ABSTRACT

Title of Dissertation: THE POLITICAL ECONOMY OF PUBLIC SPENDING ON PUBLICLY-PROVIDED GOODS IN DEVELOPING COUNTRIES

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It is common for many governments to provide services, such as education or healthcare, to the public even though many of these services have privately available counterparts. Although the literature on public economics has studied various determinants of policy choice, it typically takes granted the existence of institutions which are often very weak in less-developed countries. More importantly, many developing countries experience widespread corruption in the public sector, which undermines the functioning of governments.

In this dissertation we have developed a probabilistic voting model using political pressure approach to characterize the policy choice in a local government. Politicians seek to maximize their chances of reelection by maximizing the social welfare. They are also influenced by special interest groups seeking public funds for their own benefit. In this model leakage of public funds undermines the quality of public services. In response, the wealthy switch to private alternatives. Their exit leaves the poor as the only constituents who have a stake in local governance but with little influence over politicians. As the civic control over local governments weakens, corruption in public offices becomes even more pervasive. Such a cycle is less likely to be observed in

developed countries, where Tiebout's "voting-by-feet" functions relatively well (thereby keeping redistributive politics in check) and local politicians are more sensitive to the electorate. Our model shows that establishing institutions (such as local taxation or voucher programs) that spread the costs and benefits of governance across the whole society is crucial for the success of local governments.

Empirical results from the Philippines showed that local financing, coupled with political participation of citizens, may increase the allocation of resources on publicly provided services, that corruption in local governments is less problematic in communities that rely on local taxation, that households are more likely to participate in political processes if local government spending is financed mainly through local taxes, and finally, that demand of the wealthy for publicly provided services is among the primary forces that facilitate better governance and better public services.

THE POLITICAL ECONOMY OF PUBLIC SPENDING ON PUBLICLY-PROVIDED GOODS IN DEVELOPING COUNTRIES

By

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Chapter 1

Introduction

In the last two decades many countries have shifted provision, supervision, resource allocation and funding decisions of many publicly provided services from central to local governments. The rationale behind decentralization reforms is rarely economic and typically political, such as the challenge of ethnic and geographic diversity in Africa; the deepening of democratization in Latin America and East Asia; the transition from a command system to a market system in Eastern Europe and the Former Soviet Union; the need to improve delivery of local services to large populations in the centralized countries of East Asia, and such (see Shah, 1998, for more about motivations for such a change). Whatever the real driving force, almost all decentralization reforms have been applauded by academics, international donors, and pundits on the grounds that they would improve the well-being of the people by empowering local voters to change the kind, quantities and qualities of the public services they receive from local authorities.

The fact that most research on local public goods has been inspired by the observations on developed countries has troubled many development economists, since most institutions whose existence are taken for granted in this literature are often very weak in less developed countries. Recent anecdotal evidence has suggested that decentralization, if undertaken without sufficient planning or strengthening of appropriate institutions, may lead to outcomes that are potentially worse than centralized systems, leading instead to fragmented planning, inadequate consideration or funding of recurrent

expenditures, local capture, or under-provision of certain types of services. As decentralization reforms have become the centerpiece of international donor organizations, it is critical, both in theory and in practice, to understand the factors that determine the allocation of publicly-provided local services in developing nations.

In the first part of this dissertation, we have developed a simple analytical model that highlights a vicious cycle faced by many developing countries, where local governments' efforts to provide public services to their jurisdictions are usually hampered by widespread corruption. When publicly provided goods are not of high quality, the wealthy can switch to private alternatives. Their exit weakens the influence of citizen voice over politicians and leaves the poor as the only constituents with a stake in local governance. As the civic control over local governments weakens, corruption in public offices becomes even more pervasive.

Our model highlights two conditions for the success of decentralization reforms: (i) effective oversight – in the form of hierarchical accountability mechanisms or citizen voice – to prevent the capture of local governments by the special interest, and (ii) establishing institutions that spread the costs and/or benefits of governance over the society so that everyone has a stake in the success of local governments. Those institutions may be in the form of local revenue mobilization (e.g. use of income tax or property tax rather than transfers from central government to finance public services) or subsidies to the poor that help them to use "exit" mechanisms if necessary (e.g. school vouchers or public health insurance that subsidizes the use of private health-care providers if public services are not accessible or at desired quality).

We have tested the implications of our theoretical model in the Philippines. The Philippines is a particularly appropriate case for four reasons. First, local government units in the Philippines have significant autonomy and responsibility in the provision of basic services to their jurisdictions. Second, decentralization reforms in the last decade have ensured that the responsibilities of local governments are matched with local authority to raise revenue from local sources. Third, the devolution of responsibilities to local governments in the Philippines is not only administrative and fiscal, but also political. Finally, there exist private alternatives in education and health care so that the "exit" option is feasible.

We did not find a *direct* link between local financing and the quantity of publicly provided local goods. It may be possible that the benefits of local financing is usually based on some form of a Tiebout mechanism which may not be applicable to developing countries due to underdeveloped capital markets and constraints on household mobility. But, we found that one mechanism that may strengthen the success of local financing is political participation of citizens. Although neither voter turnout nor local financing alone was strong in general, their interaction was quite significant. Local taxation may also have an indirect impact on policy choice through its positive influence on a person's involvement in voice mechanisms. Households are more likely to participate in barangay (townhall) meetings with public officials if local public spending is primarily financed by local sources rather than transfers from the central government. In addition, we also found that by spreading the cost of corruption to the whole community, local taxation may be an important policy instrument to support good governance in the public sector.

Another finding is that keeping the wealthier segments of communities in the

public system as users of publicly provided services is critical for the success of local governments. They would be more active in voice mechanisms (such as participating in meetings with local public officials) if they use public services. Their mobilization and participation in political activities would create benefits for the whole community, because they have more ability to raise their voice against public officials as compared to the less wealthy. In this context, we found that private alternatives in the health and education sectors may even have an adverse effect on local governments, if the use of the exit option is confined to the wealthy and thereby private alternatives effectively shield these households from the mismanagement and corruption in local governments. In the Philippines, however, the teacher staffing norm established by the central government has provided an indirect link between school enrollment and promotion of school principals through a Niskanen-mechanism (i.e. budget-maximizing bureaucrats) rather than Tiebout. We found that this mechanism, coupled with availability of private schools to large segments of the population has created an institutional environment where school administrators, facing competitive pressure from private schools, have been motivated to raise the quality of education, at least in secondary schools.

We also found, however, decentralization is not a panacea. Communities with more acute wealth inequalities are more likely to have less publicly provided goods, because the friction between the have and have-not is transformed into a conflict between public good users and private good users. When this conflict is coupled with undue influence of the local elite, there could be a bias in favor of public services used by the wealthy.

Chapter 2

Literature Survey

It is quite common for many governments to use public resources to provide services, such as education, healthcare, transportation, security, and housing, to the public even though many of these services have privately available counterparts. State involvement in the provision of such services is usually based on the existence of externalities that cannot be internalized by the private sector or households[1], equity concerns[2], information asymmetries between consumers and service providers[3] (particularly in the health sector), and finally, fixed costs involved in their production that

[1] For example, the benefits of vaccination against infectious diseases are shared, accruing not only to the immunized community but also to those around it. Education of children contributes to accumulation of human capital and lifts social and economic prosperity of the whole society. Ignoring such positive externalities yields sub-optimal pricing and spending decisions.

[2] Households may not have access to credit market to make optimal inter-temporal decisions about the health and education of themselves or their children.

[3] Consumers may have limited information about the current and future benefits of various medical services. Adverse selection and moral hazard problems may impair the functioning of insurance system causing disappearance of the market for some types of insurance (Arrow, 1963; Rotschild and Stiglitz, 1976).

prevent the emergence of a private market operating under competitive conditions[4].

There is a wide range of research in the public finance literature identifying the types of services which are the best candidates for government provision and discussing the optimal sharing of responsibilities among different tiers of government in their provision[5]. With the recent popularity of decentralization around the globe, in particular among many developing countries, decision making authority for provision, supervision, resource allocation and funding decisions of many publicly provided services has shifted from central to local governments.

The decision on how to allocate public funds among various services is a political outcome. The literature on local public economics has studied a range of factors critical in this political process, ranging from electoral preferences, special interest groups, exit (jurisdictional choice – "voting by feet" - and using services provided by the private sector), and its financial consequences. Despite a wide range of research in this field, most empirical studies are confined to experiences of developed countries. As decentralization reforms have become the centerpiece of international donor

[4] The marginal cost of adding another student to a classroom, admitting another patient to a hospital or providing transportation services to one more commuter is lower than the average cost. This may cause a monopolist market structure in the private sector.

[5] Assigning responsibilities to the appropriate tier of government usually follows the decentralization theorem, introduced by Oates (1972), which states that if the benefits of particular services are largely confined to local jurisdictions, the level and mix of such services should vary according to local preferences and hence, they should be decided by each jurisdiction.

organizations, it is critical, both in theory and in practice, to understand the factors that influence the allocation of publicly-provided local services in less developed nations.

Earlier attempts in explaining the demand side of this process were centered around the preferences of the electorate, in particular the median voter who casts the decisive vote (Bowen, 1943; Downs, 1957; Black, 1948; Buchanan and Tullock, 1962; also see for example Mueller, 1989, for a review of empirical evidence). One complication with dual provision (public and private) of some services is that preferences are not single peaked owing to the presence of private alternatives (Stiglitz, 1974). Non-single-peakedness occurs because a household may be induced to use the public alternative only if its quality passes a threshold. The implication of non-single-peakedness is that a voting equilibrium may not exist, and, even if an equilibrium does exist, the standard approach (invocation of the median-voter theorem) does not generally apply to characterize that equilibrium (Epple and Romano, 1996; Glomm and Ravikumar, 1998).

Later, the influence of special interest groups over public agenda has attracted quite a bit of interest among researchers. The notion that different groups within society compete for resources is the centerpiece of many models of distributive politics (e.g. Weingast, Shepsle, and Johnsen, 1981; Grossman and Helpman, 1994; Bardhan and Mookherjee, 2000, among others). There is also a long list of empirical studies reporting intergenerational conflicts where the elderly tend to vote against public spending on education (Button, 1992; Vinovskis, 1993; Poterba, 1997, 1998). The support for publicly provided goods tends to be lower in ethnically divided communities (Rubinfeld and Shapiro, 1989; Cutler, Elmendorf, and Zeckhauser, 1993; Alesina, Baqir, and Easterly,

1999). People have discriminatory community preferences where they care only about the welfare of others within their ethnic community and choose lower public goods when they are mainly used by other ethnic groups. Examining the variation of publicly provided goods among districts of Indian states Betancourt and Gleason (2000) also found that elected state governments discriminate against scheduled castes and Muslim minority.

Heterogeneity of citizens creates an allocation problem for publicly provided goods, because whenever the median voter decides there would inevitably be winners and losers. It is not surprising that fiscal federalism literature, in its early stages, focused on the question of allocative efficiency, i.e. matching public resources with consumer preferences (Tiebout, 1956; Stigler, 1957; Oates, 1972; Musgrave, 1983). Tiebout's solution of the heterogeneity problem was that people can sort themselves into communities that provide the public goods they want. Just like a utility-maximizing individual who chooses the optimal mix of private goods, taxpayers can also move to areas where public services more closely match their preferences. Decentralized authorities overseeing various local jurisdictions would compete by offering different standards of services and by imposing different tax burdens. This hypothesis challenged Samuelson's conjecture that (local) public goods could not be allocated efficiently.

The conditions that ensure this conclusion, however, are quite restrictive: Full mobility and knowledge of voters, availability of a large number of jurisdictions offering a range of options, absence of scale economies in producing the public good, absence of spillovers, etc. When all these limitations are considered, the smooth working of Tiebout mechanism may require the number of jurisdictions be as large as the number of citizens

(Bewley, 1981). Despite the criticism on theoretical grounds, the empirical studies using aggregate data usually confirm that voters tend to vote with their feet (Miller, 1981 on Los Angeles; Munley, 1982 on New York; Gramlich and Rubinfeld, 1982 on Detroit; Brueckner, 1982 on Massachusetts; also see Rubinfeld, 1987, and Oates, 1999, for a review of the literature). Micro-level data is less conclusive, although school quality and tax rates appear to be significant determinants of jurisdictional choice (Percy and Hawkins, 1992 on the United States).

Tiebout's argument, in its pure form, implies that mobility of voters is sufficient to ensure efficient allocation of public resources. Later, a similar argument has been applied to the supply side as well to explain how voting-by-feet can motivate local governments by triggering competition among jurisdictions and achieve productive efficiency (producing goods/services at the production cost frontier). It has also been extended to involve additional mechanisms (such as property values and private investments) that establish a link between local revenue mobilization and (mis)governance in local governments.

The "neo-Tiebout" argument on productive efficiency is based on interjurisdictional competition, where local governments compete with each other to attract (or retain) households and capital to their jurisdictions. If households can choose among a large number of districts, they would tend to favor districts that produce higher quality of public services for a given local tax liability or, equivalently, have lower local tax liability for a given level of quality. Hence, mobility of labor and capital forces local governments to act like cost-minimizing entrepreneurs and achieve productive efficiency (Hoxby, 1996). Experiences of jurisdictions make it possible to compare the

performances of local governments in terms of the services they provide and the tax-prices they charge (Shleifer, 1985; Oates, 1999). Evidence from the United States (Peltzman, 1987, 1990, 1992; Besley and Case, 1995a, 1995b) supports the effectiveness of "yardstick competition" to motivate politicians. Even with the presence of fiscal disparities, interjurisdictional competition is applauded on (production) efficiency grounds as long as "the federal government has fulfilled the redistributive function" (Oates and Schwab, 1991).

"Yardstick competition" does not have to be resolved in the voting box. Even if voice options are limited, the quality and tax price of public services would be capitalized by property values, rewarding efficient governments with a bigger tax base[6]. It is frequently reported that local financing of public services leads to better productive efficiency (Husted and Kenny, 1997; Hoxby, 1999a, 2000a. When local funding is replaced by more central funding (which means state funding in the case of the United States) local support for public services declines, because central funding imposes

[6] Hoxby (1999a) summarizes the rationale behind contemporary Tiebout mechanism as follows: "Consider a school district whose quality-for-cost rises, resulting in increased demand and property values. Higher property values either bring an autonomous increase in school budgets as the property tax collects more money, which rewards school producers directly, or allow a reduction in the rate of property tax rate, which offers potential political rewards to school administrators…. Local school finance can be viewed as a real world version of the optimal mechanism for maximizing the production efficiency of schools. In fact, what is prescribed is not just local property tax-based finance, but also a structure of a local politics that causes budgets to increase semi automatically with contemporary increases in property values and that rewards school administrators for lowering property tax."

redistribution among jurisdictions (Evans, Murray, and Schwab, 1995; Figlio, 1997; Hoxby, 1999b).

Another competitive pressure on local governments comes from the private sector. Households may stop using public services by switching to private alternatives without moving to another jurisdiction. In the education literature, in particular, many advocates of school choice have argued that the presence of private schools places competitive pressure on public schools, and thereby improve their performance (Friedman, 1955; Chubb and Moe, 1990). Responding to inequality concerns, choice proponents have also proposed the selective issuance of vouchers, where each person would be given a non-transferable education voucher to be used to buy education from among competing institutions (Friedman, 1962). The empirical results concerning competitive effects between private and public schools are mixed. Some find support for positive competitive effects (Couch, Shughart, and Williams, 1993 on North Carolina; Hoxby, 1994 on the United States), while other studies do not reveal significant improvement from competition (Geller, Sjoquist and Walker, 2001 on Georgia).

Peer effects also have been of interest to social scientists. In a typical model of peer effects an individual's outcome on a certain variable is affected by the average of his/her peers' outcomes on that variable. For instance, a student's reading score would be affected by the reading scores of his/her classmates. Of course, there may exist negative spillovers, such as those caused by class disruption. Externalities inherent in peer effects may not be internalized by households and direct intervention of the government may be necessary. The education literature, for example, has showed that if peer effects exist at school, then a school finance system that encourages an efficient distribution of peers

will make human capital investments more efficient (Nechyba, 1996; Epple and Romano, 1998). Similar arguments are made regarding the organization of local government, which may encourage or discourage an efficient distribution of peer effects within neighborhoods (Benabou, 1996). Peer effects also play a prominent role in arguments for and against school choice programs (Hoxby, 2000a). Given the high policy stakes, there has been considerable interest in measuring the extent of peer effects in primary and secondary education. There is now a small but rapidly growing empirical literature that attempts to gauge the impact of peers on individual student achievement in the United States. Hoxby (2000b), Hanushek et al (2003), and Stiefel, Schwartz and Zabel (2004) all exploit large administrative databases to estimate the magnitude of peer effects in American public schools, yet obtain mixed results on their significance.

The fact that most research on decentralization has been inspired by the observations on developed countries, in particular the United States, has troubled many development economists, because most political, social and financial institutions whose existence are taken for granted in those studies are often very weak in less developed countries.

The effectiveness of voice mechanisms to motivate (elected) local officials is the most frequently cited criticism (Chubb, 1985; Prud'homme, 1995; Tanzi, 1995; Litvack, Ahmad, and Bird, 1998). In many developing countries local elections are usually decided on the basis of personal, tribal, or political party loyalties. Presence of powerful local elites hinders participation of the poor to the political process. Moreover, the

decisions on how to allocate public resources or the provision (type, quantity, quality) of many public services are typically beyond the control of local governments. Local resources usually constitute a small portion of local expenditures and transfers from the central government come with many administrative restrictions. It is difficult, therefore, to assume that the voter holds local authorities responsible for the taxation, which is centralized, and the programs, which are only partially decentralized (Peterson, 1994).

Still, some empirical evidence has demonstrated that decentralization may offer promising results even under less than perfect conditions. Fiszbein (1997) based upon a review of political decentralization in Colombia concluded that competition for political office opened the door for responsible and innovative leadership that in turn became the driving force behind capacity building and improved public performance at the local level. Gray-Molina et. al. (1999) found that misuse of public funds in municipal health service providers in Bolivia declines significantly in places where citizens participate directly into the political process by attending health board meetings. A detailed study of investment sector-by-sector in Bolivia shows that decentralization reforms have increased the sensitivity of public investment decisions to local needs (Faguet, 2000). local financing, coupled with political devolution, has led to productive efficiency in countries like Indonesia and the Philippines (James, King, and Suryadi, 1996, and Jimenez and Paqueo, 1996, respectively). Porto and Porto (2000) found that local elections in Argentina are not mere rehearsal of national elections and voters pay attention to the performance of local governments. Examining the local elections in India Khemani (2000) reached a similar conclusion. Finally, using a survey of public officials in Bolivia, Kaufmann, Mehrez, and Gurgur (2004) found a positive link between existence of

consumer complaint and feedback mechanisms and quality and accessibility of public services.

The constraints in the developing world against Tiebout mechanism are also daunting. The assumption of voter mobility has little relevance in developing countries, especially in rural areas. People are often less mobile due to underdeveloped credit market, and when they do move, it is usually related to job prospects, family ties, or some environmental devastation (Prud'homme, 1995; Bardhan, 1997). It is also questionable that there exist a large number of jurisdictions in less developed countries that offer a wide range of options. If exit options are limited, losing tax base would not be a credible threat to motivate public officials, even when local spending is primarily financed by local revenue sources.

Availability of alternative service providers in the private sector and the extent to its motivating effect on local governments is also questionable. For some services alternative suppliers in the private sector may simply not exist. In other cases, such as education and health care, private suppliers may exist, but their accessibility may be limited due to price or capacity considerations (e.g. see Azfar, Kähkönen and Meagher, 2001, for survey results on Uganda). Several factors may undermine the competitive pressure from private suppliers. Private schools may not be substitute for public schools due to religious, ethnic or socioeconomic considerations. There may not be sufficient private alternatives to have an impact on institutional performance. Local governments may not care about the loss of resources that comes with lower enrollments or less use of local public health clinics if their personal income and working conditions are not

affected. They may even prefer less demand for publicly provided services due to overcrowding and capacity constraints.

