved water provision for the population in developing countries compared to those effects in developed and transition countries; and (3) the inter-linkages of at least two dimensions of the decentralization present in a country would further increase the overall positive impact on access to services of this reform.

The regression results obtained through three different estimation methods provide evidence supporting a positive and significant effect of fiscal, administrative, and political decentralization, individually, on the variables used to measure access to health care, though the positive impact of political and administrative decentralization were smaller in size than that of fiscal decentralization, though still robust across specifications. In contrast, for the case of access to improved water provision, while all three dimensions of decentralization dimension showed a positive effect, political decentralization at the local level (that is, locally-municipal- elected leaders) level showed the strongest and most robust effect.

These findings support the case argued throughout this study about the importance of considering all dimensions of the decentralization process when investigating the effects of this reform on any economic, institutional, or social variable. The policy implications are highly relevant: decentralization implemented only through one dimension may render fewer positive fruits in terms of access to services than a multi-dimensional approach. The apparent larger impact of fiscal and administrative dimensions in the case of health care might have important implications for the design of decentralization strategies. Moreover, the strength of the effect of political decentralization in the case of access to improved water source indicates that improving access to this service is not just an issue of finance or administrative powers, but as it appears one predominantly of local political accountability that can be complemented with fiscal and administrative powers at the local levels to further strengthen local accountability.

The results obtained also support the expectation that developed countries would benefit less in terms of access to health care and water provision from changes in decentralization (that is, increasing levels of decentralization) probably because of their already strong service delivery platform and their higher level of institutional and economic consolidation. At the same time, this finding implies that developing countries could benefit significantly more from decentralization than developed countries. The policy implications of the latter are highly relevant for policy makers in developing countries in the context of on-going institutional reforms. If a decentralization process can render larger positive effects on access to services, designing adequate

decentralization frameworks in these countries could help significantly in increasing the quality of life of their citizens through better access to services.

This study pursued a similar approach to observe different effects for transition countries, but the results were rather un-conclusive, perhaps because most transition countries inherited a rather strong service delivery system, that is, for their income level. Although this does not rule out the benefits of deepening decentralization processes in these countries given that there is evidence of service quality deterioration partly attributable to lack of local autonomy to handle services at the local level and perverse incentives centrally driven affecting budget formation at the local level (World Bank 2007; World Bank 2008).

The results obtained in this study also suggest that there is an additional positive effect coming from the interaction of two decentralization dimensions on access to health care and water services (that is additional to the individual effect of each dimension of decentralization). Examining an “extra” effect arising from the inter-linkages of at least two decentralization dimensions was aimed at checking if the whole (effect of the multi-dimensional reform) was larger than the sum of the parts. Although the results are significant only at 10% level (and in one case at the 5% level) they provide some support for the hypothesis that those inter-linkages between dimensions have an extra positive mutually-reinforcing effect on improving access to services.

The two interactions that were most commonly significant in the regressions for the case of health care were that of: fiscal decentralization and administrative decentralization (autonomy to hire and fire personnel at the local level); and that of administrative decentralization and political decentralization. In the case of access to

improved access to drinking water, the two interactions that seemed to matter (but only at the 10% confidence level) were that between fiscal decentralization (revenue decentralization) and political decentralization (officials elected at the municipal level), and that of administrative decentralization and political decentralization. Drawing on these results, one could argue that this “extra” value added in improving access to health care and water provision could be occurring through several mutually reinforcing aspects, for example, a better match between local needs and locally driven public spending due, in part, to local political accountability.

In addition, the results of this study suggest that control variables related to the institutional environment also produce interesting results. For example, positive changes in the variable accounting for accountability and citizen participation (that is, improving the level of citizen engagement in policy making and the communication between citizens and the government and social interaction among citizens aimed to overlook government activities—or accountability) had positive impact on access to health care in the presence of decentralization reform. The opposite effect was found for the level of corruption variable, although with few coefficients with statistical significance across specifications.

There might a number of ways of interpreting the results of this study and the readers should be cautious about any strong policy prescriptions based on them as well known pitfalls of working with cross-country data also applies. Moreover, future research could focus efforts on refining decentralization measures across countries. Single country level work would continue to be interesting but specially if asymmetric decentralization (that is, if asymmetric decentralization can be observed in a country) is analyzed across

jurisdictions of a country (that is, examining how different levels of decentralization any given socio-economic variable in each jurisdiction).

Nevertheless, findings of this study support the premise that each dimension of decentralization individually is highly relevant in their effect on access to services. Moreover, there is some support to the belief that the inter-linkages between decentralization dimensions generate further positive benefits for improving access to services. Thus, it seems clear that countries not applying all three dimensions with a coherent reform design would be losing some of the fruits this reform can offer as regards to improving access to basic services such as health care and safe drinking water for the population. Moreover, the results also support the premise that the relevance of decentralization reform and its design is higher in developing countries.

## **APPENDIX A**

### **THE CHALLENGE OF EVALUATING AND MEASURING FISCAL DECENTRALIZATION**

Decentralization is a complex multi-dimensional process that involves fiscal, administrative and political aspects. Moreover, each of these dimensions is multi-faced by itself as it involves several features that need to be taken into account. Evaluating their impacts on different socio-economic and institutional outcomes requires the ability to assess each dimension of a decentralization process in a detailed way. To measure fiscal decentralization in empirical work, researchers typically use the shares of revenues and expenditures that flow through sub-national budgets, using the GFS data collected annually by the IMF. While these measures can be criticized for being too rough in measuring the actual degree of fiscal decentralization in a country, they remain the only way to consistently make cross country comparisons over time.

Understanding that comparable data depicting in detail all the key aspects of fiscal decentralization is non-existent for most countries, it seems clear as Bird (1995, 2001) argues, that the empirical literature will likely have to live with the existing limitations. Nevertheless, before efforts are placed on collecting more comprehensive data, it is essential to develop consensus on a framework that contains the different aspects of fiscal decentralization that are worth measuring, that can be measurable, and for which data can be actually collected in the future across countries. Having consensus on such a framework would also have a more immediate value added for researchers and policy makers working in a single-country context by helping them to evaluate more precisely

key components of the fiscal decentralization process and their relative level against certain notional benchmarks.

