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Can School Decentralization Improve Learning?

Autonomy, participation and student achievement in rural Pakistan

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Abstract

There is a lack of consensus on how to enhance learning outcomes. The traditional approach to addressing poor quality of schooling has been to increase the quantity of schooling inputs. Recently, however, interest has been growing in the ability of school decentralization to deliver in this area. This paper examines the association between school decentralization and student achievement in the context of rural Pakistan. I find that devolved decision-making is associated with lower scores in Mathematics. I also find that student achievement is better explained by traditional inputs, implying that focussing on the latter may be a stronger policy option to address poor learning outcomes in the country.

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ACRONYMS

ADB	Asian Development Bank
CCB	Pakistan's Citizen Community Boards
EDUCO	El Salvador's Educacion con Participation de la Comunidad
EFA	Education For All
FBR	Pakistan's Federal Bureau of Statistics
GNI	Gross National Income
GoP	Government of Pakistan
HH	Household
LEAPS	Learning and Educational Achievement in Punjab Schools (Survey)
LG	Local Government
LGO	Local Government Ordinance 2001, Pakistan
MoE	Pakistan's Ministry of Education
NER	Net Enrolment Ratio
NRB	Pakistan's National Reconstruction Bureau
OECD	Organization for Economic Cooperation and Development
PEC	Mexico's Programa Escuelas de Calidad
PKR	Pakistani Rupee
PROHECO	Honduras' Proyecto Hondureno de Educacion
SBM	School-Based Management
SMC	School Management Committee or Council
Std. Dev.	Standard Deviation
UIS	UNESCO Institute of Statistics
WB	World Bank

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Introduction

The primary goal of any education system is to impart knowledge. Yet, in much of the developing world, students are emerging from schools without having attained the desired levels of literacy or numeracy (UNESCO 2010).

Traditionally, this poor quality of schooling has been attributed to a lack of resources. However, recent research suggests that merely increasing the quantity of inputs without addressing education governance challenges will not have the desired impact on student achievement (Barrera-Osorio et al 2009). A significant part of this governance challenge is said to arise from *over-centralized* bureaucracies that limit the flexibility of schools to make choices most appropriate for their students (Gunnarrson et al 2004). In response to this perceived inflexibility, governments across the globe are increasingly transferring decision-making power to schools through a form of education decentralization known as School-Based Management (SBM).

SBM can be defined as "..a form of decentralization that identifies the individual school as the primary unit of improvement and relies on the redistribution of decision-making authority as the primary means through which improvement might be stimulated or sustained" (Malen et al 1990, pp290). The reform's central tenet rests on giving frontline providers more *Autonomy* in decision-making in order to increase the relevance of decisions taken (Santibanez 2006). Furthermore, SBM relies on the *Participation* of parents and other community members to enhance accountability in the local education system (Barrera-Osorio et al 2009). By overcoming information asymmetry and accountability challenges, SBM is meant to enhance the quality of education delivery.

In spite of SBM's popularity over the past three decades, few studies have been able to systematically assess how the reform affects student performance. Besides being inconclusive, the evidence base is limited in size, quality and geographic scope. In this paper, I attempt to add to this limited body of research by addressing the question, *Can SBM enhance learning?* in the context of a recent education decentralization reform in Pakistan. Unlike other papers in this arena, I not only exploit a richer dataset, but also consider if SBM's impact is conditional on the availability of more traditional school and household inputs. In order to address my primary query, I present what to my knowledge are the first results of an education production function from Pakistan. This function allows me to evaluate a secondary question that is seldom assessed directly in the literature – *How does SBM's contribution compare to that of more traditional inputs in enhancing attainment?*

Subject to the caveats mentioned in this paper, my findings stand in direct contrast to those of Hess (1999), King and Ozler (2000), and Eskeland and Filmer (2002) who argue that school decentralization enhances student achievement. My results show that higher Autonomy in primary schools is associated with a modest but statistically significant drop in attainment in Mathematics. Participation, on the other hand, does not appear to be significantly associated with student outcomes. Moreover, in contrast to suggestions in the literature, I find that neither interactions of Autonomy and school inputs, nor interactions of Participation and greater household wealth and parental education have a statistically significant impact on test scores. Though unable to isolate the exact drivers

of these outcomes, I suggest that limited personnel management devolvement, poor capacity building and a short time since decentralization may be possible reasons why SBM has not produced the desired effects.

The results of my secondary line of inquiry, on the other hand, are consistent with other studies on the contribution of inputs in developing countries (e.g. Fehrler et al 2009; c.f. Hanushek 1995). The association of higher quantity of school and household inputs is positive and statistically significant, with libraries and computers having the largest point estimates. My overall results are robust to a number of specifications, but do not hold for all geographic sub-samples.