The exit option may even have adverse effects on local governance, if that option is only available to the wealthy. Public choice literature has long recognized that people's willingness to participate in political initiatives (such as contacting or petitioning of elected representatives and bureaucrats, attending official and unofficial meetings, public protests, etc.) and community activities (e.g. participation in design, construction or operation of public projects or services, or involvement in quasi-formal organizations, such as local councils, teacher-parent associations, etc.) varies according to their perception of how much benefit they would receive from their effort (Hirschman, 1980; North, 1990, Leighley, 1995). When some groups, typically the wealthy, exit the public system by switching to a private alternative, they no longer support the funding of publicly provided services or involve in community based initiatives to improve their quality. Yet, there is an emerging literature that highlights how critical community participation is in improving the quality of public services in many developing countries (e.g. Putnam, Leonardi, and Nanetti, 1993, on Italy; Isham, Narayan, and Pritchett, 1995; Sara and Katz, 1998, on India; Isham and Kähkönen, 2002, on India; Alatas, Pritchett, and Wetterberg, 2002, on Indonesia).

Moreover, availability of an exit option in some services may distort allocative efficiency of public resources and cause incidence bias in favor of the wealthy and well-connected. Wealthy individuals staying in the public system would support the allocation of more resources on public services they use, such as tertiary education or curative care as opposed to public services they do not use, such as primary education and public

health goods (e.g. immunizations, health education, family planning). Evidence of this phenomenon is reported by Schwartz, Racelis, and Guilkey (2000) and Jeppsson (2001) on Uganda, by Birn, Zimmerman, and Garfield (2000) on Nicaragua, and by Akin, Hutchinson, Strumpf (2001) on the Philippines. As a result the public spending in many developing countries is skewed heavily in favor of public services used by the top income quintile (World Bank, 2003). This bias is even more prevalent in countries with high income inequalities (Gradstein, 2003).

Another challenge facing developing countries is widespread corruption and mismanagement in the public sector, which distorts both the allocation of public resources and their efficiency. In fact, the lack of a robust relationship between public spending and outcomes reported in the literature (e.g. Hanushek, 1995 across developing countries; Hanushek, 1996 on the United States; Filmer and Pritchett, 1999 on India) may be due to differences in the efficacy of spending stemming from corruption in local governments (Pritchett, 1996). Decentralization, particularly in the absence of well-functioning democratic mechanisms, could lower local citizen welfare through a higher degree of corruption or "leakage" of resources (Prud'homme, 1995; Collins and Green, 1994; Bardhan and Mookherjee 2001 and 2002; Gurgur and Shah, 2003; Azfar and Gurgur, 2004). This creates a vicious cycle in less developed countries suffering from widespread corruption in the public sector: corruption hinders the quality, quantity, and accessibility of publicly provided services. That, in turn, pushes the wealthy to the private alternatives and leaves the poor as the only constituents who have a stake in local governance but with little influence over local politicians. As the civic control over local governments weakens, corruption in public offices becomes even more pervasive. Such a

cycle is less likely to be observed in developed countries, where Tiebout's "voting-by-feet" functions relatively well (thereby keeping redistributive politics in check) and local politicians are more sensitive to the electorate (so that the plea of the poor for more/better public services is more likely to be heard).

To the best of our knowledge only Reinikka and Svensson (2001) have linked, albeit implicitly, the poor performance of public schools to the flight of wealthy households to private schools. They introduced a model to explain how households and teachers in public schools form parent-teacher associations and bargain with the district bureaucracy to minimize the leakage of funds in their school budget. The amount of public funds reaching public schools depends on the bargaining strength of the school, which in turn depends on the wealth of parents. Empirical results from a survey of public primary schools in Uganda showed that schools with relatively wealthy parents are more likely to afford the costs of acquiring information and initiating protests. As a result these schools are more successful to prevent leakage of funds.

The public finance literature, in particular the literature on fiscal federalism, has shed light on various mechanisms that shape the allocation of publicly provided services – ranging from Tiebout's voting-by-feet, Niskanen's budget maximizing bureaucrat, interjurisdictional competition, electoral preferences (represented by the median voter) the influence of special interest groups, and so on. Existence of some, if not most, of thee institutions is questionable in less developed countries. This does not necessarily rule out the relevance of the current literature, but necessitates new studies to advance our understanding of the political economy of publicly provided services in less developed nations.

Chapter 3

The Model

3.1 Introduction

In the last two decades many countries have shifted provision, supervision, resource allocation and funding decisions of many publicly provided services from central to local governments. Whatever the real driving force, almost all decentralization reforms have been applauded by academics, international donors, and pundits on the grounds that they would improve the well-being of the people by empowering local voters to change the kind, quantities and qualities of the public health services they receive from their local authorities.

In spite of the strong faith placed in decentralization, recent studies have suggested that decentralization, if undertaken without sufficient planning or strengthening of appropriate institutions, may lead to outcomes that are potentially worse than centralized systems, leading instead to fragmented planning, inadequate consideration or funding of recurrent expenditures, local capture, or under-provision of certain types of services (Akin et al. 2000, Jeppsson 2001, Schwartz et al. 2001).

In this chapter we aim to highlight two fundamental problems inherent in decentralization process. First, even if local communities are empowered, this may not necessarily guarantee that empowerment of each individual occurs at the same time – some individuals may end up with capturing more influence than others. “Bringing the

government closer to the people" (the premise of decentralization) reduces the "barrier of entry" that separates politicians and special interest groups and makes it easier to get connected with the public officials. Thanks to their wealth, education, and personal status in the community, the rich can more easily pay "the fixed cost" to establish such connections and influence government to advance their interests.

Another potential problem is that the power may not be transferred solely to people who have a stake in good governance – certain groups may be able to isolate themselves from mismanagement of local governments, reducing incentives to hold public officials accountable for their misdeeds. When publicly provided goods are not of high quality, the rich usually have the financial power to turn to private market provided that they can find (perfect) substitutes (such as private schools over public schools, private health care providers over public ones). Having shielded themselves from the public sector, they would neither care about mismanagement in local governments nor be involved in community-based initiatives to improve the quality of public goods. That leaves the poor as the sole user of public services and the only constituent with a stake in local governance. Migration of the rich to the private market weakens the influence of citizen voice over politicians, because these individuals are usually the only ones with enough political and financial clout to make their voice heard in the political arena.

Comparing the implications of the model with existing literature, the most striking contrast is in the impact of private institutions. Empirical studies on developed countries have focused on how private competition improves productive efficiency, especially in the public schools (e.g. Couch, Shughart, and Williams, 1993; Hoxby, 1994, among others). Our model, on the other hand, suggests that private alternatives may have adverse

effect on local governance by shielding the local elite from the public sector, especially if Tiebout mechanism is ineffective and local elections do not reflect popular preferences so that corrupt politicians have little to suffer either politically or financially.

Our model highlights two conditions for the success of decentralization reforms: (i) effective oversight – in the form of hierarchical accountability mechanisms or citizen voice – to prevent the capture of local governments by special interest groups, and (ii) establishing institutions that spread the costs and/or benefits of governance over the society so that everyone has a stake in the success of local governments. Those institutions may be in the form of local revenue mobilization (e.g. use of income tax or property tax rather than transfers from central government to finance public services) or subsidies to the poor that help them to use "exit" mechanisms (e.g. school vouchers or public health insurance that subsidize the use of private health-care providers if public facilities are not accessible or fail to provide services at desired quality). The rich would voice their discontent, only if they have a stake in good governance. This might happen if (i) they are the users of public goods, or (ii) they (partially) finance the cost of corruption. We also show that even then their activism would be limited, because the benefits they receive through their political connections partially shield them from the perils of corruption.

3.2 Theoretical Model

In this chapter, we introduce a probabilistic voting model used by Grossman and Helpman (1994) to characterize the allocation of publicly provided services as a political process. Local politicians seek to maximize their expected number of votes, where the probability of a voter's support is a function of the utility (s)he derives from the policies

adapted, including the quality of publicly provided services and the local tax rate. One important aspect of the model that sets itself apart from its counterparts (such as Epple and Romano, 1996; Glomm and Ravikumar, 1998) is the explicit modeling of local capture and its implications. The local elites exert pressure on local governments so that instead of allocating resources on publicly provided services, politicians divert resources to certain groups. In return, politicians receive direct kickbacks or support from clientele networks that are controlled by the local elites, which are also very common in less developed nations.

Previous models explaining the allocation of public funds among various services were centered around the preferences of the electorate, in particular the median voter who casts the decisive vote. One complication with dual provision is that preferences are not single peaked owing to the presence of private alternatives (Stiglitz, 1974). The implication of non-single-peakedness is that a voting equilibrium may not exist, and, if an equilibrium does exist, the standard approach (invocation of the median-voter theorem) does not generally apply to characterize that equilibrium (Epple and Romano, 1996; Glomm and Ravikumar, 1998). In contrast, in our model the objective of a politician is transformed into maximization of (weighted) sum of voters' welfare and the support received from the special interest (Bardhan and Mookherjee, 2000). A convenient feature of this model is that it allows a precise and simple identification of the policy choice at equilibrium and the degree of local capture.

We do not consider voting-by-feet, either by the poor or the non-poor, in the model, since its relevance in developing countries is questionable. We also assume that local governments do not feel any competitive pressure from the private sector due to

capacity constraints. Private alternatives, however, are included in the model as an exit option available to the wealthy.

Consider an economy with two goods: money X_1 and non-monetary good X_2, which can be thought as education, health services, transportation, etc., that is, the goods that are typically provided by the private sector as well as the public sector. The non-monetary good is provided by the government for free, but it can also be purchased from the private market at any desired quality at a unit price of p. Let Q and G denote the quality of non-monetary good provided by the private sector and the public sector, respectively. The utility of a person is $U(x_1, x_2) = x_1 + u(G)$ if she consumes the publicly provided non-monetary good, and $x_1 - pQ + u(Q)$ if she opts for the private market[7].

The population of the community is defined over [0,1] continuum and involves two classes of people: the poor and the non-poor (class p and class r, respectively), where $0<\theta<1$ represents the proportion of the non-poor. The money the poor have only covers the subsistence requirement and consequently, they have no access to the private market. For simplicity we normalize their income to zero. A non-poor person, on the other hand, has excess income y to spend on non-monetary good. The probability distribution of their

[7] In some cases dual-provision of goods or services allows individuals to use both the public system and the private system simultaneously. One can send his/her children to a public school while hiring private tutors in off-school times; or use public hospitals for preventive care and private hospitals for personal care. Some individuals may also benefit from the services provided by the public sector, although they never use them. For example, an efficient public transportation system reduces congestion and improves transportation for users of private automobiles. For simplicity, we assume that households can choose either the private sector or the public sector, but not both and that any positive externality, if exists, is negligible.

income is described by function $F(y)$ with support $\left[\underline{y}, \bar{y}\right]$.

The non-poor opt for the private alternatives if the publicly provided good is not of high quality, that is, $G \le Q^*(y,p)$, where $Q^*(y,p) = \arg\max_{y \ge pQ} \{y - pQ + u(Q)\}$.

Accordingly, the demand for the public good by the non-poor is a function of the quality of the public good and the price of the good at the private market:

(1) $D(p,G) = P(y \le Q^{-1}(p,G)) = F(Q^{-1}(p,G))$ where $\frac{\partial D}{\partial G} \ge 0$ and $\frac{\partial D}{\partial p} \ge 0$.

The task of providing the public good to the community is delegated to a local public office led by a politician. We equate the quality of public goods with spending-per-capita instead of spending-per-user and assume that raising the quality by one unit costs p dollars in the public sector, the same as the private sector. This specification rules out the change in the quality of public goods as response to change in demand. It is more justified when the production function involves fixed costs that dominate the per-user cost. Later, we look at the case where quality is proportional to the spending-per-user and discuss its implications.

The politician receives funding from the central government in the amount of T dollars per capita which is enough to ensure that the quality of the public good can be set at its efficient level G^* and be available to the whole community, that is, $u'(G^*) = p$ and $T = pG^*$. The local public office has no taxing authority; it has no other source of revenue, and is required by law to balance the budget. We later discuss the implications of local financing.

In this model corruption occurs if the politician uses (some portion of) public funds for the benefit of specific individuals rather than providing publicly provided goods

to the whole community. Although corruption hurts productive efficiency in the public sector as well as allocative efficiency, we did not consider this explicitly to keep the model simple.

A person can influence the politician only if (s)he has an established connection with her. To establish a connection one needs a certain amount of "political capital", denoted by *K*, which can be thought as financial wealth, acquaintance with friends/relatives in prominent positions, name recognition, personal status, social networks and such. The political capital is assumed to be of no private use to a person, other than establishing political connections. The cost of connection, which can be seen as a payment to an intermediary, is denoted by λ and paid in the form of political capital. Due to this fixed cost, political connection is feasible for only those with $K \geq \lambda$. For the moment, we simply assume that only the non-poor have enough capital to establish a connection with the politician. Later, we relax this assumption.

Non-poor households with similar income levels join their forces to form lobby groups and seek public subsidy by influencing the politician through bribe payments. There is a vast literature on collective action and group formation starting with Olson (1965). We, however, simply assume that the number of groups formed by the non-poor is fixed at $N \geq 1$, that each group has equal number of members, that each member within a group shares equally the subsidy and bribe payments, and that membership is solely based on income level. Thus, lobby *j* consists of 1/*N* of the non-poor whose income is in the range of $[y_j, y_{j+1}]$ with $F(y_{j+1}) - F(y_j) = 1/N$, where $y_1 = \underline{y}$ and $y_N = \overline{y}$. Let Z_j and

B_j be the total subsidy received and the bribe paid by group j, respectively[8].

The strategies of the lobby groups are modeled as contingent bids: an offer of a bribe $B_j(\mathbf{Z})$ in return for a particular policy $\mathbf{Z}=(Z_1,\ldots,Z_N)$ – the level of subsidy provided to each group. The politician chooses a policy $\mathbf{Z}$ and collects the bribes promised from each party. Her budget constraint is

$$(2) \qquad T = pG + \sum_{j=1}^{N} Z_j$$

The politician weighs a number of objectives in reaching her decision, including bribes she receives and the welfare of the community, which is described as the sum of welfare (indirect utility) of all individuals. The indirect utility V_p of the poor is simply $u(G)$. The gross welfare (excluding bribe payment) of the non-poor i (in lobby j) is:

$$(3) \qquad s_i(\mathbf{Z}) = y_i + z_j + \max_{y_i+z_j \geq pQ} \{u(G), u(Q) - pQ\} \quad y_i \in \left[y_j, y_{j+1} \right)$$

where z_j is the amount of subsidy received by that person. His/her net welfare is $v_i(\mathbf{Z}) = s_i(\mathbf{Z}) - b_i(\mathbf{Z})$, where $b_i(\mathbf{Z})$ represents his/her bribe payment. Hence, the indirect utility function of lobby j takes the form $V_j(\mathbf{Z}) = S_j(\mathbf{Z}) - B_j(\mathbf{Z})$, where

$S_j(\mathbf{Z}) = \int_{y_j}^{y_{j+1}} s_j(\mathbf{Z}) dF(y)$ and $B_j(\mathbf{Z}) = \int_{y_j}^{y_{j+1}} b_i(\mathbf{Z}) dF(y)$.

The political objective function can then be written as

$$(4) \qquad W = B(\mathbf{Z}) + \alpha V(\mathbf{Z})$$

where $B(\mathbf{Z}) = \sum_{j=1}^{N} B_j(\mathbf{Z})$ is the total bribe receipts, and $V(\mathbf{Z}) = \theta \sum_{j=1}^{N} V_j(\mathbf{Z}) + (1-\theta) V_p(\mathbf{Z})$

[8] We use capital letters for lobbies and small letters for individuals. When a symbol is in bold, it represents the vector of symbols (over lobbies).

is the social welfare generated by the policy. The parameter α measures the extent the politician cares about social welfare *vis-à-vis* her bribe receipts.

3.3 Solution

The theoretical model we describe above is known as a *common agency problem* in the literature, where several principals compete with each other to influence a single agent to take an action that benefits them but is costly to the agent. This problem can also be seen as a menu auction where bidders name a menu of offers for the various possible actions available to the auctioneer and then pay the bids associated with the action selected. Bernheim and Whinston (1986) characterized the political equilibrium for such two-stage non-cooperative game.

PROPOSITION 1: $\left(\mathbf{B}^0, \mathbf{Z}^0\right)$ *is a subgame-perfect Nash equilibrium of the game if and only if*

(i) B_j^0 *is feasible for j = 1,...,N and* $\mathbf{Z}^0$ *is feasible for the manager.*

(ii) $\mathbf{Z}^0$ *maximizes* $W = B(\mathbf{Z}) + \alpha V(\mathbf{Z})$.

(iii) $\mathbf{Z}^0$ *maximizes* $V_j(\mathbf{Z}) + W$ *, the joint objective functions of the politician and lobby j (j =1,...,M).*

(iv) There exists another policy $\mathbf{Z}^j$ *for each lobby j for j =1,...,N from which the politician receives the same utility and campaign donation by that lobby is zero.*

Proof: The first condition implies that bribe cannot be negative or larger than the illicit benefit obtained and that the amount of budget diverted to lobbies may not exceed the available budget. The second and third conditions come from the sub-game perfectness of

Nash equilibrium. The fourth condition states that the politician is left indifferent between including a lobby and assuming it will not contribute at all, forming policy on the basis of the remaining groups. The players offer to contribute just enough to ensure the auctioneer does not switch to a policy in which they have had no influence and which consequently might be very costly for them. In other words, if lobby *j* does not pay any bribe, then the politician chooses policy $\mathbf{Z}^j$ and receives the same utility she would get by choosing $\mathbf{Z}^0$ in exchange for B_j^0.

PROPOSITION 2: *A subgame-perfect Nash equilibrium, which is truthful*[9]*, stable*[10] *and unique always exists.*

Proof: A large number of strategies may satisfy the four conditions specified in Proposition 1. Bernheim and Whinston (1986), however, showed that we can restrict our attention to a class of equilibria that involve truthful strategies, since such strategies always exist and every best response correspondence contains a truthful strategy. Furthermore in situations where nonbinding communication is possible among players, they are the only *stable* equilibria, i.e. coalition- proof. Even if some bidders have the option to communicate with other bidders, they cannot arrange a stable and mutually preferable joint deviation.

Grossman and Helpman (1994) showed that if bribe function is differentiable, at least around the equilibrium policy $\mathbf{Z}^0$, then a locally truthful strategy implies that the

[9] A strategy is truthful if a player's announced bid for changing existing policy to another is exactly equal to the difference between his/her gross payoffs from these policies.

[10] An equilibrium is stable (or coalition-proof) if a subset of individuals cannot arrange a stable and mutually preferable joint deviation in the absence of legally binding agreement.

marginal change in policy matches the change in the gross welfare of lobby *j*:

(5) $\nabla B_j^0(\mathbf{Z}^0) = \nabla S_j(\mathbf{Z}^0)$ for $j = 1,\ldots, N$

A bribe schedule is truthful if we can extend (5) for all policy alternatives. Truthful contribution schedules induce the government to behave as if it were maximizing a social welfare function that weights the *gross-of-bribe* welfare of the interest groups at $(1+\alpha)$ and the welfare of unorganized households at α. Substituting (5) into the third condition in Proposition 1 we get the optimization problem of the politician:

(6) $$\mathbf{Z}^0 = \underset{Z_1,\ldots,Z_N}{\arg\max}\left[(1+\alpha)\theta\sum_{j=1}^{N} S_j(\mathbf{Z}) + \alpha(1-\theta)V_p(\mathbf{Z})\right]$$

The next proposition describes the subsidy level provided to each lobby and the amount of bribe paid to the politician:

PROPOSITION 3: *The policy* $\mathbf{Z}^0 = (Z_1^0,\ldots,Z_N^0)$ *chosen by the government is* $\left(Z_j\right)_{j=1}^{N} = Z^0$. *Moreover, at equilibrium* $\mathbf{Z}^0$*, each lobby offers the same the bribe scheme:*

(7) $$B_j(\mathbf{Z}^0) = \frac{\alpha\left[V(0) - V(\mathbf{Z}^0)\right]}{N} \quad \textit{for } j=1,\ldots,N$$

Proof: Since the lobbies are identical with respect to their size, preferences, and the political capital they possess, they would offer the same payment to the politician (i.e. $B_j = B$ for $j=1,\ldots,N$) and receive the same amount of subsidy (i.e. $Z_j = Z$ for $j=1,\ldots,N$). To see (7), note that the fourth condition in Proposition 1 implies that bribe offered by a lobby at equilibrium is the one that makes the politician indifferent between choosing that policy and the policy that would emerge if the lobby does not offer any bribe. Since the total loss of social welfare due to budget diversion is $V(0) - V(\mathbf{Z}^0)$, that loss is shared by each lobby equally through payments to the politician so that the politician is indifferent

between $\mathbf{Z}^0$ and no-corruption equilibrium.