This Appendix puts forward such a focused framework for discussion (it could also be used on country specific analysis to determine the level of decentralization and reforms needed in case the country decides to move further in the process). The focus of assessment is in examining fiscal autonomy along the lines of the core pillars of the design of fiscal decentralization reforms in a country: expenditure responsibilities, revenue assignments, intergovernmental transfers, and sub-national borrowing.

### **A simple framework to assess fiscal decentralization**

A series of different intergovernmental facets, schemes, and structures within a country, need to be considered in building a framework for comprehensive measure of fiscal decentralization. Consider:

$$FD_i \approx f(EA_i, RA_i, BP_i) \text{ (A.1)}$$

Where  $FD$  is a Fiscal Decentralization Index for country “ $i$ ”;  $EA$  is a measurement of local expenditure autonomy;  $RA$  is a measurement of revenue autonomy that includes tax and non tax revenues and transfers from upper levels of local government; and  $BP$  is measure of the level of the local government’s borrowing powers.

More specifically,

$$FD_i \cong (EA_i * \kappa) + (RA_i * \eta) + (BP_i * \rho) \text{ (A.2)}$$

Where  $\kappa + \eta + \rho = 1$ , and for simplicity  $\kappa$ ,  $\eta$ , and  $\rho$  are equal.

#### *Expenditure Responsibilities (EA)*

Fiscal decentralization at the core involves the shifting of expenditure responsibilities to lower levels of government. Assigning functions to sub-national

governments inherently involves a shift of power away from the center (Bahl 1999). Consequently, autonomy in the expenditure side is as important in measuring fiscal decentralization as is revenue autonomy.

An important factor in determining the degree of fiscal decentralization is the extent to which sub-national governments are given autonomy to determine the allocation of the resources available to them. For instance, in most developing countries, a core source of revenue for sub-national governments comes through transfers or revenue sharing schemes from the center. These transfers can be structured in a way that sub-national governments may have little discretion on how these resources are spent. The degrees of discretion may vary even within this category of earmarked revenues, which makes it difficult to measure expenditure autonomy. Moreover, as countries have several of these schemes and each with different levels of discretion granted to sub-national levels, that measurement becomes even more complicated.

Nevertheless, it is important to recognize that these shares of tied (or untied) spending resources are not the only factor that influences final spending allocation and ultimately sub-national expenditure autonomy. In fact, it is essential to examine how the expenditure responsibilities are decentralized. A critical factor to account for is the clarity of roles in spending responsibilities of central and sub-national governments. This is necessary in order to reflect an accurate picture of fiscal decentralization. In some cases, central and sub-national levels have clear and separate roles, but in others, there are concurrent responsibilities and consequently central influence over sub-national spending, which sometimes is not clear from reading the legislation and regulatory framework of a country. For example, sometimes the national government assigns

expenditure responsibilities to sub-national governments but keeps a great level of discretion on critical decision-making processes. In other cases there is not clear responsibility assignment and overlap occurs. In these cases, sub-national governments often times have to follow unwritten orders from a ministerial branch of the central government undermining discretion in the expenditure decision making.

Among scholars and experts on the topic, the consensus is that there is no single best assignment of expenditure responsibilities to sub-national governments. Rather, this assignment needs to fit to each country's particular characteristics and sub-national structure as well as general principles such as subsidiarity, efficiency (including economies of scale), externalities, benefited areas, administrative feasibility, and political accountability (Breton, Cassone, and Fraschini 1998 and Bird 2002). However, regardless what is decided to assign to each level of government, it is important that all levels have clear roles and responsibilities. Clarity of roles and functions assigned is essential in providing fiscal autonomy to sub-national governments as it provides them with the ability to work with accountability on the devolved functions.

Thus, consider:

$$EA_i \cong (SD_i * \mu) + (ER_i * \omega) \quad (A.3)$$

Where  $\mu + \omega = 1$ , and  $\mu = \omega$

And  $SD_i$  is a function of different shares of spending over which local governments have discretion, that is:

$SD_i \approx f((a)$  percent of total local budget resources over which local governments do not have discretion;  $(b)$  percent of total local budget resources over which local governments have discretion but still have to follow certain sectoral (that

*is, line ministry) or central spending guidelines; (c) percent of total local budget resources over which local governments have full discretion.)*

And where  $ER_i$  is a function of several qualitative aspects of expenditure autonomy, that is:

$ER_i \approx f$  ( (a) are expenditure functions and specific responsibilities clearly assigned in the legislation or regulatory framework (that is, clear cut roles)?; (b) is there some overlapping in expenditure functions? if so, over what percent of the local spending envelope; (c) do ministerial line representatives at the local impose rules that affect how local budgets are formed in each sector?<sup>28</sup>; if so, over what portion of the local spending envelope?)

#### *Revenue Assignments and Intergovernmental fiscal transfers (RA)*

On the revenue side, the the sub-national portion of revenues used to measure revenue decentralization can be disaggregated to identify sub-national revenue autonomy in each of its components<sup>29</sup> as follows:

$$\frac{\text{Sub-National Revenue}}{\text{Total Revenue}} = \frac{\text{Own revenue}}{\text{Total Revenue}} + \frac{\text{Shared revenues + Transfers}}{\text{Total Revenue}}$$

Or Disaggregating further:

$$\begin{aligned} \frac{\text{Sub-National Revenue}}{\text{Total Revenue}} = & \frac{\text{Own revenue}}{\text{Total Revenue}} + \frac{\text{Shared Revenue (untied)}}{\text{Total Revenue}} + \frac{\text{Unconditional transfers}}{\text{Total revenue}} \\ & + \frac{\text{Conditional transfers (*)}}{\text{Total Revenue}} \end{aligned}$$

(\*) Includes the conditional (earmarked) portion of other revenue sharing schemes

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<sup>28</sup> This issue is also closely connected with administrative decision-making at the local level, which is discussed in the main body of this dissertation.