Pakistan was deserving of this study for a number of reasons. For one, the country is representative of many others that are trailing behind on their Education for All (EFA) goals of providing quality primary education by 2015. This implies that the results of this paper may have broader policy implications for similar developing nations. For another, the 2001 devolution reforms are the mainframe around which the country's education policy is designed (MoE 2009). Yet, this policy choice has never been systematically assessed for its ability to address the nation's poor education indicators. My results not only raise questions on its effectiveness, but also indicate that the traditional approach of increasing inputs may yield a more significant impact on student achievement.

The rest of this paper is structured as follows: Chapter 1 presents a review of the relevant literature; Chapter 2 introduces the Pakistan case study; Chapter 3 outlines the methodology employed in this paper; Chapter 4 presents and discusses results. The Conclusions at the end of the paper conclude.

Education Decentralization: A Literature Review

This paper is placed in the two broad strands of literature on Education and Decentralization, as well as in the more specific literature assessing Pakistan's 2001 Devolution Reforms. As a consequence, in this chapter I highlight some of the relevant debates, theoretical justifications and empirical evidence in each area.

I begin by briefly considering the lack of consensus in the Education literature on how to improve learning. Next, I spend considerable time in classifying different types of education decentralization reforms and describing the trends and outcomes of existing empirical evidence. Along Faguet (2008), I suggest that diversity in design and lack of rigorous assessment are reasons why the debate on decentralization has remained unsettled. In the penultimate section, I summarize the trends in the research on Pakistan's devolution. Finally, I conclude this chapter by highlighting the key gaps in the literature that are addressed by this paper.

This review provides the necessary backdrop to the case study that follows.

An Alternative for Enhancing Student Outcomes?

In spite of the importance placed on education by development policymakers and governments alike, there is a lack of consensus on how to enhance learning outcomes.

The traditional approach to improving schooling quality has been to increase the quantity of inputs. Yet, in his seminal review of 96 non-experimental studies on the production function of education, Hanushek (1995) finds mixed results of the impact of six educational inputs on student outcomes. He concludes that increasing inputs such expenditure per student or teacher's salary does not necessarily enhance attainment. In contrast, Kremer (1995) interprets Hanushek's findings differently – he argues that the probability of finding positive, significant results in multiple studies when the actual coefficient is zero is low, indicating that inputs may play a role in achievement after all.

The debate, however, remains unresolved. On one hand, a number of randomized experiments conducted recently support Hanushek's results, finding that greater spending on teachers (Banerjee and Kremer 2002), flipcharts (Glewwe et al 2003) or textbooks (Glewwe and Kremer 2005) does not have a significant impact on student test scores. On the other, authors continue to find positive effects of computers (Banerjee et al 2007), textbooks, and blackboards (Fehrler et al 2009) on learning in both prospective and retrospective studies conducted in developing countries.

The as yet disputed impact of inputs has led many to suggest school governance initiatives, and education decentralization in particular, as a mode of improving outcomes instead (Kremer 2003). But despite the existence of a large literature evaluating education decentralization in various countries, decentralization's ability to enhance student attainment also remains contested.

Advocates such as Winkler (1989) and Pritchett and Pande (2006) argue that locating decisions regarding the organization of instruction and pedagogy closer to those responsible for delivering it can enhance responsiveness through greater knowledge of

local needs and preferences. Further, proponents highlight the benefits associated with creating a "short-route" of accountability (World Bank 2003), whereby parents and communities can exercise their "Voice" and "Exit" options with local governments and schools directly (Eskeland and Filmer 2002). By overcoming information asymmetry and accountability challenges, advocates posit, education decentralization can facilitate higher student attainment (Barrera-Osorio et al 2009).

Critics such as Geojaja (2004), on the other hand, dispute this claim, arguing that politicization of education devolution often results in elite capture and a subsequent decrease in equity of outcomes. Parry (1997) demonstrates this in his examination of Chile's devolution, finding increased inequity and no discernible impact on education outcomes post the reform.

The advocates and critics of education decentralization mirror ongoing debates in the broader literature of decentralization, where the lack of consensus is just as prominent (see Faguet and Sanchez 2008 for a literature review). Empirical research supporting the contrasting claims continues to be mixed, providing neither camp with the evidence required to prove their assertions conclusively.

Different Folks, Different Strokes

One reason for the mixed results may be that the purpose and design of education decentralization varies widely, making country comparisons difficult (Di Gropello 2006). Two dimensions of the reform are integral to understanding the actual structure education decentralization takes in any given country (1) who the responsibility is transferred to and (2) what responsibilities are transferred (Barrera-Osorio et al 2009).

Winkler and Gershberg (2000) provide a useful segmentation for the first question. In their typology, the first form of education decentralization involves moving decision-making of educational matters to lower tiers of governments; the second, moving decisions down to individual schools. Although most countries employ a mix of the two, the second type of education decentralization is typically a management strategy to specifically address concerns of poor school performance (ibid.). Consequently, many consider it an administrative, rather than a political form of devolution (King and Ozler 2000), referring to it as School-Based Management.