Next, we describe the solution of the game.

PROPOSITION 4: *The policy* $\mathbf{Z}^0 = (Z_1^0, ..., Z_N^0)$ *chosen by the government satisfies the following conditions:*

$$(8) \qquad u'(G^0) = \frac{p}{m(p, G^0, Z^0)}$$

where $m(p, G^0, Z^0) = \theta D(p, G^0, Z^0) + \frac{\alpha}{1+\alpha}(1-\theta)$ *represents the portion of the public using publicly provided goods, weighted by their relative importance as perceived by the politician,* $D(p, G^0, Z^0) = P(y_i \le y^*(p, G^0, Z^0))$ *is the demand for the public goods by the non-poor who earn less than*

$y^*(p, G^0, Z^0) = \min\left\{ y_i : \arg\max_Q \left\{ y_i + z^0 - pQ + u(Q) \right\} \ge G^0 \right\}$, *and* z^0 *is the subsidy received by a non-poor person,*

$$(9) \qquad T = pG^0 + NZ^0$$

provided that the bribe function $B_j(\mathbf{Z})$ *for j=1,...,N is at least locally differentiable around the optimal policy* $\mathbf{Z}^0$ *and that* $Z^0 \ge B_j(\mathbf{Z}^0)$.

Equation (8) shows that the quality of public goods at equilibrium may be lower than its first-best level G^* due to two factors: First, the welfare of the poor is not fully incorporated into the objective function of the politician. It has a weight of $\frac{\alpha}{(1+\alpha)}$ which is less than one. Secondly, some portion of the non-poor may exit the public system and opt for purchasing the good from the private market. This would happen if (i) the publicly provided good is not of high quality, (ii) the price of the good at the private market is low

so that it is affordable and/or (iii) the subsidy received by the non-poor allows them to purchase the good from the private alternative. In that case the users of public goods do not cover the entire population.

As long as the importance of social welfare (represented by α) is finite, some portion of the public budget would be diverted to benefit the few, and the funding for public goods would fall short of its-first best level. On the other hand, it is possible to attract the non-poor to the public system by offering public goods at a quality below the one available in the private market, i.e. $G^* < G \leq \bar{G}$, where $\bar{G} = Q^*(\bar{y}, p) = \arg\max_{\bar{y} \geq pQ} \{u(Q) - pQ\}$. In this case, all non-poor individuals would prefer to use the publicly provided good. The reason they choose to stay in the public system is the loss in purchasing power due to rejecting an entitlement from the government. Therefore, as long as $G^0 \geq \bar{G} = Q^*(\bar{y}, p)$, the non-poor stay in the public system despite receiving low quality goods from the government. If, for some reason (such as inadequate funding or mismanagement) other than corruption, the government fails to raise the quality of public services to the level available in the private market, the non-poor may stop using public goods and the government would be forced to lower the quality of public goods even further, since they do not benefit the whole society.

Another implication of Proposition 4 is that the proportion of non-poor individuals using public goods affects the amount of budget diverted, i.e. corruption. The more they care about public goods as consumers, the more the politician has to take into account their concerns and allocate public funds accordingly. This does not completely eradicate corruption, but at least reduces it.

3.4 Equilibrium with No Fixed Cost in Production Function

A legitimate question is whether the implications of the model is robust to "the production function, i.e. the link between public spending and the quality of publicly provided services. What happens if the fixed cost is negligible so that quality is proportional to the per-user spending, rather than total spending?

Let's assume that the quality of publicly provided goods takes the form $G = \frac{T}{Mp}$, where T is the amount of public funds spent on publicly provided services and M represents the portion of the community using these services, where $M(p, G^0, Z^0) = D(p, G^0, Z^0)\theta + (1-\theta)$. Then, the first-best quality level in the absence of local capture is:

$$(10) \quad u'(\bar{G}) = p\left(1+\eta_G(\bar{G})\right)$$

where $\eta_G(\bar{G}) = \left.\frac{dM/M}{dG/G}\right|_{G=\bar{G}}$ represents the quality elasticity of demand (of the non-poor) for publicly provided goods at $G = \bar{G}$. Since raising the quality of publicly provided goods attracts households back to the public sector, the government has to consider the extra cost of maintaining the quality level. If there were no private alternative, then $\eta_G = 0$ and consequently, $u'(\bar{G}) = p$.

When local capture is considered, the decision rule changes as follows:

$$(11) \quad u'(G^0) = p\left(1+\eta_G(G^0)\right)\frac{M(p, G^0, Z^0)}{m(p, G^0, Z^0)}$$

where $m(p, G^0, Z^0) = D(p, G^0, Z^0)\theta + \frac{\alpha}{1+\alpha}(1-\theta)$ represents the portion of the public using publicly provided goods, weighted by their relative importance as perceived by the

politician. Since the politician is more concerned about the welfare of the non-poor, the relative importance of the poor, $\frac{\alpha}{1+\alpha}$, is less than one. Thus, $M(p, G^0, Z^0) > m(p, G^0, Z^0)$ and the politician allocates less resource on publicly provided goods. Consequently, when some portion of the non-poor population chooses the private alternative, the politician would cut publicly provided services more than what is justified by the drop in demand. In other words, although exit of the non-poor to the private alternative would increase per-user spending, the politician would not hold total spending constant – in fact, the cuts would be so significant that per-user spending in equilibrium would fall, reducing the quality of publicly provided services and hurting the poor.

3.5 More on Financing of Public Services

Up to this point we have assumed that the cost of public services is financed through the funds received from the central government. In this section we consider local financing instead, but maintain the assumption that the local government has to balance the budget.

For simplicity let's assume a flat-rate head tax T is imposed on the community. The budget constraint of the local government is the same as (2) except T denotes the local tax rather than the funding received from the central government. Again for simplicity we assume that both the non-poor and the poor pay taxes, which means that the income of the poor covers both the subsistence requirement and the head-tax. Since in the absence of any deadweight loss there would be no limit on the amount of transfers to the non-poor, we assume that the tax burden of a person, denoted as $c(T)$, is larger than

his/her tax payment T, i.e. $c(T) > T$ and $c'(T) \geq 1$. This extra tax burden can also be seen as inefficiency inherent in government activities.

The gross welfare of a non-poor person i (in lobby j) becomes

$$(12) \qquad s_i(\mathbf{Z}) = y_i - c(T) + z_j + \max_{y_i - c(T) + z_j \geq pQ_i} \{u(G), u(Q_i) - pQ_i\} \quad y_i \in \left[y_j, y_{j+1}\right)$$

PROPOSITION 5: *The policy* $\left(\mathbf{Z}^0, T^0\right)$ *chosen by the government implies* $\left(Z_j^0\right)_{j=1}^N = Z^0$ *and it satisfies the following conditions:*

$$(13) \qquad u'(G^0) = \frac{p}{m(p, G^0, Z^0, T^0)}$$

where $m(p, G^0, Z^0, T^0) = \theta D(p, G^0, Z^0, T^0) + \frac{\alpha}{1+\alpha}(1-\theta)$ *represents the portion of the public using publicly provided goods, weighted by their relative importance as perceived by the politician,* $D(p, G^0, Z^0, T^0) = P\left(y_i \leq y^*(p, G^0, Z^0, T^0)\right)$ *is the demand for the public goods by the non-poor who earn less than*

$y^*(p, G^0, Z^0, T^0) = \min\left\{y_i : \arg\max_Q \left\{y_i + z^0 - pQ - c(T) + u(Q)\right\} \geq G^0\right\}$ *and* z^0 *is the subsidy received by a non-poor person,*

$$(14) \qquad c'(T^0) = \frac{1}{\theta + \frac{\alpha}{(1+\alpha)}(1-\theta)}$$

$$(15) \qquad T^0 = pG^0 + NZ^0$$

provided that the bribe function $B_j(\mathbf{Z})$ *for* $j=1,\ldots,N$ *is at least locally differentiable around the optimal* $\mathbf{Z}^0$*, that* $T^0 \leq \underline{y}$*, and that* $Z^0 \geq B_j(\mathbf{Z}^0)$.

Interestingly, taxing local community, instead of using funds from the central

government, does not change policy formulation for the public goods. The difference is on the size of transfers to the non-poor. Previously, the politician diverted the funds net of expenditures on public services to the special interest. Now, the size of transfers is a separate decision variable, whose level depends on the deadweight loss of taxation. The leakage in public funds increases the size of government, which has to be financed by taxes imposed on the community. The increase in the tax burden causes a backlash among the society and discourages the politician to expand transfers to the non-poor, which, in turn, reduces the ability of those individuals to use private alternatives.

3.6 More on Political Connection

So far we have assumed that the poor have no means to influence the politician. In this section we relax this assumption. Let K_i denote the capital possessed by individual *i* of class *j=p,r*, where $f^r(K_i, y_i)$ and $f^p(K_i)$ represent the (joint) probability density function of the non-poor and the poor respectively. We use C^j to denote the proportion of group *j*, who have the means to contact the politician: $C^j = \{K_i \geq \lambda \mid i \in j\}$, *j=p,r*. For simplicity, we assume that the poor do not afford the private alternatives even after receiving subsidy (if any) from the government and that only a single lobby group is formed by the poor and by the non-poor, respectively, provided that they have access to the politician.

PROPOSITION 6: *The policy* $\mathbf{Z}^0 = (Z_p^0, Z_r^0)$ *chosen by the government is* $Z_p^0 = Z_r^0 = Z^0$ *and it satisfies the following conditions:*

$$(16) \qquad u'(p, G^0, Z^0) = \frac{p}{m(p, G^0, Z^0)}$$

where

$$m(p,G^0,Z^0)=\theta\left[n_1(C^r)+\frac{\alpha}{(1+\alpha)}n_2(C^r)\right]D(p,G^0,Z^0)+(1-\theta)\left[n(C^p)+\frac{\alpha}{(1+\alpha)}(1-n(C^p))\right]$$

is the importance of public service users in the politician's objective function,

$n_1(C^r)=\left[F^r(\bar{K},y^*)-F^r(\lambda,y^*)\right]\theta$ *is the proportion of the influential (i.e. endowed with political ties) non-poor that uses public services,* $n_2(C^r)=F^r(\lambda,y^*)\theta$ *is the proportion of the non-influential non-poor that uses public services,*

$D(p,G^0,Z^0)=P(y_i\le y^*(p,G^0,Z^0))$ *is the demand for the public goods by the non-poor who earn less than* $y^*(p,G^0,Z^0)=\min\left\{y_i:\arg\max_Q\left\{y_i+z^0-pQ+u(Q)\right\}\ge G^0\right\}$, z^0 *is the subsidy received by a non-poor person, and* $n(C^p)=\left[1-F^p(\lambda)\right]$ *is the proportion of the poor with influence over the politician,*

$$(17)\qquad T=pG^0+\theta n(C^r)Z_r^0+(1-\theta)n(C^p)Z_p^0$$

provided that the bribe function $B_m(\mathbf{Z})$ *for* $m\in p,r$ *is at least locally differentiable around the optimal policy* $\mathbf{Z}^0$.

Since $n(C^p)$, the proportion of the poor who have access to the politician, is a function of the entry cost λ, reducing the entry cost increases involvement in the "market of corruption". Although this accessibility increases the influence of special interests over the politician, it also makes the politician be more concerned about the welfare of the poor (at least for those who have political connection, i.e. $i\in C^p$), because their welfare affects their bids. Accordingly, the weight of these individuals increases from $\frac{\alpha}{(1+\alpha)}$ to one – the same weight as the non-poor. Other poor individuals with no access to the

politician also benefit, because they use the same public good. Consequently, the level of the public good at equilibrium is higher and the total amount of budget diverted is lower when the poor have access to the politician.

What happens if the non-poor have limited access to the politician? If those individuals who lose their connection are not among the user of public goods, restricting their access does not change the level of corruption (i.e. the amount of budget diverted). The money previously distributed to those individuals would simply be shared among other influential individuals. If they do use public goods, when they lose their influence over the politician, the quality of public goods suffers as well, because the politician stops paying attention to their welfare, including the quality of public goods they use.

In summary, bringing governments closer to the people would be beneficial for the whole society. It allows the poor to organize and exert pressure on the government. This, in turn, reduces the leakage in public funds and creates enough savings both to reduce tax rate and to increase the provision of public goods.

3.7 More on Voice Mechanisms

Up to this point, the importance of social welfare in the politician's objective function has been captured by the exogenous parameter α. In this section we intend to endogenize this parameter.

Assume that each person has two options to use the political capital (s)he possesses. (S)he can use it to get connected with the politician and receive subsidy from the government or (s)he can invest it in voice mechanisms, such as contacting or petitioning of elected representatives and bureaucrats, attending official and unofficial meetings, participating public protests, and such. We assume that establishing connection

with the politician is probabilistic and this probability, defined as $q(\gamma)$ increases with the amount of political capital γ that one pays to the intermediary. With probability $q(\gamma)$ the connection is set and that person receives the subsidy from the government. With probability $1-q(\gamma)$ the connection fails. The expenditures on government services is financed through local revenue mobilization.

We assume that only two lobby groups are formed in the community: r_L, and r_H. The first group involves the non-poor who use public goods; the second group involves the non-poor who opt for private alternatives. Each group combines the political capital of its members and uses it to maximize the welfare of the group. The combined political capital of each group is $K^{r_L} = \theta D(G^o)K_r$ and $K^{r_H} = \theta(1-D(G^o))K_r$. Let ψ^j represent the amount of political capital devoted to voice mechanisms by group j, j= r_L, and r_H, where $\psi^j = \gamma^j - K^j$. We formulate the importance of social welfare in the politician's objective function as $\alpha = \alpha(\Psi)$, where $\Psi = \psi^{r_L} + \psi^{r_H}$.

First, we establish the effect of the parameter α on tax rates and total spending on publicly provided services:

$$(18) \qquad \frac{dG^0}{d\alpha} = \frac{-u'(G^0)\dfrac{(1-\theta)}{(1+\alpha)^2}}{u''(G^0)\left[D(G^0)\theta + \dfrac{\alpha}{1+\alpha}(1-\theta)\right] + u'(G^0)D'(G^0)\theta} > 0$$

$$(19) \qquad \frac{dT^0}{d\alpha} = \frac{-\dfrac{(1-\theta)}{(1+\alpha)^2}c'(T^0)^2}{c''(T^0)} < 0$$

Denominators are negative due to second-order conditions. When a person uses (part of) his/her political capital on voice mechanisms, not only the quality of public

goods increases but also the total tax burden of the community (i.e. the size of government) falls as well, because citizen voice reduces the amount of budget diverted to the special interest. That decrease in transfer payments more than offsets the increase in expenditures on public goods.

Next, we move to the equilibrium level of α. Since the poor, having no other alternative, transfer all their political capital on voice mechanisms, we simply assume that they do not posses any political capital. The non-poor, on the other hand, have to make a choice between stronger political ties and better community voice. The benefit of a stronger political connection is more (expected) subsidy from the government. The benefit of contributing on community voice is less tax burden and better public goods. The next two equations present the first-order conditions for each group:

$$zq'(\gamma^{r_L}) = \left[\frac{dz}{d\alpha}\left(q - c'(T)\theta\right) + \frac{dG^0}{d\alpha}\left(u'(G^0) - c'(T)p\right)\right]\alpha'(\psi^{r_L}) \quad (20)$$

$$zq'(\gamma^{r_H}) = \left[\frac{dz}{d\alpha}\left(q - c'(T)\theta\right) + \frac{dG^0}{d\alpha}\left(-c'(T)p\right)\right]\alpha'(\psi^{r_H}) \quad (21)$$

Equation (20) explains the trade-off of the non-poor who use publicly provided goods, whereas equation (21) represents the trade-off of the non-poor who choose private alternatives. The terms on the right hand side of both equations are the marginal benefit of investing one unit of political capital on political connections. On the left we have the benefit of investing on voice mechanisms. The non-poor who choose private alternatives do not benefit from the improvement in the publicly provided services and, therefore, their gain from more citizen voice is lower than the non-poor who use public services.

Consequently, they invest less in citizen voice: $\gamma^{r_L} \geq \gamma^{r_H}$ [11].

The predictions of the model are consistent with Hirschman, (1980), North (1990), and Leighley (1995) who argued that people's willingness to participate in political initiatives and community activities varies according to their perception of how much benefit they would receive from their effort. There is also some evidence from less developed countries in South Asia and West Africa that indicates increased contact or petitioning of elected representatives and (to a lesser degree) of bureaucrats, when political decentralization is coupled with local financing and devolution of public service provision to local governments (Crook and Manor, 1994).

3.8 The Case for School Vouchers?

One important implication of (8) and (9) is that corruption and the quality of public services are interrelated. Corruption reduces the amount of budget allocated on public services and consequently lowers their quality. As the non-poor abandon the public services and turn to private alternatives, the proportion of the public with stakes on public services drops. In response the government further reduces the funding of public services, because the "political benefit" of providing high quality services decreases. This creates opportunity for government to divert more funds to influential individuals while keeping the size of government constant.

[11] Depending on the levels of parameters, the attractiveness of investing in political connections may be too strong to discourage any investment in voice mechanisms. Thus, it is possible that both γ^{r_L} and γ^{r_H} can be zero.

A corollary of the above argument is that if the amount of funds allocated on public services were somehow locked at its first-best level or at least its second-best level (i.e. the level that raises the quality of public services to a point that attracts the non-poor), it may be possible to reduce corruption. Can vouchers be used for that purpose?

Let's assume that the local government is required by law to subsidize the *current* users of public goods for the cost of purchasing the non-monetary good from the private market if its quality in the public sector is below a certain level. The subsidy level is set to ensure that one can purchase the non-monetary good at its first-best level, G^*. Everyone is not automatically eligible to receive vouchers – only a portion of those using public services, regardless of their income level. They are chosen by a lottery, where the probability of being selected is equal to $\beta < 1$, which is an exogenous parameter. We consider two cases: (1) Production cost entirely consists of the fixed cost, i.e. quality is proportional to total spending; and (2) production cost does not include any fixed cost, i.e. the quality is proportional to the per-user spending.

In the first case, the tax revenues would be set to finance the cost of public goods (which is pG), the cost of school vouchers (which is $\beta M(p,\beta,G,Z)pG^*$), and the cost of transfers to influential individuals (which is θZ):

$$(22) \qquad T = pG + \beta M(p,\beta,G,Z)pG^* + \theta Z$$

where $M(p,\beta,G,Z) = (1-\theta) + \theta D(p,\beta,G,Z)$ represents the proportion of *public* using publicly provided goods prior to selection of voucher receivers, $D(p,\beta,G,Z)$ is the proportion of the *non-poor* using publicly provided goods prior to selection of voucher receivers, $D(p,\beta,G^0,Z^0) = P(y_i \le y^*(p,\beta,G^0,Z^0))$ is the demand for the public goods by the non-poor who earn less than $y^*(p,\beta,G^0,Z^0)$ and

$y^*(p,\beta,G^0,Z^0)=\min\left\{y_i:\max_{y_i+z^0\geq pQ}\left\{(1-\beta)\left(u(Q)-pQ\right)+\beta u(G^*)\right\}\geq u(G^0)\right\}$. The quality of public services at equilibrium is:

$$(23)\qquad u'(G^0)=\frac{p}{(1-\beta)m(p,\beta,G^0,Z^0)}+p\beta\frac{G^*}{G^0}\eta_G(G^0)$$

where $m(p,G^0,Z^0)=\theta D(p,\beta,G^0,Z^0)+\frac{\alpha}{1+\alpha}(1-\theta)$ represents the portion of the public using publicly provided goods prior to selection of voucher receivers, weighted by their relative importance as perceived by the politician and $\eta_G(G^0)=\left.\frac{dM/M}{dG/G}\right|_{G=G^0}$ is the quality elasticity of demand (of the non-poor) for publicly provided goods.