<sup>29</sup> In this desegregation we do not take into account revenues coming from borrowing, as this source provides financing for covering deficits or for capital spending. However, as borrowing powers are part of sub-national fiscal autonomy, they are discussed later in this section.

Each of these components has embedded in itself a degree of autonomy granted by the central government to sub-national governments. Combining and further expanding on guiding principles presented by McLure (2000), Oliveira and Martinez-Vazquez (2001), and OECD (2002) the degree of autonomy of each of those revenue components is discussed below.

Consider:

$$RA_i \cong (ORA_i * \mu) + (STA_i * \omega) \quad (A.4)$$

Where *ORA* is tax autonomy over own local taxes in country *i*.

Own source revenues are commonly considered to be free of any condition from the central government, but this is not often the case. Thus, in terms of own source revenues (for taxes and non-taxes) or *ORA* in our framework, the following questions should be asked: (i) which level of government chooses the taxes (and fees) from which sub-national governments receive their own local revenue; (ii) which level of government defines the tax bases; (iii) which level of government sets tax rates; (iv) which level of government administers the taxes (actual collection and other administrative related functions). In some cases sub-national governments may not have the chance to define bases, or choose their own taxes and rates, or administer these taxes. It can also be the case the sub-national government can choose to impose certain taxes or charges out of a given list authorized by the central government. In summary, there could be different mixes of these features present in the regulations that own revenues have and ultimately they are inherent in determining the degree of fiscal autonomy.

In a simpler way *ORA* could be rated from lower to higher autonomy as follows:

$ORA_i \approx f$  [(a) sub-national governments do not have any power to set their own revenues' rates and bases; (b) sub-national government are assigned certain taxes they have to collect and they have some flexibility on the rate; (c) sub-national governments can pick their taxes (and fees) exclusively from an authorized list of options and can not change rates; (d) sub-national governments can pick their taxes (and fees) exclusively from an authorized list of options and have some flexibility in changing rates (within bands); (e) sub-national governments can pick their taxes (and fees) exclusively from an authorized list of options and have full discretion on rates; (f) local governments can choose their taxes and rates; and (g) additionally this could also be evaluated examining the portion of own source sub-national revenues over which these sub-national governments have discretion at any of the levels of autonomy mentioned above.]

STA is autonomy over transfer revenues and shared taxes (with the central government) in country i, and can be disaggregated in following way:

$$STA_i \approx f(USTA_i; SSTA_i; LSTA_i)$$

Where *USTA* is most basic level to measure the degree of sub-national autonomy in transfers and shared revenues, that is, the differentiation between the shares of conditional (or earmarked) transfers and unconditional (or untied) transfers [for simplicity, here we bundled untied shared revenues together with unconditional transfers, and earmarked revenue sharing schemes together with conditional transfers]. Or,

$USTA_i \approx f(\text{share of unconditional transfers (and untied shared revenues) over total transfers and shared revenues})$ .<sup>30</sup>

Conditional transfers (and earmarked revenue schemes) are typically tied to the fulfillment of a specific function, for example: (i) financing salaries or utility bills; (ii) financing capital expenditures; (iii) financing a specific service (e.g., education); (iv) financing a specific bundle of local services (in this situation sub-national governments may have some limited latitude or discretion in allocating the money within the service sectors); or (v) financing any particular spending item in local budgets.

In the case of unconditional transfers (and untied shared revenues) it is clear that local governments have discretion over the spending of these resources; however, it is necessary to know if they carry out some sort of “conditionalities”. For example, such “conditionalities” appear in supposedly unconditional transfers in Bolivia and El Salvador, where some untied (block) transfers are considered “unconditional” but still have some investment restrictions behind them: in Bolivia and el Salvador a percentage of the unconditional block grant has to be invested in infrastructure related to certain services (Arze and Martinez-Vazquez 2003). Under the specific item of intergovernmental transfers, the autonomy would be greater the larger the share of the transfers in block (untied) transfers.

*SSTA* represents a portion of shared revenues and transfers over which local government have certain voice in its determination and/or changes; *SSTA* can be represented in the following way:

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<sup>30</sup> A higher share would denote higher sub-national autonomy.

$SSTA_i \approx f [(a) \text{ percentage of revenue sharing schemes and transfers over which the central government can not take decision unilaterally without agreeing with sub-national governments;}^{31} (b) \text{ percentage of revenue sharing schemes and transfers that are set in legislation but rules may be changed by central government unilaterally;}^{32} (c) \text{ percentage of sharing schemes and transfers that are determined unilaterally each year by the central government as part of the national budget;}^{33} (d) \text{ percent of shared revenues over which local governments have voice in decision making regarding exemptions granted on the base and changes in rate;}^{34} (e) \text{ unconditional or block transfers as percentage of total transfers}^{35} ]$

And, *LSTA* represents the degree of autonomy and stability for sub-national governments' transfers and shared revenues that arises from the legal basis of the intergovernmental transfer system. *LSTA* can be represented by the function below where (a) is the strongest setting for the transfer system (in terms of autonomy and predictability) and (e) is the weakest:

$LSTA_i \approx f [(a) \text{ the system is precisely determined by the constitution;} (b) \text{ the general principles are contained in the constitution and actual criteria are approved with national law in agreement with sub-national governments;} (c) \text{ the system is decided by national law (budget code or other);} (d) \text{ the system is}$

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<sup>31</sup> A higher percentage denotes more sub-national autonomy

<sup>32</sup> A higher percentage denotes lower sub-national autonomy

<sup>33</sup> A higher percentage denotes more sub-national autonomy

<sup>34</sup> A higher percentage denotes more sub-national autonomy

<sup>35</sup> A higher percentage denotes more sub-national autonomy

*decided each year in the annual budget law in agreement with sub-national governments; (d) the system is decided each year in the annual budget law and sub-national governments have no voice in its determination*<sup>36</sup>;