Comparing this result with (8), the quality of publicly provided services is unambiguously lower. School vouchers reduce the proportion of public using public services. As the demand goes down, so does the support for public funding.

In the second case, the cost of public goods is $(1-\beta)M(p,\beta,G,Z)pG$, the cost of school vouchers is $\beta M(p,\beta,G,Z)pG^*$, and the cost of transfers to influential individuals is θZ:

$$(24)\qquad T=(1-\beta)M(p,\beta,G,Z)pG+\beta M(p,\beta,G,Z)pG^*+\theta Z$$

The quality of public services at equilibrium is:

$$(25)\qquad u'(G^0)=p\left(1+\eta_G(G^0)\right)\frac{M(p,\beta,G^0,Z^0)}{m(p,\beta,G^0,Z^0)}+p\beta\left[\frac{G^*-G^0}{G^0}\eta_G(G^0)-1\right]$$

In this case, the success of the voucher program depends on the relative difference between the quality of public services and the quality of services available in private alternatives, and the quality elasticity of demand, $\eta_G(G^0)$. If the non-poor individuals are

sensitive to quality of services in public schools or health facilities, the government would be better off lowering the quality of public services even further and compensate the non-poor (who have to pay for the private alternatives) by shifting funds from publicly provided services to subsidies targeting the non-poor. In that case, most of the non-poor would exit the public system. Although their departure makes public schools and health facilities less crowded, the cuts in public funds would offset any gains and in fact reduce per-user spending.

In both cases, the best voucher scheme is the most radical one: providing universal coverage that offers full compensation to anyone who prefers a private alternative over the publicly provided one. Its financial burden on public would ensure that the publicly provided service would be as good as the one available in the private sector. Although it is possible to reach a more refined conclusion using a more sophisticated model, our finding highlights the need for a system that punishes local governments instead of shifting the cost to the central government, if there is an exit to the private alternative.

3.9 Conclusion

In this chapter we present an analytical model that highlights a vicious cycle faced by many developing countries, where local governments' efforts to provide public services to their jurisdictions are usually hampered by the influence of local elites and widespread corruption. When publicly provided goods are not of high quality, the wealthy can switch to private alternatives. Their exit weakens the influence of citizen voice over politicians and reduces the popular support for the funding of publicly

provided services. Anti-corruption initiatives to improve local governance would suffer, since political connections of the non-poor partially shield them from the tax burden caused by corruption. They would have even less reason to do so, if they were not users of public goods.

Our model suggests that it is critical to create institutions that distribute the cost of "government failure" across the whole community. Those institutions may be in the form of local revenue mobilization (e.g. use of income tax or property tax rather than transfers from central government to finance public services) or public subsidies to the poor that help them to use "exit" mechanisms (e.g. school vouchers or public health insurance that subsidize the use of private health-care providers).

Chapter 4

Empirical Evidence

4.1 Introduction

In this chapter we test the implications of our theoretical model using a unique data set from detailed responses of public officials and households in the municipalities and the provinces of the Philippines.

The Philippines is a particularly appropriate case for testing our hypotheses on local capture, citizen voice, local finance, and the dual provision of health and education services in the context of developing countries for at least four reasons.

First, local government units in the Philippines have significant autonomy and responsibility in provision of basic services to communities. These services include most primary health services, disease control, operation and infrastructure of public schools and health facilities. Primary health care, in particular, is significantly devolved in the Philippines, with staff being hired, fired, and paid (according to a nationally-defined scale, and mostly with central grant funds) by the local governments. Public education, although more centralized in policy, curriculum, and personnel (almost all important administrative issues are determined by the central government, including appointments, promotions, salary scales), is still subject to local input, since almost nine tenth of the central budget is allocated on personnel salaries leaving maintenance, operations, and capital expenditures to local governments. Moreover, local governments have broad

latitude in hiring additional teachers or supplement teacher salaries using their own sources.

The second feature of decentralization reforms in the Philippines is that the responsibilities of local governments are matched with local authority to raise revenue from local sources (mostly through property taxes and business registration fees). Local governments can set tax rates within limits set by the central government. In addition there are entitlements from central government (called Internal Revenue Allocation) which constitutes almost one fourth of the central government budget. These entitlements prevent large disparities in local spending. There is a also major tax earmark for education, the Special Education Fund, which is funded yearly by some portion of the proceeds of real property taxes collected by all municipalities within the country. The use of the fund is under the control of local school boards, whose members involve both elected and appointed local officials as well as members of parent-teacher associations.

Third, the devolution of responsibilities to local governments in the Philippines is not only administrative and fiscal, but also political. Local elections are held every three years with the participation of 80-85 percent of electorates for more than 60,000 positions (governor, vice governor, provincial board member, mayor, vice mayor, town council member, and barangay captain) at the province, city, municipality, and barangay level.

In addition to institutional characteristics of the country at the local level, which permits policy and performance variation across local government units, a necessary condition for dual-provision of services is also satisfied, namely the presence of private service providers. Private education plays an important role in the Philippines, particularly at the secondary and tertiary levels. Private schools account for a substantial

share of secondary and tertiary schools (33 percent and 79 percent, respectively) and a modest share in elementary schools (7 percent) (World Bank, 2001). There are more than 1,000 private hospitals in the country with more than 50,000 beds, almost as many as the public hospitals. Almost half the population has access to private health facilities or private doctors (World Bank, 2001).

A more detailed analysis of decentralization reforms in the Philippines and the institutional setting of the country is available in Appendix A. In the next section, we highlight the hypotheses we derived from our theoretical model, link each of them to the current literature and present the empirical approach.

4.2 Hypotheses and Econometric Model

We test the implications of our theoretical model in the Philippines using 1999 Annual Poverty Indicators Survey and a unique data set, 2000 IRIS Survey, which involves detailed responses of more than 600 public officials and 1120 households in the selected 80 municipalities of the Philippines. A description of these survey instruments is provided in Appendix B.

(1) Allocation of Publicly Provided Services

The key equation in our analytical model is (13), where we link the equilibrium level of publicly provided services to local capture and redistributive politics.

$$(1) \qquad u'(G^0) = \frac{p}{m(p, G^0, \alpha, \theta, Z^0, T^0)}$$

$$\frac{\partial \Delta G}{\partial p} < 0, \ \frac{\partial \Delta G}{\partial \alpha} < 0, \ \frac{\partial \Delta G}{\partial \theta} > 0, \ \frac{\partial \Delta G}{\partial Z} < 0, \ \frac{\partial \Delta G}{\partial T} < 0.$$

where $\Delta G = G^* - G^0$ is the gap between the first-best level of publicly provided goods and the level funded by the local government,

$m(p, G^0, \alpha, \theta, Z^0, T^0) = \theta D(p, G^0, Z^0, T^0) + \frac{\alpha}{1+\alpha}(1-\theta)$ represents the portion of the public using publicly provided goods, weighted by their relative importance as perceived by the politician, $D(p, G^0, Z^0, T^0)$ the proportion of the non-poor using publicly provided goods when its quality is G^0, its price in the private sector is *p*, tax level is T^0 and the amount of leakage in public funds is Z^0, θ represents the proportion of the non-poor, and α measures the extent to which the politician cares about social surplus *vis-à-vis* her support from special interest groups.

Our model predicts that the allocation of public funds for publicly provided goods is adversely affected by the proportion of public good users (in particular, among the wealthy and the local elite), the heterogeneity within the community based on wealth (also possibly other factors such as ethnicity, religion, or demographic factors, which were not explicitly considered in the analytical model) and the amount of leakage in public funds. The proportion of local public spending funded by local taxes and the importance of citizen voice relative to local capture in the political system, on the other hand, is expected to have positive influence. To the extent that private alternatives enable the wealthy to be less dependent on publicly provided services, we also predict a negative link between viability of private option and the level of publicly provided services. Our model also implies that the proportion of the wealthy using a publicly provided service would increase with its price in the private market. Hence, if some services are more expensive than others in the private sector (tertiary education v. primary education, curative health care v. preventive care), they are more likely to push for shifting public

funds to these services.

Comparing the implications of the model with existing literature, the most striking contrast is the impact of private institutions. Empirical studies on developed countries have focused on how private competition improves productive efficiency, especially in the public schools (e.g. Hoxby, 1994 among others). There are no comparable studies on less developed countries. As far as the allocative efficiency is concerned, there is some evidence that suggests the public spending in many developing countries is skewed heavily in favor of public services (such as tertiary education and curative health care) used by the top income quintile (World Bank, 2003; also Schwartz, Racelis, and Guilkey, 2000, and Jeppsson, 2001, on Uganda; Birn, Zimmerman, and Garfield, 2000, on Nicaragua; Akin, Hutchinson, Strumpf, 2001, on the Philippines). This bias is even more prevalent in countries with high income inequalities (Gradstein, 2003). To the best of our knowledge, however, there is no study linking the political economy of funding publicly provided services to viability of private alternatives and their use by the wealthy. Our model also implies that, all else being equal, the proportion of wealthy individuals using a publicly provided service would increase with its price in the private market. These predictions are in line with aforementioned studies.

On the other hand, at least in the context of the Philippines, there is one mechanism that makes public school principals be responsive to the number of students enrolled in their schools: the teacher staffing norm used by the central government to allocate teacher positions. Teacher positions across public schools are determined by the Department of Education, Culture, and Sports and their salaries are paid from the central government budget, although local governments may hire additional teachers if they

choose. The staffing norm is based on student enrollments, more specifically the class size. A new class and consequently a new teacher is assigned for every 40 students. When enrollments decline, classes may be merged causing schools to lose teacher positions. Schools, however, resist losing teachers, because a principal's rank depends on the number of teachers in the school. This does not necessarily mean that school enrollment is a motivating factor. Principals may exert pressure on superintendents to allocate more teachers to their schools despite the decline in enrollments and then use extra teachers in non-teaching positions (World Bank 1999). Still, although we predict a negative link between private schools and public sector performance, in the context of the Philippines, there are also reasons to expect a positive feedback through Niskanen-mechanism (i.e. budget-maximizing bureaucrats) rather than Tiebout's.

Our empirical specification takes the following form:

$$(2)\quad G = \beta_0 + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + X_5\beta_5 + \boldsymbol{\beta}_{\mathbf{Z}}\mathbf{Z} + \varepsilon_1$$

where G stands for the quality or quantity of publicly provided services, X_1 is political participation (voice), X_2 is the viability of exit mechanisms, which captures (indirectly) the use of public services by the wealthy, X_3 is the degree of local financing, X_4 is the influence of special interest groups over local governments, X_5 is the degree of redistributive frictions in the community, and $\mathbf{Z}$ is the set of control variables. The equation is estimated at the province level.

We used both inputs and outputs as performance variables to measure G. The publicly provided services that we focus on are health care and education. Our input variables are (1) the number of doctors in public sector per capita, (2) the number of nurses, midwives, trained birth attendants, and other medical personnel in public sector

per capita, (3) teacher-student ratio in public elementary schools, and (4) teacher-student ratio in public secondary schools. We consider the first variable as a proxy for public spending on curative health care, whereas the second variable as a proxy for primary health care. The data on health personnel came from the Department of Health and regional field offices, whereas the data on education comes from the National Statistical Coordination Board for the 1999-2000 school year. The population estimates used to calculate health personnel per capita are based on 1995 Census-Based Population Projections reported by the National Statistical Coordination Board.

Public sector outcomes capture the decisions on budget allocation and inputs as well as some other unobservable factors, including efficiency of public sector, local conditions, and such. The output variables used in our regressions are: (1) the percentage of children (0-5 years old) immunized against hepatitis, DPT, measles/mumps/rubella and polio, (2) the percentage of student passing National Elementary Assessment Test, NEAT, and (3) the percentage of student passing National Secondary Assessment Test, NSAT. Immunization data was obtained from 1999 Demographic and Health Survey, whereas test scores at the school level are from the Department of Education, Culture, and Sports Statistical Bulletin for the 1999-2000 school year.

The choice of dependent variable used for public sector performance dictates whether to apply a production function specification or not[12]. Estimation of output variables necessitates the use of a production function, where health or education outcomes are regressed on input variables (such as doctors per capita or teacher-student

[12] A production function is a model that identifies the possible outcomes that can be achieved with a given combination of inputs.

ratio) along with household/community characteristics and institutions. Our theoretical model, however, postulates that inputs are also influenced by output variable. For example, sub par quality of education adversely affects the use of public services by the wealthy, which in turn affects the resources allocated on education. We had two options: using instruments for inputs or estimating a reduced form equation. Due to difficulty in finding legitimate instruments, we chose the second option and regressed the output variables into a set of regressors discussed below which are also the ones used to estimate input variables. For the same reason we did not use corruption as a regressor. Since it is an endogenous variable whose level is basically determined by the same variables that influence the level of publicly provided goods, we again estimated a reduced form equation.

We chose immunization as a performance measure instead of child mortality for two reasons. First, as argued by Gauri and Khaleghian (2002), immunization is a fundamental task of government, the cost of vaccines is quite low (less than 1$ per fully immunized child), and financial and technical assistance is available from international organizations. Therefore, failure to immunize the population is fundamental failure of a government. Second, child mortality rates are influenced by a variety of household characteristics and environmental factors (such as supply for safe drinking source, availability of toilet facilities, sanitary garbage disposal, climate, etc.) that are beyond the control of local government units. For education outputs we used two national tests conducted for elementary and secondary school students. NEAT is designed to assess abilities and skills of 6^{th} grade pupils in elementary schools, whereas NSAT aims to assess abilities and skills of 4th year high school students in secondary schools.

The most conventional measure of ***citizen voice*** is voter turnout, which provides a crude idea about the strength of citizen voice over local governments. Local voter turnout is reported by the Commission on Elections for 1995 local elections. Ideally, we would prefer to disaggregate voting statistics across income groups and test their significance separately. This approach, however, is not feasible due to lack of necessary data. The viability of ***exit mechanisms*** was captured in the form of having private service providers (schools and health centers) in the area. Our measure for private education (health) services is the number of private schools (health facilities) per capita. The data on the number of private schools and the number of private health facilities came from the Department of Education, Culture, and Sports and the National Statistical Coordination Board, respectively. The measure we used for ***local financing*** is local revenues per capita as reported by the 1998 Annual Financial Report of Local Governments. Local government revenues come from two sources: intergovernmental transfers (mainly in the form of Internal Revenue Allotments) and locally generated revenues (mainly property taxes and to lesser extent fees and taxes levied on businesses). At the aggregate level they have nearly an equal share in the total local government income, but there exists significant variations across local government units. We also included total local spending per capital in the model to separate the effect of local financing from the effect of government size.

The influence of special interest groups over politicians was captured by two variables. Following Bardhan and Mookherjee (2000) we assumed that the more unequal the wealth distribution is, the more likely that some individuals have means to influence local government. We created a wealth index using principal component analysis based

on the 2000 Census of Population and Housing, which provides information on housing characteristics and household assets. We measured the wealth inequality as the ratio of standard deviation of wealth index within a community to average wealth index in that community. Although one could use annual income of households for the same purpose, it is subject to more noise than wealth, since it is a flow variable as opposed to wealth, which is a stock variable.

As an indirect measure of influence of special interest groups over political process we used membership in labor unions, trade, agriculture or business cooperatives. The data provided by the 1999 Annual Poverty Indicators Survey is at the household level and allows us to match a person's membership with his/her wealth status. Using the wealth index we created from the 1999 Annual Poverty Indicators Survey, households were grouped into "poor" and "non-poor". We ranked the households in descending order based on the wealth index. The poor involve households in the 0-33 percent, whereas the non-poor involve households in the 33-100 percent. Although it was also possible to form groups based on the median, we did not choose this approach and preferred to classify "the middle class" as a part of the non-poor group, since they are likely to have access to private alternatives as well. We calculated average membership rate for each group and included both variables in the regressions.

Redistributive conflicts can also occur or be exacerbated along ethnic or demographic lines as shown by Rubinfeld and Shapiro (1989), Alesina, Baqir, and Easterly (1997), and Poterba (1997, 1998). Therefore, we included an index of ethnic

fractionalization and the proportion of elderly population (60 years of age or older[13]) to capture these factors. The ethnolinguistic fractionalization variable was computed as one minus the Herfindahl index of ethnolinguistic group shares, and reflected the probability that two randomly selected individuals from a population belonged to different groups[14]. The data for both variables were obtained from the 2000 Census of Population.

Finally, as ***control variables***, we used the rate of urbanization[15], prosperity of the community, population density, and price level. These variables capture differences in taste, cost of production, and potential unobservable factors. We also included the percentage of population under 15 years of age as a proxy for demand in the immunization equation. To determine the prosperity of a local community we used the wealth index created from 2000 Census of Population and Housing. We do not have any data on the cost of health or education (relative to the price of other goods in the community). Ideally, we would prefer to have teacher or health personnel salaries to measure price differences across communities, since both health and education services are labor-intensive and personnel expenditure constitutes a major portion of health and education budgets. Fortunately, in the Philippines teacher salaries are standardized

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[13] Studies on developed countries commonly use 65 years of age as a cut-off point. We, however, use a lower number, due to differences in life expectancy between developed and developing countries.

[14] The exact formula is $1-\sum_i s_i^2$ where s_i is the share of group i in the jurisdiction.

[15] In the Philippines, "urban" areas fall under the following categories: (1) have a population density of at least 1,000 persons per square kilometer, (2) at least six establishments (commercial, manufacturing, recreational and/or personal services), (3) at least three of the following: town hall, church, public plaza, market place, or public building.

throughout the country at a fixed rate regardless of school location, merit or experience. Therefore, we used consumer price index at the province level to measure the price level of non-education goods/services in 2001. The inverse of the cost price index is a proxy of education costs. The data is obtained from the National Statistics Office of the Philippines.

(2) Involvement in Voice Mechanisms and Community Initiatives

Equations (24) and (25) in Chapter 2 linked the parameter α to voters' involvement in voice mechanisms and showed that the flight of the wealthy is also harmful for the effectiveness of citizen voice over local governments:

(3) $$\psi = f\left(u(G), qZ, T, y\right)$$

$$\psi\big|_{u(G)>0} > \psi\big|_{u(G)=0},\ \frac{\partial\psi}{\partial q} < 0,\ \frac{\partial\psi}{\partial Z} < 0,\ \frac{\partial\psi}{\partial T} > 0,\ \frac{\partial\psi}{\partial y} < 0$$

where ψ represents the amount of political capital devoted to voice mechanisms, $u(G)$ is the utility from publicly provided services (which is zero if (s)he is not a user), q is the probability of establishing connection with the government, Z is the benefit of from local capture, T is the degree of local tax burden, and y is the wealth of an individual.

If a person has fled to the private alternative, (s)he would not receive any benefit from public services and hence, (s)he would be less likely to spend any effort to make politicians more sensitive to social welfare. Personal wealth and belonging to ethnic majority may provide opportunities for political connections and reduce incentives to support civic accountability. Local financing, on the other hand, is likely to increase the interest for political participation among those that pay local taxes.

The predictions of the model are consistent with the theoretical work by Hirschman, (1980), North (1990), and Leighley (1995) who argued that people's willingness to participate in political initiatives (such as contacting or petitioning of elected representatives and bureaucrats, attending official and unofficial meetings, public protests, etc.) and community activities (e.g. participation in design, construction or operation of public projects or services, or involvement in quasi-formal organizations, such as local councils, teacher-parent associations, etc.) varies according to their perception of how much benefit they would receive from their effort. There is also some evidence from less developed countries in South Asia and West Africa that indicates increased contact or petitioning of elected representatives and (to a lesser degree) of bureaucrats, when political decentralization is coupled with local financing and devolution of public service provision to local governments (Crook and Manor, 1994).

We used the following econometric specification:

(5) $\psi = \beta_0 + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + \boldsymbol{\beta}_{\mathbf{W}}\mathbf{W} + \boldsymbol{\beta}_{\mathbf{Z}}\mathbf{Z} + \varepsilon_2$

where X_1 is a dummy variable for using publicly provided services, X_2 is the household wealth, X_3 is the degree of local financing, **W** is the set of control variables at the household level, including ethnic and demographic factors, and **Z** is the set of control variables at the municipal level. The equation is estimated at the household level.

We used three different measures for the dependent variable, all from a unique data set: 2000 IRIS Household Survey: The first one is the most direct measure of civic participation: the frequency of participating in meetings with barangay officials to discuss issues related to improvement of health provision, local roads, water delivery, etc. The second one measures the involvement or association with PTA, mothers club, youth club,

women club, local welfare clubs, non-governmental organizations. Finally, we also looked at the determinants of voting in local elections.

Use of public services was captured by the same survey, which asked questions on the use of health facilities (public, private, self) in case of illnesses experienced by any family member and the type of schools (private, public) used for children over 5 years old. As shown in Table 1, our sample consists of 432 poor and 686 non-poor households. Only 7 percent of the poor have sent at least one of their children to private schools as compared to 27 percent of the non-poor. Use of private health clinics/doctors is more common among both groups; however, the non-poor still hold an edge with 31 percent as compared to 9 percent by the poor. We also tried an indirect measure for this variable: the existence of ***exit mechanisms***– in the form of having private service providers (schools and health centers) in the area. We expect the non-poor to have more access to private service providers than the poor thanks to their (relatively higher) wealth.

Table 1: Descriptive Statistics On The Use Public v. Private Services

	Poor	**Non-poor**
Use of Public Schools	298 (93%)	399 (73%)
Use of Private Schools	23 (7%)	150 (27%)
Use of Public Health Clinics	378 (91%)	457 (69%)
Use of Private Health Clinics / Doctors	39 (9%)	204 (31%)
N	432	686

The wealth index was created from household characteristics and household assets based on the questions asked in the 2000 IRIS Household Survey. The measure we used for ***local financing*** is the ratio of local revenues to local government expenditures as explained above. The set of ***municipal level control variables*** includes average wealth level, average education level, consumer price index, and urbanization rate. The set of ***household level control variables*** are education level of the parents, marital status, age, ethnic minority dummy, home ownership, number of children, family size, and dummy variables for occupation (wage earners, working in agriculture, rent/profit earners).

(3) Determinants of Local Capture

Our last hypothesis is on the link between local taxation and governance in local government units. Equations (14) and (15) in Chapter 2 can be reformulated as follows:

$$(5) \qquad Z^0 = c'\left(\frac{1}{\theta + \frac{\alpha}{(1+\alpha)}(1-\theta)}\right)^{-1} - pG^0$$

$$\frac{\partial Z}{\partial \theta} > 0\,,\ \frac{\partial Z}{\partial \alpha} < 0$$

where Z^0 is the amount of public funds diverted to the special interest groups, c' is the marginal tax burden of local taxes, pG^0 is the amount of public funds allocated on publicly provided services, θ represents the proportion of the influential individuals, and α measures the extent the politician cares about social welfare *vis-à-vis* her support from the special interest groups.

The equation predicts that local financing can reduce leakage of funds by spreading the burden of corruption through the whole community. Citizen voice and other forms of accountability mechanisms are also expected to have a positive effect on

local governance by raising α. Heterogeneity within society based on wealth, ethnicity, religion, demographic factors, etc., on the other hand, is likely to increase redistributive frictions and strengthening the power of the local elite. Viability of private sector as an alternative in health care or education is expected to reduce popular support for publicly provided services and divert public funds to special interest groups.

There are very limited country-specific empirical studies on the determinants of local corruption in less developed countries. Reinikka and Svensson (2001) have linked the leakage of funds in school budgets to the wealth of parents in PTAs. They showed that schools with relatively wealthy parents in Uganda are more likely to afford the costs of acquiring information and initiating protests and these schools are more successful to prevent leakage of funds. Gray-Molina et. al. (1999) found that misuse of public funds in municipal health service providers in Bolivia decline significantly in places where citizens participate directly into the political process by attending health board meetings. Finally, using a survey of public officials in Bolivia, Kaufmann, Mehrez, and Gurgur (2004) found a positive link between existence of consumer complaint and feedback mechanisms and public sector performance (quality, quantity, accessibility of services and control of bribery and budget diversion). They also found that formal accountability mechanisms have little effect on curbing corruption.

Our econometric specification takes the following form:

(6) $$Z = \beta_0 + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + X_5\beta_5 + X_6\beta_6 + \boldsymbol{\beta}_{\mathbf{Z}}\mathbf{Z} + \varepsilon_3$$

where X_1 stands for the degree of local financing, X_2 is political participation (voice), X_3 is formal accountability mechanisms both at the local level and central government, X_4 is the viability of exit mechanisms, X_5 is the influence of special interest groups over

politicians, X_6 is the degree of redistributive frictions in the community, and **Z** is the set of control variables. The equation is estimated at the municipal level.

For the dependent variable we created indices measuring the corruption perceptions of public officials and households separately using a set of questions asked in respective surveys conducted by IRIS. The index for public officials is the normalized sum of the first seven variables in Table 2. We constructed a "public official corruption index" combining the answers of public officials working at public schools, health clinics and municipalities. The resulting index is correlated at 0.28 (p-value=0.01) with households' corruption perceptions. We used this corruption index as a proxy for the leakage of public funds.

The measures we used for ***local financing*** and ***exit mechanisms*** are the same as above: the ratio of local revenues to local government expenditures in the first case and the number of private service providers (schools and health centers) in the area per capita. For ***political participation*** we used three measures: (i) the frequency of participating in meetings with barangay officials to discuss issues related to improvement of health provision, local roads, water delivery, etc.; (ii) involvement or association with PTA, mothers club, youth club, women club, local welfare clubs, non-governmental organizations; and (iii) voter turnout. The source for the first two variables is the 2000 IRIS Household Survey. Data on voter turnout, on the other hand, is from the Commission on Elections for 1995 local elections. To measure the ***formal accountability*** mechanisms at the local level we constructed an index based on ten questions asked in the IRIS survey of public officials about the existence and enforcement of written targets, inventory control, record-keeping, and frequency of personnel evaluations. We also used

frequency of audit by central government to measure the extent of hierarchical oversight over local governments. ***The influence of special interest groups*** was captured by wealth inequality as we did before. We did not use membership in labor unions, trade, agriculture or business cooperatives this time, since the data was not available at the municipal level. For ***redistributive frictions*** in the community we only used ethnic fragmentation, not other demographic factors (e.g. proportion of elderly in the community) since there is no compelling theoretical argument to consider the latter. Like many empirical studies on corruption, we also controlled for average prosperity of a municipality (based on the wealth index), population density and urbanization level.

Table 2: Corruption Index and Its Components

Mean Statistics	**Mun. Health**	**Mun. Adm.**	**Mun. DECS**	**Public School**	**Pub. Health**
Proportion of People Who Get Paid but Don't Show Up	2.56	6.33	0.00	-	-
Paid to Obtain Jobs	2.95	3.80	5.00	8.87	-
Bribery Happened in the last year	2.53	18.99	1.25	0.92	-
Theft of Funds Happened in the last year	16.45	31.65	1.25	1.83	-
Theft of Supplies Happened in the last year	16.23	15.38	0.00	1.83	-
Frequency of Theft of Funds	3.80	9.09	14.67	1.53	20.37
Frequency of Seeking Informal Payments	4.49	10.68	12.00	0.92	15.51

4.3 Estimation Methods and Results

(1) Allocation of Publicly Provided Services

As discussed in Betancourt and Gleason (2000), one should expect the disturbance terms of education and health equations to be correlated with each other due to reasons such as trade-off in the allocation of resources or group level fixed effects that influence decision making or operations across health and education services in a similar pattern. Therefore, we treated the health and education equations as a system and used seemingly unrelated regression (SUR) to estimate system parameters. The input variables (number of doctors per capita, number of nurse/other medical personnel to population, and teacher-student ratio) lie in the zero to one interval. The output variables (NEAT scores, immunization rate of children) were also transformed into zero to one interval after dividing by 100. This allowed a logit specification, which yields predicted values in the same range as dependent variables. We also addressed potential unobservable effects across regions by using a fixed-effects estimation approach. Since the F-test did not support the existence of any fixed effects (the minimum *p*-value of the test statistic was 0.65), the results were not reported.

Our theoretical model predicts a reverse causality between public sector performance and political participation. Another variable susceptible to endogeneity problem is the viability of private alternatives in education and health care. It is possible that private schools or health centers may choose to operate in communities where public

sector fails to satisfy local demand in quality or quantity or both[16]. Therefore, we also use an instrumental variable approach to prevent potential bias that arises from such reverse causality. Logit specification leads to a non-linear estimation that enables us to use polynomials of exogenous variables as instruments in the first stage. Our choice of instruments are the squares of wealth, ethnic fractionalization, percent of population over 60 years of age, population density, and percent of population in urban area.

There is a growing literature on detecting weak instruments, surveyed in Stock, Wright, and Yogo (2002). As long as the instruments are strongly correlated with the explanatory variable, standard asymptotic theory can be employed to develop reliable inference methods. However, these econometric methods may fail if the instruments are weakly correlated with the endogenous explanatory variables. In particular, the IV estimates are strongly biased in the same direction as OLS estimates in finite samples and may lead to incorrect inference (Maddala and Jeong, 1992). The paper by Bound, Jaeger, and Baker (1995) is an important reference point for applied researchers who use potentially weak instruments. Their striking result that confidence regions for returns-to-schooling using randomly generated instruments are similar to those found by Angrist and Krueger (1991) has prompted applied researchers to address the issue of weak instruments.

Various procedures are available for detecting weak instruments in the linear IV model:

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[16] In fact, Jimenez and Sawada (2001) examined the relationship between public and private school enrollment in the Philippines and found that the large expansion in the public secondary education sector in the last decade is negatively associated with private secondary enrollment.

1. The first-stage *F*-statistic: Bound, Jaeger, and Baker (1995) and Staiger and Stock (1997) argue that, for the case of a single endogenous regressor, one could rely on the usual procedures with a first-stage *F*-statistic larger than 10. While the first-stage *F*-statistic is useful for suggesting when the IV approach performs poorly, it does not distinguish between the many instrument and the weak instrument problems. If there are many instruments the *F*-statistic can be arbitrarily small.
2. The first stage R^2: Shea (1997) considered multiple included regressors and suggested looking at a partial R^2. As a rule of thumb, the first stage R_2 should be greater than 30%.
3. Cragg-Donald statistic: Stock and Yogo (2002) use the Cragg-Donald (1993) statistic to test whether given instruments are weak. The proposed test for weak instruments is based on the eigenvalue of the matrix analog of the *F*-statistic from the first stage regression:

   $\mathbf{G} = \hat{\mathbf{\Sigma}}^{-1/2}\mathbf{Y}^{-1'}\mathbf{P}_{\mathbf{Z}}\mathbf{Y}^{-1}\hat{\mathbf{\Sigma}}^{-1/2} / K_2$ where **Z** is the set of instruments, **Y** is the set of endogenous variables, K_1 is the number of endogenous variables, K_2 is the number of exogenous variables, T is the number of observations, $\mathbf{\Sigma} = \mathbf{Y}'\mathbf{M}_{\bar{\mathbf{Z}}}\mathbf{Y}/(T - K_1 - K_2)^2$, $\mathbf{M}_{\mathbf{Z}} = \mathbf{I} - \bar{\mathbf{Z}}(\bar{\mathbf{Z}}'\bar{\mathbf{Z}})\bar{\mathbf{Z}}'$, $\bar{\mathbf{Z}} = [\mathbf{X}, \mathbf{Z}]$, and **X** is the set of exogenous variables included in the second stage. The test statistic is the minimum eigenvalue of **G**. The critical values are reported in Stock and Yogo (2002).

We verified the validity of overidentifying restrictions using Hausman test[17] and addressed the weak instruments problem by reporting first-stage *F*-statistics, first-stage partial R^2, concentration parameter, and Cragg-Donald statistic. The test results, overall, did not indicate "weak instruments" problem.

The first-stage results on private health facilities, private primary schools and private secondary schools are reported in Table 3. The findings are mostly consistent with Jimenez and Sawada (2001), where the enrollment in public secondary schools were found to be negatively correlated with public school enrollment and positively correlated with population and income per capita. We found also that average wealth per province, population density, percent of population under 15 years of age and percent of population in urban area have positive effect on the supply of private schools and private health facilities. Interestingly, the supply of primary schools is more elastic to wealth than the supply of secondary schools. This may be due to large variation in the quality of private school at the secondary level, which makes private alternatives somewhat available in less wealthy areas as well as more affluent regions. We also found that wealth inequality

[17] The test is based on regressing the residuals from the main structural equation on the entire set of exogenous variables. Under the null hypothesis of overidentifying restrictions, the test statistic, NR^2 (N is the sample size and R^2 is the uncentered the goodness of fit from the regression of residuals on all the instruments) has a χ^2 distribution with K-T degrees of freedom, where K is the number of exogenous variables and T is the number of endogenous variables. If the instruments are excluded from the structural equation correctly, the set of instruments should have no explaining power over the residuals and consequently R^2 should be low. The *p*-value of the test statistic ranges between 0.76 and 0.92 depending on which input or output variable is tested. Hence, we failed to reject the null hypothesis that the overidenfying restrictions are valid.

has an adverse effect on the supply of private primary schools, but not private secondary schools. This again may be caused by quality differences across private secondary schools. Another interesting finding is that although local financing does not have any significant effect on private supply, the size of local government expenditures do: Private alternatives are less likely to be available in provinces where local spending per capital is higher. This finding suggests that private schools and health centers emerge as a response to the failure of government to satisfy the public demand for education and health.

Table 3: First-Stage Results on Private Health Centers, Private Primary Schools and Private Secondary Schools

	Prv. Health Centers	Prv. Primary Schools	Prv. Secondary Schools
Local government revenues per capita (log)	0.1732 (1.22)	0.1678 (1.36)	0.0982 (1.56)
Local government expenditures per capita (log)	-0.2933 (-2.15)**	-0.2912 (-2.08)**	-0.2243 (-1.71)*
Wealth inequality	-0.1343 (-1.33)	-0.4081 (-2.19)**	-0.1474 (-1.63)
Membership in labor unions, trade, agriculture or business coop by the non-poor	0.1290 (1.38)	0.0790 (1.02)	0.0988 (1.18)
Membership in labor unions, trade, agriculture or business coop by the poor	-0.0220 (-0.11)	0.0773 (0.60)	0.0675 (0.98)
Ethnic fractionalization	0.1033 (1.20)	0.1933 (1.77)*	0.1766 (1.90)*
Percent of population under 15 years of age		0.4641 (2.49)**	0.5953 (2.15)**
Percent of population over 60 years of age	0.0905 (0.69)	0.1164 (0.17)	0.0050 (0.10)
Consumer price index	0.0160 (0.04)	0.0553 (0.61)	0.0576 (0.98)
Population density	0.5276 (2.15)**	0.6820 (2.48)**	0.2172 (1.89)*
Average wealth of the province	0.5527 (3.31)***	1.0432 (3.10)***	0.3975 (2.28)**
Percent of population in urban area	0.4386 (3.08)***	0.3506 (2.05)**	0.2784 (2.13)*
N	114	114	114
F-test on significance of the model	5.36	2.86	3.33
Wald test on significance of the model	p=0.00	p=0.00	p=0.00
Pseudo R square	0.82	0.65	0.71

[1] Elasticities around the mean are reported.
[2] t-statistics in parenthesis. *** significant at 1%; ** significant at 5%; * significant at 10%.

We begin with input variables. The regression results on public health inputs and public education inputs are reported in Table 4 and Table 5, respectively. The coefficient in the voter turnout is positive but not significant in all four models, regardless of whether the estimations are from SUR or instrumental variable approach. It is possible that voting alone is not an effective mechanism to discipline politicians in the Philippines[18].

We find a strong direct link between health inputs and local financing. A 10 percent increase in the local revenues per capita (keeping total government expenditures constant) raises the number of doctors by 2 percent and the number of other medical personnel by 2.5 percent. If the increase in local financing is matched with an increase in total spending, then the rise in the number of medical personnel would be as much as 6 percent. We do not find a similar impact on education inputs. That can be attributed to more extensive devolution of health service to local government units as compared to education where teacher allocation is mostly controlled by the central government.

We also look at the interaction of voter turnout and local financing, which is positive and significant when the dependent variable is the number of nurses, midwives, etc. or the teacher-student ratio in primary schools. Since the closest public health facilities in many areas are mainly barangay health stations and rural/urban health units, which are staffed by nurses and midwives (World Bank, 2001), this result can be seen as an indication that political and local financing working together gives local governments flexibility to prioritize health spending based on local needs and preferences.

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[18] Another possibility is that voter turnout is not a good measure for citizen voice. Ideally, we would prefer to disaggregate voting statistics across income groups and test their significance separately. This approach, however, is not feasible due to lack of necessary data.

Table 4: Province Level Regression Results on Public Health Inputs

	SUR	IV	SUR	IV
	Doctors per capita		Nurses, midwives, and other per capita	
Voter turnout	0.1204 (1.60)	0.0953 (1.34)	0.1190 (1.41)	0.0763 (0.98)
Local government revenues per capita (log)	0.1922 (1.93)*	0.2204 (2.17)**	0.2492 (2.21)**	0.2684 (2.36)**
Local government expenditures per capita (log)	0.4105 (2.77)***	0.3564 (2.52)**	0.3002 (2.50)**	0.2892 (2.16)**
Voter turnout * Ratio of local revenues to local government expenditures	0.0049 (0.06)	-0.0118 (-0.13)	0.3574 (2.33)**	0.3784 (2.47)**
Wealth inequality	-1.020 (-2.71)***	-0.7114 (-2.43)**	-0.9274 (-2.02)**	-0.8385 (-1.97)**
Membership in labor unions, trade, agriculture or business cooperatives by the non-poor	0.6922 (2.40)**	0.7092 (2.56)**	-0.4392 (-2.52)**	-0.4001 (-2.23)**
Membership in labor unions, trade, agriculture or business cooperatives by the poor	0.0322 (0.57)	0.0781 (0.81)	-0.0290 (-0.19)	-0.0673 (-0.71)
Number of private health centers per capita	-0.1655 (-1.89)*	-0.1982 (-2.02)**	-0.0711 (-1.42)	-0.15873(-1.92)*
Number of private health centers per capita * Membership in labor unions, trade, agriculture or business cooperatives by the non-poor	0.0890 (0.77)	0.0651 (0.69)	-0.0441 (-0.27)	-0.0527 (-0.42)
Ethnic fractionalization	-0.2881 (-2.40)**	-0.3309 (-2.57)**	-0.1912 (-1.78)*	-0.1013 (-0.78)
Percent of population over 60 years of age	-0.0823 (-0.88)	-0.0717 (-0.62)	0.0301 (0.73)	0.0022 (0.09)
Consumer price index	-0.0024 (-0.01)	0.0092 (0.13)	0.0762 (0.54)	0.0444 (0.40)
Population density	0.5119 (2.10)**	0.6573 (2.39)**	0.2287 (1.92)*	0.4082 (2.11)**
Average wealth of the province	0.5493 (2.35)**	0.4478 (2.01)**	0.8300 (2.65)**	0.9012 (2.99)***
Percent of population in urban area	0.4343 (2.09)**	0.4705 (2.33)**	0.5432 (2.57)**	0.6012 (2.49)**
N	114	114	114	114
Wald test on significance of the model	p=0.00	p=0.00	p=0.00	p=0.00
Pseudo R square	0.41	0.39	0.35	0.34

[1] The input equations are estimated as a system by SUR and IV. Robust estimates of the variance covariance matrix is used due to potential heteroscedasticity across provinces.
[2] Elasticities around the mean are reported.
[3] t-statistics in parenthesis. *** significant at 1%; ** significant at 5%; * significant at 10%.
[4] Instruments for voter turnout, private alternatives and interactions terms are the squares of wealth, ethnic fractionalization, percent of population over 60 years of age, population density, and percent of population in urban area.
[5] First-stage F-statistic = 3.70 (voter turnout), 5.36 (private health centers), 4.34 (interaction term)
[6] First-stage R^2= 0.73 (voter turnout), 0.82 (private health centers), 0.77 (interaction term)
[7] Cragg-Donald statistics: 3.12 (cutoff point: 6.59)