### *Sub-national Borrowing*

Often, this aspect has been neglected when analyzing case studies of fiscal decentralization in different countries. However, it is increasingly important as the process of decentralization moves forward. Typically, as decentralization unfolds, sub-national governments see growing opportunities to borrow resources from the financial sector and international donors. Although awareness of this issue is growing, many countries do not regulate borrowing powers for sub-national governments.<sup>37</sup>

In defining the degree of fiscal decentralization, accounting for borrowing autonomy is extremely important. As Oliveira and Martinez-Vazquez (2001) argue, transferring this responsibility to sub-national governments is an important step in developing a sense of ownership at the local level, which tends to result in improved capital infrastructure and efficiency in its financing.<sup>38</sup> Moreover, borrowing power may become an independent mechanism for fostering sub-national accountability in countries where the process of decentralization is fairly advanced. Indeed, the level of borrowing autonomy is another indication of the degree of independence of sub-national governments in their financing, and consequently in terms of measuring fiscal

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<sup>36</sup> This variable is very important for sub-national fiscal autonomy as it illustrates issues such as legal ownership of revenues and transparency of the system.

<sup>37</sup> In any case, a well-designed regulatory framework is necessary to ensure that the decentralization of borrowing does not provide perverse incentives to the sub-national governments (Litvack and Seddon 2002).

<sup>38</sup> Efficiency comes from the optimal allocation of long-term debt to capital expenditure. In addition sub-national ownership and improved infrastructure may generate economic growth. See Oliveira and Martinez-Vazquez (2001) for a discussion on this issue.

decentralization in a country.<sup>39</sup> However, this aspect needs to be treated carefully and in the framework of fiscal responsibility. For example, in countries with early stage processes of decentralization, sub-national borrowing may be prudently limited and well-controlled as to avoid soft-budget constraints.

To measure sub-national borrowing autonomy we can use the following framework, with borrowing powers (SNBP) classified in five levels from no power to borrow (a) to significant powers to borrow (e)

$SNBP_i = f [(a) \text{ no sub-national borrowing at all; } (b) \text{ sub-national borrowing with tight ceilings (including debt ceilings on outstanding debt as percent of total revenues, ceilings on annual debt repayments as percent of recurrent local revenues or the like) and only with central government's ex-ante control and authorization; } (c) \text{ sub-national borrowing with ceilings (relatively increased compared to initial stages but still conservative) and only with central government's ex-ante control and authorization; } (d) \text{ sub-national borrowing with ceilings but only with ex-post (annual) control from central authorities, tough debt registration is part of the process; } (e) \text{ sub-national borrowing without ceilings or controls but only for local governments with credit ratings from internationally recognized rating companies (still registration applies)}].$

It should be highlighted, however, that as the system of sub-borrowing matures and sub-national governments acquire more powers (or even from the very beginning) a proper

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<sup>39</sup> Here is important to make clear that we do not make the case for more or less borrowing power for local governments. There are a variety of good reasons for which the autonomy in this regard could be restricted such as macroeconomic stability, poor technical ability in risk evaluation of the sub-national governments as so on; See Bird, Ebel and Wallich, (1995).

sub-national bankruptcy framework should be in place to avoid moral hazards in lenders and borrowers, and to increase local officials' accountability.

## APPENDIX B: DATA SOURCES

VARIABLE NAME	SOURCE
Percentage of births attended in health facilities	WHO (various years) and Millennium Development Indicators, United Nations (2003)
Percentage of births attended by skilled personnel	WHO (various years) and Millennium Development Indicators, United Nations (2003)
Immunization coverage rates for DPT (children under 1 year old )	WHO (various years) and Millennium Development Indicators, United Nations (2003), World Bank Development indicators
Percentage of population with access to improved drinking water sources (total population)	Millennium Development Indicators, United Nations (1990-2003)
Percentage of population with access to improved drinking water sources (Urban population)	Millennium Development Indicators, United Nations (1990-2003)
Percentage of population with access to improved drinking water sources (Rural population)	Millennium Development Indicators, United Nations (1990-2003)
Fiscal decentralization measured as revenue decentralization and expenditure decentralization	Government Finance Statistics – International Monetary Fund (2006)
Administrative decentralization: generated dummy variable that indicates if sub-national governments can hire and fire people	Combining Database of Political Institutions DPI (World Bank 2002), Treisman (2002). WB-OECD dataset Budget Practices and Procedures (2004) and DPR World Bank.
Political decentralization <i>Municipal/local government elections</i> , answering the question if municipal/local executive and legislature are democratically (and locally) elected.	Database of Political Institutions DPI (World Bank 2004) complemented by a review of WB Development Policy Reports and Country Reports made by the author
Political decentralization State/province elections, basically answering the question if state/province executive and legislature are democratically (and locally) elected	Database of Political Institutions DPI (World Bank 2002) complemented by a review of WB Development Policy Reports and Country Reports made by the author
Citizen participation and accountability	Governance Matters III (World Bank 2003)
Perceived corruption in the country.	Governance Matters III (World Bank

	2003)
Public per capita Expenditure in each specific sector (i.e: health, water provision)	World Development Indicators (2003)- World Bank.
Private per capita expenditure in each specific sector (i.e: health, water provision)	World Development Indicators (2003)- World Bank.
Income per capita; income per capita growth.	World Development Indicators (2003)- World Bank.
Percentage of rural population in the country	World Development Indicators (2003)- World Bank.