Table 5: Province Level Regression Results on Public Education Inputs

	SUR	IV	SUR	IV
	Teacher-student ratio in public primary schools		Teacher-student ratio in public secondary schools	
Voter turnout	0.0965 (1.16)	0.1364 (1.59)	0.0184 (0.16)	0.0271 (0.64)
Local government revenues per capita (log)	0.0877 (0.99)	0.1231 (1.48)	0.1773 (1.79)*	0.1891 (1.90)*
Local government expenditures per capita (log)	0.1509 (1.88)*	0.1229 (1.63)	0.1982 (2.03)**	0.2110 (2.14)**
Voter turnout * Ratio of local revenues to local government expenditures	0.3271 (2.33)**	0.2891 (2.12)**	0.1687 (1.82)*	0.1263 (1.32)
Wealth inequality	-0.7400 (-2.28)**	-0.6662 (-2.11)**	-0.4702 (-2.39)**	-0.5382 (-2.53)**
Membership in labor unions, trade, agriculture or business cooperatives by the non-poor	0.6392 (2.16)**	0.5220 (1.91)*	0.2274 (1.78)*	0.1892 (1.55)
Membership in labor unions, trade, agriculture or business cooperatives by the poor	-0.0160 (-0.41)	0.0552 (0.60)	0.0675 (0.98)	0.0196 (0.47)
Number of private elementary (secondary) schools per capita	0.0890 (0.77)	0.0651 (0.69)	-0.0441 (-0.27)	-0.0527 (-0.42)
Number of private elementary (secondary) schools per capita * Membership in labor unions, trade, agriculture or business cooperatives by the non-poor	-0.1710 (-1.33)	-0.4299 (-2.00)**	-0.3109 (-2.13)**	-0.2441 (-1.92)*
Ethnic fractionalization	0.1044 (0.69)	0.0371 (0.39)	0.0050 (0.10)	0.0192 (0.41)
Percent of population over 60 years of age	0.0551 (0.40)	0.0642 (0.53)	-0.0043 (-0.09)	-0.0122 (-0.14)
Percent of population under 15 years of age	-0.0023 (-0.01)	0.0087 (0.12)	0.0755 (0.53)	0.0440 (0.39)
Consumer price index	0.1377 (1.25)	0.1476 (1.56)	0.2483 (2.33)**	0.1983 (2.05)**
Population density	1.3216 (3.27)***	1.1640 (3.50)***	0.4491 (2.00)**	0.2734 (1.69)*
Average wealth of the province	0.5900 (3.60)***	0.5206 (4.01)***	0.3551 (2.93)***	0.4010 (3.07)***
Percent of population in urban area	0.4343 (2.09)**	0.4705 (2.33)**	0.5432 (2.57)**	0.6012 (2.49)**
N	114	114	114	114
Wald test on significance of the model	p=0.00	p=0.00	p=0.00	p=0.00
Pseudo R square	0.29	0.33	0.39	0.32

[1] The input equations are estimated as a system by SUR and IV. Robust estimates of the variance covariance matrix is used due to potential heteroscedasticity across provinces.
[2] Elasticities around the mean are reported.
[3] t-statistics in parenthesis. *** significant at 1%; ** significant at 5%; * significant at 10%.
[4] Instruments for voter turnout, private alternatives and interactions terms are the squares of wealth, ethnic fractionalization, percent of population over 60 years of age, population density, and percent of population in urban area.
[5] First-stage F-statistic = 3.70 (voter turnout), 2.86 (private schools), 3.13 (interaction term)
[6] First-stage R^2= 0.73 (voter turnout), 0.65 (private health centers), 0.68 (interaction term)
[7] Cragg-Donald statistics: 2.24 (cutoff point: 6.59)

The variables we used to capture the influence of special interest groups, wealth inequality and membership in professional organizations by the non-poor, are found to be significant in both health and education inputs with various degrees. The adverse effect of wealth inequality is clearer in the public health sector as compared to public education system. Holding other variables at their average levels, a 10 percent increase in wealth inequality causes a more than 10 percent decrease in the number of health personnel and 5-7 percent decrease in the number of teachers at public schools.

The second variable that measures the influence of special interest groups is membership in professional organizations. We estimate the coefficient in this variable for the poor and the non-poor separately, where each group is defined based on the wealth index we have constructed before. We do not find any significant link between input variables and membership in professional organizations by the poor. Membership by the non-poor, on the other hand, is significant in three cases: teacher-student ratio in public primary schools, the number of doctors per capita and the number of nurses, midwives and other personnel per capita. Provinces that report higher membership figures for the non-poor are more likely to have more teachers at the primary level and more doctors in public payroll, but at the same time less nurses, midwives and other medical personnel in public health facilities.

These results on public education inputs are in contrast with some empirical evidence cited in the literature that suggests skewness of resource allocation towards tertiary education[19]. The reason we observe this influence over public primary schools rather than public secondary schools may be the viability of private alternatives at the

[19] See page 6.

secondary level[20]. In other words, most parents may use their political influence to shift funding from secondary education to primary education (either by lobbying the Department of Education for more teaching positions or pressuring local governments to hire additional teachers) due to lack of alternatives in the private sector for the latter. The significant and negative coefficient in the interaction term (membership of the non-poor in professional organizations times the number of private schools) supports this argument. Presence of private schools alone does not seem to have any effect on public education inputs. The results do not change when potential endogeneity is addressed with an instrumental variable approach. An adverse effect becomes visible only when having private alternatives in community is coupled with influence of special interest groups[21].

In the public health sector, on the other hand, provinces that have higher membership in professional organizations seem to have a preference for more doctors and less nurses, midwives, and other medical personnel. To the extent that public spending for doctors is a proxy for public spending on curative health care, this result is consistent with the view that health care spending on developing countries is biased towards public services mostly used by the top income quintile. Although there exist private alternatives in curative health care, many influential households may prefer to use public hospitals for such services due to cost considerations and, therefore, pressure local governments to hire more doctors rather than nurses or midwives, which are primarily used by low income

[20] Private schools account for 33 percent share of secondary and 7 percent share in elementary schools (World Bank, 2001).

[21] We should note that this finding does not contradict Jimenez (2001) who found a negative link between enrollment rates of public and private schools, because he did not look at the teacher-student ratio.

groups. The interaction term (membership of the non-poor in professional organizations times the number of private health facilities) is insignificant, but the number of private health facilities enters with a negative and significant coefficient in both public health inputs. This may arise from crowding-out effect. Unlike public education, where the Department of Education decides the minimum number of teaching positions in public schools local governments usually enjoy more discretionary authority in public health. Hence, local governments may choose to reduce the number of medical personnel in public health facilities to save from personnel expenditures.

There is little evidence that shows the presence of redistributive conflicts along demographic lines. Neither the proportion of elderly population nor the proportion of school-age children population appears to have any effect in health or education inputs. Ethnic fractionalization, on the other hand, is significant with a negative coefficient on health inputs, but not education inputs. The price index of consumer goods has no effect on the number of health personnel. Surprisingly, it positively affects the teacher-student ratio. We attribute this result to generous salary scheme of teachers which is set uniformly across provinces by the central government. In provinces where the price level of other goods and services is above the national average, the real cost of hiring additional teachers would be lower. The positive coefficient in the population density in some health and education inputs can also be contributed to presence of fixed cost in production functions and consequently, the economies of scale in densely populated areas. Finally, we find that both the urbanization of a province and the prosperity level have very large and significant effect on health and education inputs. This suggests that decentralization experience of the Philippines has so far been unsuccessful in allocating

publicly provided services to rural areas and removing input inequity across provinces that stems from differences in wealth distribution.

In Table 6, we use the same empirical specification to estimate output equations. The goodness of fit is generally lower (in particular in immunization rate) as compared to the regressions that use input variables as dependent variables. There may be other factors affecting the variation in quality of education and health outcomes possibly beyond the control of local governments. There is little evidence that student test scores and immunization rates do respond to higher spending or the way government expenditures are financed. However, one should be careful in the interpretation of these results, our variable captures total government expenditures, not education expenditures. Ethnic fractionalization, wealth inequality, prosperity of the province and urbanization rate seem to be the most critical factors in both education and health outcomes. The first two variables have significant adverse effects on both immunization rates and test scores. Average prosperity and urbanization, on the other hand, have positive and statistically significant coefficients. Percent of population under 15 years of age, a proxy for demand, is another significant variable with a negative coefficient in the immunization equation. Local governments in the Philippines seem to have difficulty in coping with demand due to capacity problems. Membership in professional organizations, voter turnout, and local financing, on the other hand, are insignificant in all three equations.

The most interesting finding is the effect of private secondary schools on average NSAT scores. Unlike immunization rate and average NEAT scored, where the presence of private service providers have no effect, when it comes to secondary education the coefficient in the private schools become significant and positive – the more private

schools exist in the area, the better the scores are in public secondary schools. Note that when we used input variables on the left hand side, the effect of private health facilities and to some extent private schools were negative. Why does the “exit” option have a positive impact on secondary education? We explain this result with two factors: First, private schools have a wider coverage at the secondary level. Unlike private elementary schools which are quite limited in most of the country, private secondary schools account for more than one third of secondary students of which one fourth are from poor families. Second, as discussed in the introduction, the promotion of school principals is linked indirectly to enrollment rate. Higher enrollment rate necessitates allocation of more teachers to the school, which, in turn, allows the promotion of school principal, whose rank depends on the number of teachers. Facing competition with private schools, public school principals needs to boost education quality to retain existing students and attract more students.

Table 6: Province Level Regression Results on Public Education Outputs and Public Health Outputs

	Average scores of public schools in National Elementary Assessment Test		Average scores of public schools in National Secondary Assessment Test		Immunization rate of infants	
	SUR	**IV**	**SUR**	**IV**	**SUR**	**IV**
Voter turnout	-0.0438 (-0.72)	-0.0420 (-0.96)	0.0013 (0.05)	0.0052 (0.11)	0.0289 (0.11)	-0.0242 (-0.24)
Local government revenues per capita (log)	0.0205 (0.50)	0.0240 (0.63)	0.0812 (0.77)	0.0778 (0.81)	0.1083 (1.12)	0.1012 (1.02)
Local government expenditures per capita (log)	0.0992 (0.98)	0.1082 (1.03)	0.1673 (1.92)*	0.2152 (2.18)**	0.0582 (0.38)	0.0703 (0.43)
Voter turnout * Ratio of local revenues to local government expenditures	0.1814 (1.53)	0.1515 (1.23)	0.0961 (0.76)	0.1002 (0.85)	-0.0033 (-0.12)	-0.0061 (-0.33)
Wealth inequality	-0.8902 (-2.70)***	-0.8739 (-2.49)**	-0.7604 (-2.01)**	-0.7489 (-2.10)**	-0.5489 (-2.23)***	-0.4284 (-1.98)**
Membership in labor unions, trade, agriculture or business cooperatives by the non-poor	0.1198 (1.11)	0.1460 (1.09)	0.0919 (0.76)	0.1255 (1.34)	0.2189 (1.89)*	0.2042 (1.71)*
Membership in labor unions, trade, agriculture or business cooperatives by the poor	0.0101 (0.56)	0.0109 (0.61)	-0.0194 (-0.06)	-0.0221 (-0.13)	0.0203 (0.22)	0.0299 (0.41)
Number of private elementary schools per capita	0.1782 (1.58)	0.1408 (1.37)				
No. of private elementary schools per capita * Membership in labor unions, trade, agriculture or business cooperatives by the non-poor	0.0166 (0.28)	0.0199 (0.42)				
Number of private secondary schools per capita			0.4148 (2.48)**	0.3841 (2.13)**		
No. of private secondary schools per capita * Membership in labor unions, trade, agriculture or business cooperatives by the non-poor			-0.0651 (-0.41)	-0.0778 (-0.45)		
Number of private health facilities per capita					0.0930 (0.88)	0.1104 (1.08)
No. of private health facilities per capita * Membership in labor unions, trade, agriculture or business cooperatives by the non-poor					-0.0078 (-0.06)	-0.0111 (-0.14)
Ethnic fractionalization	-0.3912 (-2.41)**	-0.4031 (-2.33)**	-0.2056 (-1.97)**	-0.2189 (-2.08)**	-0.1416 (-1.33)	-0.1730 (-1.73)*

Percent of population under 15 years of age	0.2989 (1.81)*	0.2631 (1.54)	0.1110 (1.41)	0.1323 (1.06)	-0.2644 (-1.89)*	-0.3204 (-1.99)**
Percent of population over 60 years of age	-0.1031 (-0.62)	-0.0677 (-0.39)	0.0356 (0.26)	0.0224 (0.24)	-0.0611 (-0.78)	-0.0629 (-0.83)
Population density	0.3786 (2.17)**	0.3482 (2.08)**	0.1285 (1.09)	0.1379 (1.41)	0.0979 (1.33)	0.0892 (1.47)
Consumer price index	0.1092 (1.03)	0.1333 (1.32)	0.1491 (1.76)*	0.1271 (1.69)*	0.0973 (0.87)	0.1001 (0.99)
Average wealth of the province	0.9109 (3.25)***	1.1642 (3.50)***	2.4917 (4.13)***	2.7344 (4.56)***	2.0892 (3.47)***	2.0091 (3.38)***
Percent of population in urban area	0.6099 (3.61)***	0.6206 (4.01)***	0.8355 (2.63)**	0.7401 (2.47)**	0.0872 (0.99)	0.1522 (1.22)
N	114	114	114	114	114	114
Wald test on significance of the model	p=0.00	p=0.00	p=0.00	p=0.00	p=0.00	p=0.00
Pseudo R square	0.23	0.21	0.19	0.21	0.18	0.17

[1] The output equations are estimated as a system by SUR and IV. Robust estimates of the variance covariance matrix is used due to potential heteroscedasticity across provinces.
[2] Elasticities around the mean are reported.
[3] t-statistics in parenthesis. *** significant at 1%; ** significant at 5%; * significant at 10%.
[4] Instruments for voter turnout, private alternatives and interaction terms are the squares of wealth, ethnic fractionalization, percent of population over 60 years of age, percent of population under 15 years of age, population density, and percent of population in urban area.
[5] First-stage *F*-statistic: see Table 4 footnote 5 and Table 5 footnote 5
[6] First-stage R^2: see Table 4 footnote 6 and Table 5 footnote 6
[7] Cragg-Donald statistics: 3.35 (cutoff point: 6.59)

(2) Involvement in Voice Mechanisms and Community Initiatives

The empirical results in the previous section showed that citizen voice may motivate local politicians to invest on publicly provided services, if local governments have financial and administrative flexibility to respond to voter preferences. In this section we quantify the determinants of a person's involvement in voice mechanisms and other initiatives for the common good.

Since the individual units of analyses (households) in our sample are nested within higher-level units of analysis, it is possible that unobservable effects in each cross-section may cause biased estimates. Therefore, we estimated the equations using a random effect probit model where observations are grouped by provinces. We also included corruption in municipal governments as a control variable in the model, since households may be less likely to participate in local politics, if they believe that their voice cannot be heard in a corrupt government. In the next section we will address reverse causality between citizen voice and local corruption. We did not take into account endogeneity of the corruption variable below, since our regressions are at the household level and it is unlikely that the decision of each individual would have a significant effect on a municipal level variable.

In Table 7 we reported the determinants of three voice variables: (1) participating in meetings with barangay officials; (2) involvement or association with community initiatives, such as PTA, mothers club, youth club, women club, local welfare clubs, non-governmental organizations; and (3) voting in local elections. Each equation was estimated separately for the poor and the non-poor.

We start with the sample of poor households. Although the coefficient of using public services is positive in all three equations, it is not significant. This may be due to the fact that there is little variation in the regressor, i.e. most poor households use public services. Local financing has a positive but marginal impact on poor households' participating in barangay meetings. There is some evidence pointing out the adverse effect of corruption on voice variables. It seems to discourage both voter turnout by the poor and their participation in barangay meetings, but interestingly it has a positive effect on a person's involvement in community activities. One explanation may be that local communities, facing corruption and mismanagement in public offices, step up and try to fill the void. Both the wealth index and education level, on the other hand, turn out to be significant with a positive sign, whereas the ethnic minority dummy is significant and negative, suggesting that poorer, less educated households and those in ethnic minority are more likely to be alienated from the political process. Interestingly, households in rural areas are more politically active than those in urban areas. This may be an indication of stronger community ties among rural households. We did not find any evidence for the influence of a person's occupation on his/her decision to involve in voice mechanisms. Age and home ownership are also insignificant, in general, but younger households seem to vote less likely in local elections and home-owners are more likely to participate in barangay meetings.

Turning to the regression results for the non-poor we find that using public services is strongly linked with participating in meetings with barangay officials. The more the wealthy use public health facilities or public schools, the more likely they are participate in meetings with public officials to discuss issues related to public services,

improvement of health provision, local roads, water delivery, etc. Home ownership also has a similar effect. Our prediction about a positive link between local financing and political activism is also partially confirmed by the regression results. The coefficient in the local financing variable is positive and significant when the dependent variable is participation in barangay meetings and it has positive sign in other two equations. Unlike the regressions on poor households, we do not find any evidence that corruption in local governments influence decisions of non-poor households. The coefficient in that variable stays insignificant. Among household characteristics, the wealth index has a significant and positive coefficient in all three equations, but its square is negative when the dependent variable is involvement in community activities and participating in barangay meetings. This suggests that political participation is supported by individuals' resources, but after some point more financial resource reduces that interest. Unlike the sample of poor individuals, we do not find any negative effect of being in ethnic minority.

Overall, the regression results support our prediction that using publicly provided services motivates wealthy individuals to be more active in the community in terms of participating in meetings with barangay officials. We did not find a similar link for poor households, but this may be due to lack of a variation in the regressor. In both samples we found some evidence that shows local financing as a determinant of a person's involvement in voice mechanisms. Corruption in local governments seems to have some adverse effect on poor households' participation in barangay meetings and their voting in local elections, but it does not influence the non-poor households.

Table 7: Household Level Regression Results on Civic Participation and Voice

Dependent variables are:

(1) Participation in barangay meetings (IRIS 2000)
(2) Involvement in PTA, mothers club, youth club, women club, local welfare clubs, and other community-based organizations (IRIS 2000)
(3) Voting in local elections (IRIS 2000)

	Poor	Poor	Poor	Non-poor	Non-poor	Non-poor
	(1)	(2)	(3)	(1)	(2)	(3)
Use of public schools and public health facilities	0.0502 (0.72)	0.0821 (1.30)	0.0178 (0.24)	0.2684 (2.91)***	0.1424 (1.44)	0.0718 (1.06)
Wealth index of the household	0.2292 (2.40)**	0.1718 (2.33)**	0.1402 (1.94)*	0.1901 (1.94)*	0.3978 (2.94)***	0.2422 (2.08)**
Wealth index square of the household	-0.0253 (-0.75)	-0.0422 (-1.56)	0.0899 (1.73)*	-0.1782 (-2.43)**	-0.047 (-2.32)**	0.0681 (0.89)
Ratio of local revenues to local government expenditures	0.1338 (1.85)*	0.0470 (0.44)	0.0889 (1.60)	0.2654 (2.26)**	0.0932 (1.53)	0.0593 (0.41)
Corruption in municipal government	-0.3932 (-2.25)**	0.1630 (2.45)**	-0.1274 (-1.82)*	0.0432 (0.81)	0.0133 (0.50)	0.0563 (0.89)
Education level of household (high school or higher)	0.2003 (2.41)**	0.1929 (2.03)**	0.2112 (2.47)**	0.1027 (2.22)**	0.0904 (1.73)*	0.2261 (2.51)**
Household at urban area	-0.3566 (-2.89)***	-0.2622 (-2.25)**	0.0992 (1.16)	-0.1393 (-1.89)*	0.0890 (0.91)	0.1477 (2.35)**
Ethnic minority	-0.1890 (-2.03)**	-0.3693 (-3.44)***	-0.1043 (-1.81)*	-0.0412 (-0.75)	0.0038 (0.12)	-0.0353 (-0.71)
Age (log)	-0.1120 (-1.44)	-0.0733 (-1.05)	0.1470 (1.77)*	0.1002 (1.94)*	0.1763 (2.33)**	0.1441 (1.99)**
Home ownership	0.1204 (1.80)*	0.1692 (1.99)**	-0.0291 (-0.39)	0.1991 (2.05)**	0.0929 (1.03)	0.0022 (0.05)
Wage earner	0.0423 (0.91)	0.0579 (1.02)	0.1008 (1.82)*	0.0352 (0.57)	0.0664 (0.98)	-0.0981 (-1.41)
Working in agriculture	0.1100 (1.35)	0.0991 (0.92)	0.0477 (0.78)	0.1992 (2.40)**	0.0009 (0.03)	0.0393 (0.25)

Rent/profit earner	-0.0531 (-1.05)	-0.0033 (-0.05)	0.0099 (0.13)	0.0412 (0.65)	0.0302 (0.31)	-0.0912 (-1.09)
N	429	429	429	623	623	623
Pseudo Rsq.	0.21	0.22	0.16	0.20	0.13	0.14
Wald-test on the model	p=0.00	p=0.00	p=0.00	p=0.00	p=0.00	p=0.00
Wald-test on random effects	p=0.00	p=0.00	p=0.00	p=0.00	p=0.00	p=0.00

[1] Observations are grouped by provinces. The model is estimated using random effect probit.
[2] Elasticities around the mean are reported.
[3] t-statistics in parenthesis. *** significant at 1%; ** significant at 5%; * significant at 10%.
[4] The model also includes the following variables: average municipal wealth, average municipal education level, and consumer price index. The set of household level control variables are: marital status, number of children, and family size.

(3) Determinants of Local Capture

We estimated the equation on corruption using a logit specification since corruption index is between zero and one. We also considered an ordered probit specification (where corruption variable is divided into 5 equal units) due to the fact that the dependent variable is a subjective measure of corruption, which makes it sensitive to measurement error. Finally, to address potential reverse casualty problems inherent in some regressors, in particular voice variables, we tried an instrumental variable approach. The influence of corruption on voice variables was predicted by our model and the empirical results at the household level above suggested that this influence might be significant. We used three questions from the 2000 IRIS Household Survey as instruments for ***participating in voice mechanisms***. These are the extent to which households follow local events and politics, whether the households receive their information from local officials instead of news organizations or their friends and neighbors, and whether households know who their vice-mayor is. We assume that the households, who show interest in activities of their local governments and spend time to get informed about local events (through unbiased sources), are more likely to voice their support or contempt of local politicians.

The results are presented in Table 8. It is clear that prosperity of a municipality is the most important factor determining the level of corruption in local governments. Wealth inequality, a proxy for the strength of local elite in a community, on the other hand, has a strong adverse effect on governance. In our theoretical model local financing acts like a cost-sharing mechanism that distributes the burden of corruption throughout the whole community and consequently we predicted a negative link between the two.

Empirical results confirms this prediction; the coefficient in the local financing variable is indeed negative, but it loses its significance in IV regressions.

When it comes to voice related variables, voter turnout is barely significant in random effects estimation, and not significant in others. Participation in barangay meetings becomes significant at the 5 percent with a negative sign when we control for endogeneity of the voice variables. The third voice variable, involvement in community activities has the correct sign in all three equations, but is not significant. We also created a voice index by taking the average of aforementioned three voice variables for the poor and the non-poor, respectively. Regression results reported in the last three columns indicated that voices of both the poor and the non-poor reduce corruption in local governments, but the latter tends to have more influence.

Turning to formal accountability mechanisms, we find that accountability index we have created for municipal governments and frequency of audit by the central government, which captures inter-governmental oversight, appear to be weakly related to corruption. Finally, availability of private alternatives in the education and health care has a positive but marginally significant influence over governance in the all three columns. This suggests that exit mechanisms may curb corruption by putting competitive pressure on local governments. We do not find any link between ethnic fractionalization and local governance.

Table 8: Municipality Level Regression Results on Corruption in Local Governments

	Random Effects	Ordered Probit	G2SLS	Random Effects	Ordered Probit	G2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Voter Turnout	-0.2203 (-1.66)*	-1.9726 (-1.14)	-0.1201 (-1.09)			
Participation in barangay meetings	-0.1564 (-1.30)	-0.4721 (-1.08)	-0.3675 (-2.18)**			
Involvement in PTA, mothers club, youth club, women club, local welfare clubs, NGO	-0.1326 (-1.56)	-0.5692 (-1.30)	-0.0990 (-1.39)			
Voice of the poor[6]				-0.1093 (-1.09)	-0.6225 (-1.43)	-0.3675 (-1.85)*
Voice of the nonpoor[7]				-0.2199 (-2.19)**	-1.9366 (-2.41)**	-0.4244 (-1.78)*
Hierarchical accountability mechanisms	-0.2984 (-1.88)*	-2.2869 (-2.04)**	-0.0401 (-1.39)	-0.3307 (-1.97)**	-2.3144 (-2.11)**	-0.0497 (-1.12)
Frequency of audit by the central government	-0.4209 (-2.01)**	-1.8154 (-1.47)	-0.2234 (-1.95)*	-0.4193 (-1.86)*	-1.6938 (-1.31)	-0.1930 (-1.87)*
Ratio of local revenues to local government expenditures	-0.1729 (-1.82)*	0.9303 (2.25)**	-0.2785 (-2.03)**	-0.1544 (-1.56)	0.8951 (2.14)**	-0.0537 (-1.71)*
Number of private elementary and secondary schools and private health centers per capita (province average)	-0.3326 (-2.20)**	-2.0372 (-1.86)*	-0.1008 (-1.55)	-0.3609 (-2.33)**	-2.0782 (-1.88)*	-0.1293 (-1.70)*
Wealth inequality	0.5132 (2.35)**	4.6607 (2.16)**	0.3843 (2.03)**	0.5088 (2.31)**	4.5803 (2.04)**	0.4173 (2.11)**
Ethnic fractionalization	0.1665 (1.50)	1.3530 (1.67)	0.2432 (1.21)	0.1871 (1.63)	1.4138 (1.75)*	0.2671 (1.37)
Average wealth of the municipality	-0.4777 (-2.45)**	-2.5381 (-2.50)**	-0.4102 (-2.12)**	-0.5104 (-2.57)**	-2.4001 (-2.32)**	-0.4330 (-2.19)**
Population density	0.1206 (1.01)	1.5994 (1.47)	0.0451 (0.31)	0.0867 (0.84)	1.3887 (1.25)	-0.0012 (-0.09)
Percent of population in urban area	0.0583 (0.89)	2.0244 (1.89)*	0.0751 (1.15)	0.0770 (0.97)	2.1856 (1.93)*	0.1036 (1.22)

N	64	64	64	64	64	64
F-test on significance of the model	*p*=0.00	*p*=0.00	*p*=0.00	*p*=0.00	*p*=0.00	*p*=0.00
Breusch-Pagan test for random effects	*p*=0.66		*p*=0.54	*p*=0.72		*p*=0.53
Hausman test on orthogonality condition	*p*=0.99		*p*=0.97	*p*=0.99		*p*=0.99
Adj. R square	0.36	0.24	0.28	0.34	0.23	0.27

[1] Random effects model group observations by provinces.
[2] Random effects model reports maximum likelihood results.
[3] Elasticities around the mean are reported (except for ordered probit model).
[4] Ordered probit model assumes observations are independent across groups (provinces) but not necessarily independent within groups. Dependent variable is divided into 5 categories.
[5] t-statistics in parenthesis. *** significant at 1%; ** significant at 5%; * significant at 10%.
[6] Instruments for voter turnout, civic participation, and voice are four survey questions: following local events by the households, being informed about local events through local officials, and knowing who vice-mayor is in the municipality.
[7] First-stage *F*-statistic = 2.97 (voter turnout), 2.86 (civic participation), 3.21 (voice)
[8] First-stage R^2= 0.49 (voter turnout), 0.57 (civic participation), 0.62 (voice)
[9] Cragg-Donald statistics: 4.12 (cutoff point: 7.11)
[10] Voice of the poor is the average of three voice variables (voting in local elections, participating on barangay meetings, and involvement in community activities) for the group of poor households.
[11] Voice of the non-poor is the average of three voice variables (voting in local elections, participating on barangay meetings, and involvement in community activities) for the group of non-poor households.

Overall, the empirical results gave us some evidence that both citizen voice and local financing may be critical in reducing corruption in local governments. Accountability mechanisms in municipalities or oversight by central government are rather weakly successful in promoting good governance. We did not find any evidence to suggest a positive or negative link between exit mechanisms and corruption. Other critical variables explaining governance seems to be prosperity of the community (a proxy for institutional development) and wealth inequality (a proxy for the strength of the local elite).

4.4 Conclusion

We have tested the implications of our theoretical model in the Philippines, where local government units have significant autonomy and responsibility in provision of basic services to their jurisdictions.

The results are summarized in Tables 9-11. We did not find a strong *direct* link between local financing and the quantity of publicly provided local goods. A possible explanation for this finding is that the benefits of local financing is usually based on some form of a Tiebout mechanism which may not be applicable to developing countries due to underdeveloped capital markets and constraints on household mobility. Nevertheless, one mechanism that may strengthen the success of local financing is political participation of citizens. Although neither voter turnout nor local financing alone was strong in general, their interaction was quite significant.

Our empirical results also showed that local taxation may have an indirect impact on policy choice through its positive influence on a person's involvement in voice mechanisms. Households are more likely to participate in barangay meetings if local public spending is primarily financed by local sources. In addition, we also found that by spreading the cost of

corruption to the whole community, local taxation may be an important policy instrument to support good governance in the public sector.

Another important finding is that keeping the wealthier segments of communities in the public sector as users of publicly provided services is critical for the success of local governments. They would be more active in voice mechanisms (such as participating in meetings with local public officials) if they use public services. Their mobilization and participation in political activities would create benefits for the whole community, because they have more ability to raise their voice against public officials as compared to the less wealthy households. In this context, we found that availability of private alternatives in the health and education sectors may even have an adverse effect on local governments, if the use of the exit option is confined to the wealthy and thereby private alternatives effectively shield these households from the mismanagement and corruption in local governments. In the Philippines, however, the teacher staffing norm established by the central government has provided an indirect link between school enrollment and promotion of school principals through a Niskanen-mechanism (i.e. budget-maximizing bureaucrats) rather than Tiebout. We found that this mechanism, coupled with availability of private schools to large segments of the population has created an institutional environment where school administrators, facing competitive pressure from private schools, have motivated to raise the quality of education, at least in secondary schools.

We also found, however, the decentralization is not a panacea. Communities with more acute wealth inequalities are more likely to have less publicly provided goods, because the friction between the have and have-not is transformed into a conflict between public good users and private good users. When this conflict is coupled with undue influence of the local elite, there could be a bias in favor of public services used by the wealthy.

Table 9: Summary of Results - Allocation of Publicly Provided Goods

Variable	Measure	Prediction of the model	Empirical results on Education	Empirical results on Health
Citizen voice	Voter turnout	Increases education and health inputs/outputs	No effect	No effect
Local financing	Local revenues per capita	Increases education and health inputs and outputs	No direct effect on education inputs or test scores. Its interaction with voter turnout has positive effect on the teacher-student ration in primary school	Positive direct effect on the number of doctors; no effect on immunization rates. Its interaction with voter turnout has positive effect on the number of nurses.
Influence and connections by the non-poor	Wealth inequality	Increases education and health inputs used by the non-poor, decreases those used by the poor	Negative on education inputs and outputs	Negative on health inputs and outputs
	Membership in labor unions, trade, agriculture or business coop. by the non-poor	Increases education and health inputs used by the non-poor, decreases those used by the poor	Increases the teacher-student ratio in public primary schools. No effect on public secondary schools. No effect on test scores	Increases the number of doctors, but lowers the number of nurses, midwives. No effect on immunization rates.
Influence and connections by the poor	Membership in labor unions, trade, agriculture or business coop. by the poor	Increases education and health inputs and outputs used by the poor	No effect	No effect
Availability of private alternatives	Number of private health centers and private schools per capita	Decreases education and health inputs and outputs	No direct effect on inputs; its interaction with the influence of the non-poor has negative effect on teacher-student ratio. Positive effect on test scores in secondary schools.	Negative, but marginally significant effect on inputs. Positive effect on immunization rates.
Re-distributional conflicts	Ethnic fractionalization	Decreases education and health inputs and outputs	No effect on teacher-student ratios. Negative effect on test scores.	Negative effect on the number of doctors; negative, but marginally significant effect on the number of nurses, midwives. Marginally significant negative effect on immunization rates.
	Percent of population over 60 years of age	Decreases education inputs; increases health inputs	No effect	No effect
	Percent of population under 15 years of age	Increases education inputs; decreases health inputs	No effect	Negative effect on immunization rates

Table 10: Summary of Results – Participation in Voice Mechanisms

Variable	Measure	Prediction of the model	Empirical results on participation in barangay meetings	Empirical results on involvement in community activities	Empirical results on voting in local elections
Use of public services	Use of public schools or public health facilities	Positive effect	Positive effect for the rich, no effect for the poor	No effect	No effect
Local financing	Ratio of local revenues to local government expenditures	Positive effect	Positive effect for the rich, positive but marginally significant effect for the poor	No effect	No effect
Corruption	Corruption in local governments	Negative effect	Negative effect for the poor, no effect for the rich	Positive effect for the poor, no effect for the rich	Negative effect for the poor, no effect for the rich
Household wealth	Ownership of selected durable goods	Negative effect	Positive effect for the poor, inverse-U shape for the rich	Positive effect for the poor, inverse-U shape for the rich	Positive effect
Household education	High school or higher		Positive effect	Positive effect	Positive effect
Urbanization	Household resides in urban area		Negative effect for the poor and the rich (marginally)	Negative effect for the poor, no effect for the rich	Negative effect for the poor, positive for the rich
Ethnic Minority	Household belongs to an ethnic minority		Negative effect for the poor, no effect for the rich	Negative effect for the poor, no effect for the rich	Negative effect for the poor, no effect for the rich
Home ownership			Positive effect for the poor (marginally) and the rich	Positive effect for the poor	No effect

Table 11: Summary of Results – Corruption in Local Governments

Variable	Measure	Prediction of the model	Empirical results
Citizen voice	Voter turnout	Negative effect	No effect
	Participation in barangay meetings	Negative effect	Negative effect in IV estimation
	Involvement in social organizations	Negative effect	No effect
Voice of the poor	Average of voter turnout, participation in barangay meetings, and involvement in community initiatives	Negative effect	Negative but marginally significant effect in IV estimation
Voice of the rich	Average of voter turnout, participation in barangay meetings, and involvement in community initiatives	Negative effect	Negative
Accountability	Accountability mechanisms in local government units	Negative effect	Negative effect
	Frequency of audit by central governments	Negative effect	Negative effect
Local financing	Ratio of local revenues to local government expenditures	Negative effect	Negative effect
Availability of private alternatives	Number of private health centers and private schools per capita	Positive effect	Negative effect
Influence and connections by the non-poor	Wealth inequality	Positive effect	Positive effect
Re-distributional conflicts	Ethnic fractionalization	Positive effect	No effect

Appendix A

Country Background

The Philippines is a country of 70 million people who live upon thousands of islands that lie between the Pacific Ocean and the South China Sea[22]. The larger of these islands have vast expanses of mountains and jungles that physically separate large populations. The sheer geography of the Philippines necessitated some form of decentralized or at least deconcentrated governance for centuries, but this was not always combined with devolution of political authority.

The Philippine government is a unitary system comprised of the central government and the local government units. The local government consists of three levels: province/highly urbanized city, municipality/component city, and barangays. At present there are 77 provinces, 20 highly urbanized cities, 45 component cities, 1536 municipalities and 41,300 barangays or neighborhoods[23] [24].

Province is the largest unit in the political structure of the Philippines. Composed of a cluster of municipalities and/or component cities, the province is both a political and corporate body, which is headed by an elected governor and a provincial legislature. Its functions and duties in relation to its component cities and municipalities are generally

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[22] Some portions of the country background is from Azfar, Gurgur, and Meagher (2001).

[23] These numbers change as new units are created or old ones combined (Miller, 1997).

[24] Manasan (1992)

coordinative and supervisory. They are mainly responsible for strategic planning and decision making, leaving execution of policies to cities and municipalities.

There are three classes of cities in the Philippines: the highly urbanized, the independent component cities which are independent of the province, and the component cities which are part of the provinces where they are located and subject to their administrative supervision. Consisting of more urbanized and developed barangays, the city coordinates and delivers basic public services. Highly urbanized cities have a population of at least 200,000 inhabitants. The cities are both headed by an elected mayor and a legislative body.

Municipality is a political corporate body which consists of a number of less urbanized barangays within its territorial boundaries. It performs the same role as the city and also headed by an elected mayor and a legislative body.

Barangay is the smallest political unit into which cities and municipalities in the Philippines are divided. It is the basic unit of the Philippine political system. It consists of less than 1,000 inhabitants residing within the territorial limit of a city or municipality and administered by a set of elective officials, headed by a barangay captain. It serves as a primary planning and implementing unit of government, as well as a forum for people to express their views and to settle local disputes.

Decentralization in the Philippines was mandated by the new democratic constitution of 1987 which has allowed local government units to have the power to create its own resources of revenue, to levy taxes, fees, and charges (subject to guidelines and limitations of Congress), and to have a just share in national taxes. The Local Government Code enacted in 1991 has devolved even broader taxing and revenue raising

power and granted a larger share in national internal revenue taxes. The Code devolved "basic services" to local governments—these include most health services along with such infrastructure provision as school, clinic, and local road building The bulk of local government taxes comes from the real property tax (which is reserved solely for local governments) and the local business tax. The tax base of each of these taxes are defined by Congress which also sets lower and upper limits on the tax rates. The provinces and their constituent municipalities are each allowed to levy a basic tax on real properties within their boundaries (in the range of 0.25-0.5 percent). In addition they are authorized to collect an additional 1 percent tax on real property for the Special Education Fund, which is earmarked exclusively for education. The share of local governments in national internal revenues (Internal Revenue Allotment) has raised from 18 percent of the national budget in 1996 to 24 percent in 2000. Ten percent of the Internal Revenue Allotment goes to barangays, 45 percent to municipalities, 25 percent to cities, and 30 percent to provinces using a distribution formula that gives 70 percent weight to population, 20 percent weight to land area, and 10 percent weight to equal sharing. Relative to GNP, total local government revenues is around 2 percent as compared to 16 percent of the national government. Locally generated revenues and inter-governmental transfers have nearly an equal share in the total local government income. According to a study by the World Bank provinces with high household income and large population are more likely to raise more local revenue, whereas there is no apparent link between the level of centrally provided grant funds and local revenue mobilization (World Bank, 1994).

A.1 Health Care

The health system is characterized by a rough parity between private and public sectors in terms of health expenditure, number of hospital beds and manpower – thus creating a truly mixed system. The centralized public system is composed of a vast network of hospitals, clinics and health stations over the entire country, while the private system of hospitals, outpatient clinics and private practitioners has a national coverage.

Implementation of Local Government Code has resulted in devolution of all the Department of Health facilities at the local level and over half of its staff to local governments. As a result all rural health units, barangay health stations and municipal maternity clinics were devolved to municipal and barangay governments and all provincial, district, and municipal hospitals were devolved to provincial governments. Public health services and hospital operations at these levels are no longer subject to central financial or managerial control. In terms of the scope of health services, personnel and facilities involved, the number of local governments participating, and the degree to which authority is being decentralized, the experience stands out as one of the most ambitious health decentralization initiatives ever undertaken in Asia (World Bank, 1994).

Primary health care is significantly devolved in the Philippines, with staff being hired, fired, and paid (according to a nationally-defined scale, and mostly with central grant funds) by the local governments. Many localities use their discretionary resources to supplement the health staff salaries defined by the central government, while others attempt to deal with fiscal shortfalls by hiring fewer or cheaper health staff. The Local Government Code provides that provinces, cities, and municipalities are all to have health officers as well as health boards (the barangays provide only minimal health services).