#### **Summary Statistics of Control Variables**

Control Variables	Obs	Mean	Std. Dev.	Min	Max
Voice and accountability	330	0.1145	0.9269	-1.81	1.72
Control of corruption	319	0.0499	1.0265	-1.89	2.48
Public health expenditure as %of GDP	401	0.0342	0.0196	0.00	0.09
Per Capita GDP in constant USD 2000	439	5740.5730	8927.0580	90.19	38200.41
Per Capita GDP growth	437	0.0196	0.0430	-0.15	0.25

## APPENDIX C: Regression Results

**Table C-1: fixed effects estimation results on decentralization effects on health care access- Hypotheses 1 and 2**

Dependent Variable =====>	% of births attended in health facilities			
Model specification	(1)	(2)	(3)	(4)
<b>Independent Variables /1</b>				
Fiscal Decentralization (FD) rd	0.29 [2.36]**	0.29 [2.36]**	0.401 [2.17]**	0.249 [1.67]*
Political Decentralization (PD) le			0.028 [1.61]	0.036 [2.01]**
Political Decentralization (PD) se	0.018 [0.89]	0.018 [0.89]		
Administrative Decentralization (AD)	0.05 [3.00]***	0.05 [3.00]***	0.034 [1.89]*	0.035 [1.96]*
Developed Country (D)	-0.012 [0.23]		0.123 [1.81]*	
(D*FD)			-0.429 [2.28]**	
Transition Country (T)		-0.006 [0.11]		0.825 [13.36]***
(T*FD)				-0.114 [0.40]
GDP per capita /2	0.0009 [0.38]	0.0011 [0.38]	0.0012 [1.94]*	0.0007 [0.29]
Control of Corruption	-0.014 [1.03]	-0.014 [1.03]	-0.014 [0.93]	-0.015 [0.96]
Per capita health expenditure /2	0.0218 [1.16]	0.0205 [1.83]*	0.0310 [0.84]	0.0293 [1.27]
Constant	0.824 [18.57]***	0.83 [11.65]***	0.784 [15.86]***	0.019 [0.97]
Observations	286	286	280	280
R-squared	0.99	0.99	0.99	0.99
Panel robust t statistics in brackets				
* Significant at 10%; ** Significant at 5%; *** Significant at 1%				
1/ Country and time dummies are omitted in the table.				
2/ Units transformed (in thousands)				

**Table C-2: First Differences estimation results on decentralization effects on health care access- Hypotheses 1 and 2**

Dependent Variable =====> Model specification	% of births attended in health facilities			% of births attended by skilled personnel
	(1)	(2)	(3)	(4)
Independent Variables /1				
Fiscal Decentralization (FD) rd	0.30 [2.24]**	0.36 [2.64]***	0.56 [3.22]***	0.478 [3.76]***
Political Decentralization (PD) le	0.04 [1.84]*			
Political Decentralization (PD) se		0.016 [0.60]	0.009 [0.36]	0.001 [0.05]
Administrative Decentralization (AD)	0.028 [1.75]*	0.044 [2.76]***	0.04 [2.51]**	0.016 [0.74]
Developed Country (D)			0 [.]	0 [.]
(D*FD)			-0.551 [3.17]***	-0.516 [3.86]***
Transition Country (T)				
(T*FD)				
GDP per capita /2	0.0007 [0.40]	0.0009 [0.35]	0.0006 [0.57]	0.0011 [1.85]*
Voice and Accountability	0.009 [0.59]	0.013 [0.80]	0.017 [1.03]	0.035 [1.68]*
Per capita health expenditure /2	0.0091 [0.54]	0.0099 [0.54]	0.0087 [0.33]	0.0010 [1.29]
Constant	0.00 [0.47]	0.00 [0.18]	0.00 [0.23]	0.001 [0.22]
Observations	147	150	150	149
R-squared	0.33	0.29	0.34	0.17
Panel robust t statistics in brackets				
* Significant at 10%; ** Significant at 5%; *** Significant at 1%				
1/ Country and time dummies are omitted in the table.				
2/ Units transformed (in thousands)				

**Table C-3: System GMM estimation results on decentralization effects on health care access- Hypotheses 1 and 2**

Dependent Variable =====>	% of births attended	% of births attended by skilled personnel		
Model specification	(1)	(2)	(3)	(4)
Independent Variables /1				
Lag exec(i)	0.55 [5.37]***	0.14 [1.21]	-0.049 [0.48]	0.13 [1.40]
Fiscal Decentralization (FD rd)		0.581 [1.85]*	0.785 [2.03]**	
Fiscal Decentralization (FD ed)	-0.006 [0.05]			0.264 [1.46]
Political Decentralization (PD) le	0.029 [0.69]	-0.021 [0.42]		-0.002 [0.05]
Political Decentralization (PD) se			-0.01 [0.17]	
Administrative Decentralization (AD)	0.064 [2.41]**	0.019 [0.58]	-0.004 [0.14]	0.048 [1.72]*
Developed Country (D)			0 [.]	
(D*FD)			0.289 [1.88]*	
GDP per capita /2	0.0007 [0.78]	0.0009 [0.83]	0.0012 [0.34]	0.0008 [0.64]
Voice and Accountability	0.066 [1.15]	0.151 [2.34]**	0.137 [2.30]**	0.124 [2.58]***
Per capita health expenditure /2	0.029 [0.65]	0.021 [2.19]**	0.0270 [2.36]**	0.0230 [1.77]*
time==2	0.024 [1.62]	-0.004 [0.25]	-0.013 [0.82]	-0.003 [0.25]
time==3	-0.002 [0.13]	0.013 [0.79]	0.019 [0.98]	0.011 [0.74]
Constant	0.277 [4.30]***	0.641 [5.76]***	0.757 [7.41]***	0.68 [7.62]***
Observations	211	224	229	215
Number of panels	92	98	100	94
Panel robust z statistics in brackets				
* Significant at 10%; ** Significant at 5%; *** Significant at 1%				
1/ Country and time dummies are omitted in the table.				
2/ Units transformed (in thousands)				

**Table C-4: fixed effects estimation results on decentralization effects on access to improved water source- Hypotheses 1 and 2**