The boards are to include chief executive of local government unit as chairman, the local health officer as vice-chairman, a representative from the local legislature, a representative of the private sector or non-governmental sector, and a representative of the Department of Health. The authority of the health boards, however, is limited to an advisory role with regard to health policy and standards, and to proposing the health budget to the local legislature.

The assets and staff retained by the central government are concentrated in hospital facilities at the regional and national level, the health delivery structure of the National Capital Region, the central administrative offices in Manila, and the regional health offices. The Department of Health retains key functions in regulation and accreditation, health information and education, surveillance, research and national health policy areas, and is charged with managing technical and financial assistance to local governments.

The private health sector in the Philippines is composed of thousands of single-proprietor outpatient clinics, over a thousand hospitals of all sizes and types ranging from 5-1,000 beds, thousands of stores selling drugs, several large chains of drug stores, and uncounted thousands of traditional healers and birth attendants. Distribution of private health facilities across the country is somewhat affected by variation of income level across provinces. In recent years, however, the distribution has become more even. Almost half the population has access to private health facilities or private doctors (World Bank, 2001).

There is a relatively modest system of social health insurance in the Philippines, launched in 1972. It is a compulsory program covering public and private salaried

employees, retirees, and the self-employed. Enrollment, however, is well below its potential, with only 4.6 million employees and their families covered out of a total target group of 21.8 million employed. It accounts less than 5 percent of total spending on health care.

A.2 Education

By constitution, the government is responsible for free public education in the elementary and secondary level. The Philippine education system consists of a broad-based basic education sub-sector that is largely provided by the public sector. The government has been the dominant provider of basic education: the public sector accounts for over 92 percent of total enrollment at the elementary level. In contrast, the public sector has traditionally been a relatively small player at the secondary and tertiary level. According to a World Bank report, the distribution of public school enrollment becomes increasingly skewed in favor of the rich as the level of education rises (World Bank, 2003). While 61 percent of public elementary school students come from poor families, this figure goes down to 49 percent in the case of public secondary schools and 29 percent in public tertiary institutions. Between 1990 and 1996 public spending on higher education increased at the expense of public spending on basic education. In recent years, however, policy initiatives have resulted in a re-alignment of spending priorities in favor of basic education.

Public education is centralized under the administration of the Department of Education, Culture and Sports (DECS), but with some (at times significant) local input. Local governments are responsible for school building construction and repair and the center is responsible for practically everything else, including policy, curriculum,

personnel, and operations. Adjustments in the salaries of public school teachers in the late 1980s and most of the 1990s have made personnel expenditures the single biggest item in the DECS budget. By 1997, the entry-level salary of a public school teacher was 70 percent higher than its private school counterpart. Since personnel salaries are accounted for almost nine tenth of the central budget, maintenance, operations, and capital expenditures are mostly left to local governments. Local governments still have broad latitude in personnel management through three channels: (i) supplementing the salaries paid by central government; (ii) paying the salaries of newly recruited teachers until they are integrated in the DECS payroll; and (iii) recruiting permanent teachers over and above the school staffing norms applied by DECS.

Local institutions with a formal role in education governance include the school boards at provincial and municipal levels and the Parent-Teacher Community Associations (PTCA) for each school. Members of school boards involve both elected and appointed local officials as well as members of parent-teacher associations. As with health, there are no fees charged (formally) in the school system, though parents have to buy uniforms and pay modest PTCA fees. As envisioned in the Local Government Code, DECS chooses local school teachers and administrators in consultation with local school boards. Furthermore, while the budgeting of financial resources in particular is highly centralized in the Philippines, the local share of education finance has grown. There is a also major tax earmark for education, the Special Education Fund, which is funded yearly by some portion of the proceeds of real property taxes collected by all municipalities within the country. The use of the fund is under the control of local school boards.

Private education plays an important role in the Philippines, particularly at the secondary and tertiary levels. Private schools account for a substantial share of secondary and tertiary schools (33 percent and 79 percent, respectively) and a modest share in elementary schools (7 percent) (World Bank, 2001). Compared with the rest of Asia, the relative size of the private sector in the Philippines is below average for primary and above average for secondary and tertiary (Jimenez and Sawada, 2001). At the primary level, the small private sector tends to provide higher-quality schools for the relatively small proportion of households who have opted out of the public system. At the secondary and tertiary levels, private school quality spans a wider range, from some of the very best to some of the very worst. These institutions include non-profit schools run by religious groups or non-sectarian foundations, as well as profit-making entities that produce a substantial rate of return to their owners.

A program for Government Assistance to Students and Teachers in Private Education (GASTPE) was launched in 1989. It was essentially designed to provide financial assistance to students from lower income families enrolling in private high schools and tertiary institutions. The appropriation for the program constitutes approximately of 3 percent of DECS' recurrent budget. GASTPE support at the secondary level is channeled through two different schemes: Tuition Fee Supplements (TFS), and Educational Service Contracting (ESC). The TFS scheme subsidizes a portion of annual tuition fees for students enrolled in private high schools. For the 1994/95 school year, the number of beneficiaries was 644,000 (41 percent of total private enrollment at that level). ESC is an innovative financing scheme designed to enable students to enroll in participating private schools, in communities where there is no public high school, or

where there is excess enrollment in existing public high schools. Private schools participate in a voluntary basis, and must meet certain quality criteria. ESC funding was provided to 187,000 secondary students (12 percent of private enrollment) during the 1994/95 school year. GASTPE plays a considerably less prominent role at the tertiary level – less than 2 percent of private enrollment at that level (World Bank, 1996).

Appendix B

Description of Survey Instruments

The 2000 IRIS Survey

The 2000 IRIS Survey consists of eight modules of surveys undertaken in the Philippines by IRIS with financial assistance of the World Bank in the spring of 2000. The sample covered 19 provinces and 80 municipalities from 11 regions. The sample involves 1120 households; 80 municipal administrators, 80 municipal health officials and 80 municipal education officials; 19 provincial administrators, 19 provincial health officials and 19 provincial education officials, 160 government health facility managers and 160 school principals –some private (50) and some public (110). The sample of households represents 19 provinces, 80 municipalities within them, and 301 barangays[25] within those 80 municipalities. Households can be matched to either schools or health facilities at the barangay level.

1999 Annual Poverty Indicators Survey

The Annual Poverty Indicator Survey (APIS) is a nationwide sample survey designed to provide information on the different indicators related to poverty. More specifically, this survey gathers information for the 78 provinces and all cities and

[25] Barangay is the smallest political unit into which cities and municipalities in the Philippines are divided. It is the basic unit of the Philippine political system. It often consists of less than 1,000 inhabitants residing within the territorial limit of a city or municipality and administered by a set of elective officials, headed by a barangay chairman.

municipalities of Metro Manila on the demographic and economic characteristics, health status and education of the family members; awareness and use of family planning methods; housing, water and sanitation condition of the families; availability of credit to finance the family business or enterprise; and income and expenditures of the family. In addition, it gathers information on the effect of the economic crisis in families and the steps they had taken in response to these problems.

It is a joint undertaking of the National Statistics Office, World Bank Mission and the United Nation Development Program.

Appendix C

Description of Variables

Table 12: Description of Health Care and Education Inputs and Outputs

Variable	Description
Percentage of infants (0-5 years old) immunized against hepatitis, DPT, measles/mumps/rubella and polio	Province average. Source: 1999 Demographic and Health Survey.
Percentage of student passing National Elementary Assessment Test	National Elementary Assessment Test (NEAT) is designed to assess abilities and skills of 6th grade pupils in all public and private elementary schools. Province average. Source: The Department of Education, Culture, and Sports Statistical Bulletin for the 1999-2000 school year.
Percentage of student passing National Secondary Assessment Test	National Secondary Assessment Test (NSAT) aims to assess abilities and skills of 4th year high school students in all public and private secondary schools. Province average. Source: The Department of Education, Culture, and Sports Statistical Bulletin for the 1999-2000 school year.
Teacher-student ratio in public elementary schools	Province average. Source: National Statistical Coordination Board for the 1999-2000 school year.
Teacher-student ratio in public secondary schools	Province average. Source: National Statistical Coordination Board for the 1999-2000 school year.
The number of doctors in public sector per capita	Province average. Source: Medical personnel per province from the Department of Health, 1999; province population from 1995 Census-Based Population Projections reported by the National Statistical Coordination Board.
The number of nurses, midwives, trained birth attendants, and other medical personnel in public sector per capita	Province average. Source: Medical personnel per province from the Department of Health, 1999; province population from 1995 Census-Based Population Projections reported by the National Statistical Coordination Board.

Table 13: Description of Variables from 2000 IRIS Survey

Variable	Description
Accountability index for public health centers and public schools	Based on 10 questions measuring the existence and enforcement of written targets, frequency of evaluations, inventory control, and record-keeping. Source: Public Schools Survey and Health Clinics Survey.
Age	Source: Household Survey.
Corruption index	Average of corruption perceptions of public officials and households. For public officials, the following questions are used: (1) Proportion of public officials who get paid but do not show up, (2) Proportion of public officials who paid kickbacks to obtain their positions, (3) Bribery happened in the last year, (4) Theft of funds happened in the last year, (5) Theft of supplies happened in the last year, (6) Frequency of theft of funds, (7) Frequency of seeking informal payments. Source Municipal Administrators, Municipal DECS, Municipal Health Officials, Health Facility Workers, and Public School Principals Surveys. For households we use the following two questions: (1) Have you ever seen or heard reports of municipal/city officials involved in corruption?", (2) "How common is the corruption in municipal/city government?". Source: Household Survey.
Education	Whether the household has high school education or above. Source: Household Survey
Ethnic minority	Tagalogs and Cebuanos are the two main ethnic groups in the Philippines, comprising about 50 percent of the population, followed by Ilocana and Visaya (around 15 percent each). We consider the remaining population, which involves over 30 ethnic groups, as ethnic minority. Source: Household Survey.
Female	Source: Household Survey.
Following local events/politics	"Does your family follow national or local events and politics?". Source: Household Survey.
Frequency of attending meetings with barangay officials	"In the past year, have people in your barangay met to request that officials address a specific issue? (for example, improvement of health provision, local roads, water delivery etc.)". Source: Household Survey.
Frequency of audit at health centers and municipal health services (public schools and municipal education services) by central government	Frequency of visits by provincial or municipal officials. Source: Public Schools Survey and Health Clinics Survey.
Home ownership	Source: Household Survey.
Informed about local events from local officials	"Is your main source of information about national events and politics local officials". Source: Household Survey.

Involvement in social organizations	Average involvement/association with the following organizations/groups/ activities: PTA, mothers club, youth club, women club, local welfare clubs, non-governmental organizations, etc. Source: Household Survey.
Knows who vice-mayor is	"Is your main source of information about national events and politics local officials". Source: Household Survey.
Married	Source: Household Survey.
Number of children	Source: Household Survey.
Rent/Profit earners	Rent and profit as percent of household income. Source: Household Survey
Urban area	Household live in urban area. Source: Household Survey.
Use of public health services	"Which health facility (public, private, self) do you use in case of illnesses experienced by any family member?"; if the respondent chooses public health facility for at least one member of the family, (s)he is considered as using public health facilities. Source: Household Survey.
Use of public primary schools	"What type of primary school (public, private) do you send your child(ren) to?"; if at least one child is sent to public school, the household is considered as using public primary schools. Source: Household Survey.
Use of public secondary schools	"What type of secondary school (public, private) do you send your child(ren) to?"; if at least one child is sent to public school, the household is considered as using public secondary schools. Source: Household Survey.
Wage-earners	Wage as percent of household income. Source: Household Survey
Working in agriculture	Agriculture income as percent of household income. Source: Household Survey

Table 14: Description of Variables from Other Sources

Variable	Description
Local financing	Ratio of local revenues to local government expenditures. Source: 1998 Annual Financial Report of Local Governments.
Index of ethnic fractionalization	One minus the Herfindahl index of ethnolinguistic group shares. Source: The 2000 Census of Population.
Membership in labor unions, trade, agriculture or business cooperatives	Source: The 1999 Annual Poverty Indicators Survey.
Population density	Population per km^2. Source: The 2000 Census of Population.
Price level	Consumer price index. Source: The National Statistics Office of the Philippines.
The number of private health facilities per capita	Source: The number of private health facilities from the National Statistical Coordination Board, 1999; population data from 1995 Census-Based Population Projections reported by the National Statistical Coordination Board.
The number of private primary schools per capita	Source: The number of private schools from the Department of Education, Culture, and Sports, 1999; population data from 1995 Census-Based Population Projections reported by the National Statistical Coordination Board.
The number of secondary schools per capita	Source: The number of private schools from the Department of Education, Culture, and Sports, 1999; population data from 1995 Census-Based Population Projections reported by the National Statistical Coordination Board.
The proportion of elderly population	The proportion of population 60 years of age or older. Source: The 2000 Census of Population.
The proportion of school-age population	The proportion of population 15 years of age or younger. Source: The 2000 Census of Population.
Urbanization	Percent of population living in urban areas. In the Philippines, "urban" areas fall under the following categories: (1) have a population density of at least 1,000 persons per square kilometer, (2) at least six establishments (commercial, manufacturing, recreational and/or personal services), (3) at least three of the following: town hall, church, public plaza, market place, or public building. Source: The 2000 Census of Population.

Voter turnout	Ratio of voter turnout to registered voters in 1995 local elections. Source: The Philippines Commission on Elections.
Wealth index	Created using principal component analysis based on the 2000 Census of Population and Housing, which provides information on housing characteristics and household assets.
Wealth inequality	The ratio of standard deviation of wealth index within a community to average wealth index in that community.

Appendix D

Descriptive Statistics

Table 15: Descriptive Statistics on Health Care and Education Inputs and Outputs

Variable		N	Mean	St.Dev.	Min.	Max.
Percentage of infants (0-5 years old) immunized against hepatitis, DPT, measles/mumps/rubella and polio	**Province average**	114	76.251	17.682	59.216	91.234
Percentage of student passing National Elementary Assessment Test	**Province average**	114	78.395	17.789	51.480	89.747
Percentage of student passing National Secondary Assessment Test	**Province average**	114	69.387	21.236	41.091	87.299
Teacher-student ratio in public elementary schools	**Province average**	114	39.364	18.681	31.597	51.519
Teacher-student ratio in public secondary schools	**Province average**	114	51.598	22.697	35.996	64.961
The number of doctors in public sector per 10,000	**Province average**	114	1.5506	1.8802	0.6802	4.2377
The number of nurses, midwives, trained birth attendants, and other medical personnel in public sector per capita	**Province average**	114	4.7351	4.9326	1.1762	17.1.95

Table 16: Description Statistics of Variables from 2000 IRIS Survey

Variable		N	Mean	St.Dev.	Min.	Max.
Accountability index	**Public schools**	110	0.7405	0.0753	0.4296	0.8914
	Private schools	50	0.7278	0.0852	0.4667	0.9078
	Health clinics	128	0.7700	0.0818	0.5619	0.9357
	Municipal average	80	0.7458	0.0764	0.4290	0.9032
Age	**Household average**	1118	34.966	10.189	16	84
	The poor	432	33.914	9.5762	16	84
	The non-poor	686	35.627	10.509	17	77
Corruption index (municipality level)	**Household average**	81	0.2968	0.1633	0	0.75
	Public official average	81	0.2493	0.1001	0.0194	0.4770
	Composite	81	0.2736	0.1060	0.0277	0.5530
Education	**Household average**	1118	0.4796	0.2436	0	1
	The poor	432	0.3848	0.2396	0	1
	The non-poor	686	0.5317	0.2304	0	1
Ethnic minority	**Household average**	1118	0.2658	0.2464	0	1
	The poor	432	0.3326	0.2658	0	1
	The non-poor	686	0.2081	0.2784	0	1
Female	**Household average**	1118	0.8917	0.3108	0	1
	The poor	432	0.8825	0.3203	0	1
	The non-poor	686	0.8965	0.3043	0	1
Following local events/politics	**Household average**	1118	0.5859	0.4911	0	1
	The poor	432	0.4935	0.4859	0	1
	The non-poor	686	0.6429	0.4795	0	1
Frequency of participating meetings with barangay officials	**Household average**	1118	0.4250	0.4929	0	1
	The poor	432	0.3281	0.5004	0	1
	The non-poor	686	0.5239	0.4847	0	1
Frequency of audit by central government	**Public schools**	110	0.5742	0.2398	0	1
	Private schools	50	0.2889	0.2145	0	0.8577
	Health Clinics	128	0.4915	0.2910	0	1
	Municipal average	80	0.5955	0.2183	0.1333	1
Home ownership	**Household average**	1118	0.7758	0.4171	0	1
	The poor	432	0.5744	0.2855	0	1
	The non-poor	686	0.9122	0.1566	0	1
Informed about local events from local officials	**Household average**	1118	0.0912	0.2880	0	1
	The poor	432	0.0932	0.2854	0	1
	The non-poor	686	0.0849	0.2910	0	1
Involvement in social organizations	**Household average**	1118	0.0875	0.1261	0	1
	The poor	432	0.0615	0.0972	0	0.5714
	The non-poor	686	0.1039	0.1389	0	1
Knows who vice-mayor is	**Household average**	1118	0.3478	0.3344	0	1
	The poor	432	0.2829	0.3658	0	1
	The non-poor	686	0.3887	0.3085	0	1
Married	**Household average**	1118	0.9678	0.1766	0	1
	The poor	432	0.9745	0.1577	0	1
	The non-poor	686	0.9634	0.1875	0	1
Number of children	**Household average**	1118	1.3148	1.2099	0	6
	The poor	432	1.3542	1.2382	0	5
	The non-poor	686	1.2900	1.1918	0	6
Rent/Profit earners	**Household average**	1118	0.0367	0.4518	0	1
	The poor	432	0.0093	0.0958	0	1
	The non-poor	686	0.0540	0.2260	0	1

Urban	**Household average**	1118	0.3757	0.4845	0	1
	The poor	432	0.3287	0.4703	0	1
	The non-poor	686	0.4053	0.4919	0	1
Use of public health services	**Household average**	1118	0.2282	0.4325	0	1
	The poor	432	0.1063	0.3198	0	1
	The non-poor	686	0.2758	0.4899	0	1
Use of public primary schools (given that at least one child goes to school)	**Household average**	708	0.0624	0.2051	0	1
	The poor	266	0.0156	0.0864	0	1
	The non-poor	442	0.1188	0.2411	0	1
Use of public secondary schools (given that at least one child goes to school)	**Household average**	349	0.2568	0.3548	0	1
	The poor	80	0.1047	0.2490	0	1
	The non-poor	269	0.3147	0.3990	0	1
Wage-earners	**Household average**	1118	0.6932	0.4614	0	1
	The poor	432	0.6574	0.4715	0	1
	The non-poor	686	0.7157	0.4514	0	1
Working in agriculture	**Household average**	1118	0.2853	0.4517	0	1
	The poor	432	0.3241	0.4686	0	1
	The non-poor	686	0.2609	0.4394	0	1

Table 17: Descriptive Statistics of Variables from Other Sources

Variable (province average)	N	Mean	St.Dev.	Min.	Max.
Local financing	114	0.5298	0.2016	0.3533	0.6492
Index of ethnic fractionalization	114	0.6588	0.2941	0.2809	0.8511
Membership in labor unions, trade, agriculture or business cooperatives	114	0.3416	0.1946	0.0270	0.8230
Population density (per km2)	114	86.653	23.145	35.154	119.87
Price level (national average = 1)	114	0.9684	0.2352	0.7465	1.1289
The number of private health facilities per 10,000	114	0.7824	0.9246	0.1355	1.9752
The number of private primary schools per 10,000	114	0.5715	0.4978	0.1098	1.2987
The number of secondary schools per 10,000	114	1.6489	0.9716	0.2401	3.9814
The proportion of elderly population	114	0.0775	0.1260	0.0451	0.1179
The proportion of school-age population	114	0.2401	0.1057	0.1978	0.2841
Urbanization	114	0.6270	0.3054	0.1209	0.9584
Voter turnout	114	0.7710	0.2198	0.5117	0.8866
Wealth index	114	0.4106	0.2574	0.1977	0.6985
Wealth inequality	114	0.4702	0.2016	0.2057	1.2066

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