Dependent variable	=====>			
	% of people with access to improved water source		% of people with access to improved water source in rural areas	
Model specification	(1)	(2)	(3)	(4)
<b>Independent Variables /1</b>				
Fiscal Decentralization (FD rd)		0.11 [1.58]	0.187 [1.73]*	
Fiscal Decentralization (FD ed)	0.011 [0.36]			0.02 [0.27]
Political Decentralization (PD) le	0.051 [3.61]***			
Political Decentralization (PD) se		0.032 [1.61]	0.01 [0.71]	0.013 [0.92]
Administrative Decentralization (AD)	0.014 [1.07]	0.031 [2.61]**	0.014 [1.25]	0.019 [1.81]*
Developed Country (D)			-0.174 [0.86]	-0.165 [4.11]***
(D*FD)			0.72 [0.89]	
Transition Country (T)				
(T*FD)	0.214 [24.52]***	0.167 [7.60]***		
GDP per capita /2	0.0011 [0.09]	0.0018 [0.44]	0.0022 [0.71]	0.0013 [0.64]
Voice and Accountability	-0.016 [0.81]	-0.006 [0.32]	0.013 [0.85]	0.016 [0.87]
Constant	0.681 [30.85]***	0.726 [47.19]***	0.895 [31.70]***	0.929 [38.69]***
Observations	279	294	278	269
R-squared	0.98	0.98	0.96	0.96
Panel robust t statistics in brackets				
* Significant at 10%; ** Significant at 5%; *** Significant at 1%				
1/ Country and time dummies are omitted in the table.				
2/ Units transformed (in thousands)				

**Table C-5: First Differences estimation results on decentralization effects on access to improved water source - Hypothesis 1 and 2**

Dependent variable	=====>				% of people with access to improved water source	% of people with access to improved water source in rural areas
Model specification	(1)	(2)	(3)	(4)	(5)	
<b>Independent Variables /1</b>						
Fiscal Decentralization (FD rd)	0.21 [2.56]**	0.09 [1.69]*		0.14 [2.36]**	0.956 [2.03]**	
Fiscal Decentralization (FD ed)			0.00 [0.27]			
Political Decentralization (PD) le		0.033 [3.15]***	0.036 [3.55]***			
Political Decentralization (PD) se	0.015 [1.00]			0.017 [1.19]	-0.019 [1.13]	
Administrative Decentralization (AD)	0.03 [3.59]***	0.02 [2.22]**	0.02 [2.20]**	0.03 [3.79]***	0.006 [0.69]	
Developed Country (D)	0 [.]					
(D*FD)	-0.193 [2.30]**					
Transition Country (T)					0 [.]	
(T*FD)					-0.886 [1.97]*	
GDP per capita /2	0.0017 [2.16]**	0.0012 [0.55]	0.0011 [0.03]	0.0007 [0.57]	0.0023 [0.69]	
Voice and Accountability	-0.012 [0.71]	-0.016 [0.95]	-0.012 [0.72]	-0.013 [0.78]	0.002 [0.16]	
Constant	0 [0.11]	-0.001 [0.18]	-0.001 [0.41]	0 [0.13]	0.006 [0.81]	
Observations	149	146	142	149	139	
R-squared	0.22	0.25	0.26	0.20	0.27	
Panel robust t statistics in brackets						
* Significant at 10%; ** Significant at 5%; *** Significant at 1%						
1/ Country and time dummies are omitted in the table.						
2/ Units transformed (in thousands)						

**Table C-6: System GMM estimation results on decentralization effects on access to improved water source- Hypothesis 1 and 2**

Dependent variable	=====>					
	% of people with access to improved water source					% of people with access to improved water source in rural areas
Model specification	(1)	(2)	(3)	(4)	(5)	(6)
<b>Independent Variables /1</b>						
Lag exec(i)	0.571 [3.89]***	0.405 [3.29]***	0.356 [1.89]*	0.504 [3.30]***	0.571 [3.90]***	0.32 [1.22]
Fiscal Decentralization (FD rd)	-0.068 [0.53]	-0.004 [0.05]			-0.033 [0.29]	0.376 [2.37]**
Fiscal Decentralization (FD ed)			-0.03 [0.65]	-0.02 [0.33]		
Political Decentralization (PD) le	0.057 [2.23]**			0.062 [3.05]***	0.06 [2.15]**	
Political Decentralization (PD) se		0.064 [2.42]**	0.071 [3.00]***			0.071 [1.06]
Administrative Decentralization (AD)	0.025 [0.80]	0.021 [1.13]	0.023 [1.43]	0.019 [0.90]	0.03 [0.87]	
Developed Country (D)				0.069 [1.23]		
(D*FDrd)						-0.059 [0.37]
(D*FDed)				-0.05 [0.57]		
Transition Country (T)					-0.115 [0.89]	
(T*FD)					0.123 [0.25]	
GDP per capita /2	0.0025 [1.68]*	0.0031 [0.79]	0.0025 [1.00]	0.0031 [0.96]	0.0021 [0.66]	0.0017 [0.80]
Voice and Accountability	-0.004 [0.11]	0.024 [0.97]	0.022 [0.61]	0.007 [0.23]	0.007 [0.19]	-0.034 [1.08]
time==2	0.013 [1.53]	0.008 [1.13]	0.009 [1.21]	0.009 [1.04]	0.011 [1.18]	0.011 [1.18]
time==3	0.002 [0.31]	0 [0.07]	-0.001 [0.16]	0.001 [0.13]	0.006 [0.63]	0 [0.01]
Constant	0.314 [3.00]***	0.456 [4.69]***	0.498 [3.36]***	0.366 [3.16]***	0.326 [2.96]***	0.417 [2.50]**
Observations	219	224	217	212	219	208
Number of panels	96	98	95	93	96	94

Panel robust z statistics in brackets  
\* Significant at 10%; \*\* Significant at 5%; \*\*\* Significant at 1%  
1/ Country and time dummies are omitted in the table.  
2/ Units transformed (in thousands)

**Table C-7: fixed effects estimation results on decentralization (additional interaction) effects on health care access- Hypothesis 3**

Dependent variable	% of birth attended in health facilities				% of births attended by skilled personnel		Immunization coverage (%) for DPT
Model specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Independent Variables /1							
Fiscal Decentralization (FD rd)	0.25 [2.44]**	0.42 [2.67]***	0.30 [1.79]*		0.27 [1.66]*		
Fiscal Decentralization (FD ed)				0.014 [0.25]		-0.013 [0.35]	0.137 [2.30]**
Political Decentralization (PD) le	0.032 [1.68]*		0.066 [2.10]**				
Political Decentralization (PD) se		0.069 [2.04]**		0.071 [1.95]*	0.049 [1.53]	0.06 [2.13]**	0.017 [0.47]
Administrative Decentralization (AD)	0.055 [1.66]*						
(FDrd*PDle)			-0.084 [0.63]				
(FDrd*AD)	-0.074 [0.66]						
(FDrd*PDse)		-0.108 [0.93]			-0.074 [0.48]		
(FDed*PDse)				-0.035 [0.28]		-0.073 [0.68]	-0.1 [0.82]
GDP per capita /2	0.0020 [2.11]**	0.0029 [1.33]	0.0025 [0.93]	0.0039 [0.69]	0.0021 [1.94]*	0.0019 [1.23]	0.0092 [1.93]*
Control of Corruption		-0.009 [0.65]	-0.012 [0.78]	-0.005 [0.32]	-0.013 [0.66]	-0.005 [0.27]	-0.024 [1.02]
Constant	0.832 [27.09]***	0.768 [14.72]***	0.791 [17.51]***	0.845 [23.26]***	0.875 [19.97]***	0.931 [31.94]***	0.935 [30.81]***
Observations	383	294	283	283	292	281	287
R-squared	0.98	0.99	0.99	0.99	0.99	0.98	0.93
Panel robust t statistics in brackets							
* Significant at 10%; ** Significant at 5%; *** Significant at 1%							
1/ Country and time dummies are omitted in the table.							
2/ Units transformed (in thousands)							

**Table C-8: First Differences estimation results on decentralization (additional interaction) effects on health care access- Hypothesis 3**

Dependent variable	% of birth attended in health facilities			% of births attended by skilled personnel		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Model specification</b>						
<b>Independent Variables /1</b>						
Fiscal Decentralization (FD rd)	0.49 [2.63]**	0.30 [2.28]**	0.28 [2.24]**	0.302 [2.52]**	0.37 [2.01]**	0.40 [2.69]***
Political Decentralization (PD) le	0.109 [2.77]***	0.031 [1.47]	0.033 [0.92]	0.038 [2.44]**	0.081 [1.57]	
Political Decentralization (PD) se						0.058 [1.46]
Administrative Decentralization (AD)		-0.015 [0.77]	0.059 [3.02]***	0.031 [0.62]		
(FDrd*PDle)	-0.25 [1.49]		-0.05 [0.39]		-0.199 [0.86]	
(FDrd*Pdse)						-0.123 [0.65]
(FDrd*AD)				0.157 [0.70]		
(AD*PDle)		0.051 [2.08]**				
GDP per capita /2	0.0025 [0.49]	0.0036 [0.26]	0.0024 [1.01]	0.0019 [0.65]	0.0032 [0.95]	0.0028 [1.95]*
Voice and Accountability		0.014 [1.01]		0.025 [1.30]		
Control of Corruption	-0.015 [1.43]				-0.018 [1.16]	-0.021 [1.37]
Public health expenditure as % of GDP			-0.175 [1.03]			
Per capita health expenditure /2				0.0091 [0.17]		
Constant	-0.002 [0.56]	-0.001 [0.33]	0.001 [0.50]	-0.001 [0.24]	0.002 [0.53]	0.003 [0.83]
Observations	142	149	243	146	141	146
R-squared	0.38	0.34	0.27	0.19	0.2	0.12

Panel robust t statistics in brackets

\* Significant at 10%; \*\* Significant at 5%; \*\*\* Significant at 1%

1/ Country and time dummies are omitted in the table.

2/ Units transformed (in thousands)

**Table C-9: System GMM estimation results on decentralization effects (additional interaction) on health care access- Hypothesis 3**

Dependent variable	=====>	% of birth attended in health facilities	% of births attended by skilled personnel	(Immunization coverage (%) for DPT			
Model specification		(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables /1							
Lag exec(i)		0.499 [5.16]***	0.66 [7.65]***	0.65 [6.64]***	0.06 [0.79]	0.175 [1.43]	0.207 [1.79]*
Fiscal Decentralization (FD rd)			0.102 [0.41]		0.547 [2.25]**	0.653 [3.29]***	0.484 [2.23]**
Fiscal Decentralization (FD ed)		-0.011 [0.12]		0.011 [0.16]			
Political Decentralization (PD) le			0.059 [2.03]**		0.093 [1.57]	-0.001 [0.03]	0.009 [0.20]
Political Decentralization (PD) se		0.038 [0.78]		0.121 [2.38]**			
Administrative Decentralization (AD)		0.057 [2.35]**	-0.028 [0.58]		0.013 [0.36]	0.117 [1.45]	-0.005 [0.10]
(FDrd*PDle)					0.0416 [1.84]*		
(FDrd*AD)			0.149 [0.93]			-0.419 [1.39]	
(AD*PDle)							0.035 [0.56]
GDP per capita /2		0.0011 [1.95]*	0.0016 [0.18]	0.0015 [0.33]	0.0082 [0.61]	0.0079 [0.24]	0.0090 [2.12]**
Voice and Accountability		0.065 [1.50]			0.027 [0.55]		
Control of Corruption			0.022 [0.38]	0.021 [1.02]		0.009 [0.12]	0.057 [1.59]
Public health expenditure as % of GDP						-0.825 [0.48]	1.09 [0.55]
Per capita health expenditure /2		0.009 [0.80]		0.0087 [0.07]			
time==2		0.016 [1.41]	0.01 [0.90]	0.003 [0.32]	-0.007 [0.47]	-0.002 [0.14]	0.005 [0.40]
time==3		-0.01 [1.13]	0.001 [0.19]	-0.001 [0.14]	0.016 [1.65]*	0.014 [0.97]	0.011 [0.64]
Constant		0.284 [5.08]***	0.225 [3.55]***	0.235 [2.78]***	0.691 [8.53]***	0.61 [4.60]***	0.579 [4.10]***
Observations		216	215	217	225	218	218
Number of panels		94	96	97	98	98	98
Panel robust z statistics in brackets							
* Significant at 10%; ** Significant at 5%; *** Significant at 1%							
1/ Country and time dummies are omitted in the table.							
2/ Units transformed (in thousands)							

**Table C-10: fixed effects estimation results on decentralization (additional interaction) effects on access to improved water source- Hypothesis 3**

Dependent variable	(1)	(2)	(3)
	% of people with access to improved water source		% of people with access to improved water source in rural areas
Model specification	(1)	(2)	(3)
Independent Variables /1			
Fiscal Decentralization (FD rd)	0.044 [0.54]	0.13 [2.02]**	0.354 [1.29]
Fiscal Decentralization (FD ed)			
Political Decentralization (PD) le	0.041 [2.46]**	0.042 [3.16]***	0.021 [2.06]**
Political Decentralization (PD) se			
Administrative Decentralization (AD)	0.016 [1.21]	0.039 [1.82]*	-0.026 [0.49]
(FDrd*PDle)	0.004 [0.06]		
(FDrd*AD)		-0.098 [1.25]	0.108 [0.54]
GDP per capita /2	0.0027 [2.10]**	0.0018 [0.61]	0.002 [0.67]
Control of Corruption	-0.014 [1.27]		-0.004 [0.37]
Constant	0.89 [44.37]***	0.887 [46.35]***	0.833 [12.00]***
Observations	281	356	265
R-squared	0.98	0.98	0.96
Panel robust t statistics in brackets			
* Significant at 10%; ** Significant at 5%; *** Significant at 1%			
1/ Country and time dummies are omitted in the table.			
2/ Units transformed (in thousands)			

**Table C-11: First Differences estimation results on decentralization (additional interaction) effects on access to improved water source - Hypothesis 3**

Dependent variable	=====> % of people with access to improved water source			
Model specification	(1)	(2)	(3)	(4)
<b>Independent Variables /1</b>				
Fiscal Decentralization (FD rd)	0.19 [1.88]*	0.072 [1.30]	0.095 [1.75]*	0.109 [2.24]**
Political Decentralization (PD) le		0.031 [3.08]***	0.029 [2.63]**	0.02 [1.93]*
Political Decentralization (PD) se	0.031 [1.35]			
Administrative Decentralization (AD)		-0.007 [1.19]	-0.004 [0.67]	-0.004 [0.88]
(FDrd*PDse)	0.006 [0.04]			
(AD*PDle)		0.032 [3.39]***	0.029 [2.76]***	0.033 [3.36]***
GDP per capita /2	0.0014 [2.30]**	0.0009 [1.90]*	0.0011 [0.58]	0.0007 [1.34]
Voice and Accountability		-0.02 [1.30]	-0.014 [0.83]	
Control of Corruption	-0.03 [2.46]**			-0.024 [2.17]**
Constant	-0.002 [0.46]	0 [0.02]	0 [0.06]	-0.001 [0.29]
Observations	147	146	146	140
R-squared	0.14	0.32	0.26	0.28
Panel robust t statistics in brackets				
* Significant at 10%; ** Significant at 5%; *** Significant at 1%				
1/ Country and time dummies are omitted in the table.				
2/ Units transformed (in thousands)				

**Table C-12: System GMM estimation results on decentralization (additional interaction) effects on access to improved water source- Hypothesis 3**

Dependent variable	=====> % of people with access to improved water source					% of people with access to improved water source in urban areas
Model specification	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables /1						
Lag exec(i)	0.61	0.61	0.61	0.59	0.61	0.80
	[5.40]***	[6.17]***	[4.63]***	[4.50]***	[5.03]***	[7.92]***
Fiscal Decentralization (FD rd)	0.159	0.192	0.121	0.225	0.251	
	[2.22]**	[2.12]**	[1.41]	[1.53]	[1.91]*	
Fiscal Decentralization (FD ed)						0.041
						[1.48]
Political Decentralization (PD) le	0.05	0.054	0.05	0.082	0.093	
	[2.13]**	[2.59]***	[2.00]**	[1.91]*	[2.28]**	
Political Decentralization (PD) se						-0.023
						[1.44]
Administrative Decentralization (AD)	0.028	0.037	0.03	0.034	0.024	
	[1.19]	[0.93]	[1.19]	[1.74]*	[1.07]	
(FDrd*PDle)				-0.14	-0.179	
				[0.79]	[1.26]	
(FDrd*AD)		0.055				
		[0.40]				
(FDed*PDse)						0.06
						[1.73]*
(AD*PDle)	0.009		0.013			
	[0.25]		[0.33]			
GDP per capita /2	0.0029	0.0023	0.0021	0.0020	0.0028	0.0009
	[0.66]	[2.07]**	[0.37]	[0.37]	[0.74]	[0.98]
Control of Corruption						-0.001
						[0.12]
time==2	-0.002	0.001	0	0.002	-0.001	0.002
	[0.38]	[0.20]	[0.01]	[0.34]	[0.10]	[0.68]
time==3	-0.006	-0.005	-0.007	-0.003	-0.005	0.002
	[0.90]	[0.81]	[0.97]	[0.48]	[0.68]	[0.93]
Constant	0.254	0.248	0.267	0.264	0.239	0.206
	[2.56]**	[2.96]***	[2.36]**	[2.31]**	[2.24]**	[2.26]**
Observations	285	285	285	285	285	206
Number of panels	97	97	97	97	97	93
Panel robust z statistics in brackets						
* Significant at 10%; ** Significant at 5%; *** Significant at 1%						
1/ Country and time dummies are omitted in the table.						
2/ Units transformed (in thousands)						

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