The impact either form of education decentralization can have on schooling quality, however, depends largely on the second dimension of the reform: what specific responsibilities are transferred. Here, the OECD suggests four categories in which decision-making are typically decentralized, presented in Table 1. Most commonly devolved tend to be decisions on school maintenance, while decisions on curriculum development, hiring and firing personnel and financial autonomy are less common (Winkler and Gerschberg 2000).

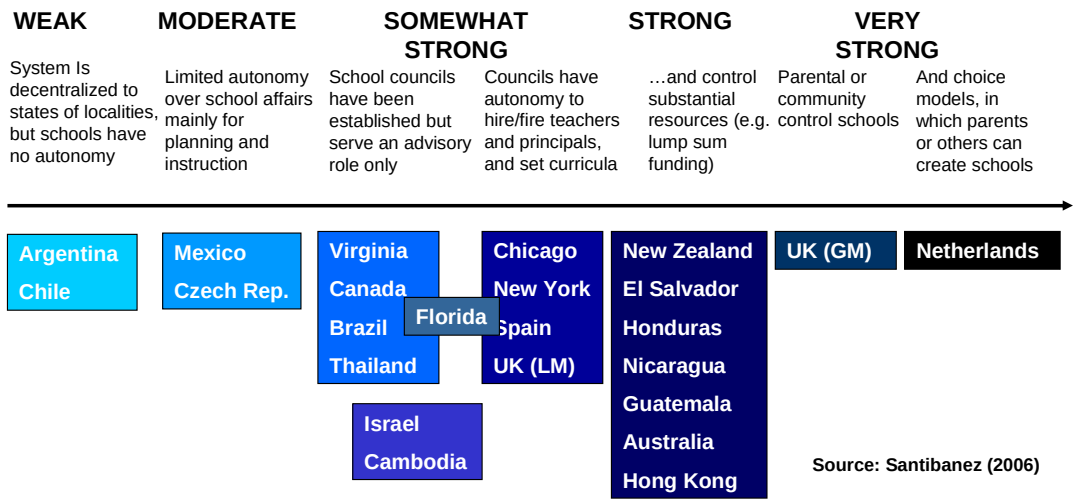
Table 1: Types of Decisions Devolved

Segment	Type of Decisions
Organizaton of Instruction	Select school attended by student Set instruction time Choose textbooks Define curriculum content Determine teaching methods
Personnel Mangement	Hire and fire school director Recruit and hire teachers Set or augment teacher pay scale Assign teaching responsibilities Determine provision of training
Planning and Structures	Create or close a school Maintenance and upkeep of school Selection of programs offered Definition of course content Set examinations to monitor performance
Resources	Develop school improvement plan Allocate personnel budget Allocate non-personnel budget Allocate resources for training

Source: Winkler and Gerschberg 2000

In both forms of education decentralization, however, the actual reform can vary depending on which combination of decisions is devolved. In SBM for instance, estimates indicate that over 800 different models are used in the US alone, with the number being even higher globally (Barrera-Osorio et al 2009). Figure 1 depicts this variety, with Santibanez (2006) using a continuum of weak to strong to classify SBM reforms implemented. In the weaker reforms, school autonomy is limited; in the stronger ones, schools take on considerable personnel management and financial decisions.

Figure 1: Classification of SBM Reforms Implemented



Given this level of diversity in design, it is but expected that comparing and generalizing the impact of education decentralization on outcomes would be a challenging task.

In Search of Rigour: Trends in the Education Decentralization Literature

Another challenge in resolving the debate on decentralization's ability in the area arises from the mode and rigour of assessment. Faguet (2008), for example, argues that the inconclusiveness of decentralization's effects is not surprising given the non-rigorous empirical approaches employed.

That said, the literature on education decentralization has evolved considerably over the past two decades. Like the broad-level literature, the tendency of early works was to focus on theoretical debates, with support from primarily qualitative and often anecdotal accounts of country experiences (e.g. Fiske 1996). These works suffered from the challenge mentioned above of having to compare differing and sometimes incomplete education devolution across countries. In more recent years, the shortcomings of this earlier approach has resulted in a shift towards more detailed country case studies (e.g. Fiszbein 2001), and the use of basic quantitative methods to assess the impact on education outcomes (e.g. Behrman et al 2002; Gamage and Sooksomchitra 2004). While the results of these accounts are again mixed, they do offer more nuanced theories about the reform's ability than previous works.

Most recently, however, a number of studies particularly in the area of SBM have attempted to use quantitative techniques to answer the question of how devolution affects education quality. These studies yield mostly positive results for impact on

repetition and dropout rates and mixed ones on achievement - I consider them in detail in the next section.

A staggering amount of literature throughout has also focused on the pitfalls of decentralization. Authors of these works tend to provide a diverse set of prerequisites to achieving positive outcomes of education decentralization. Some of the salient prescriptions and enablers include better planning, training and capacity building, favourable political environment, history of citizen participation, literacy and equality, piecemeal decentralization and availability of basic inputs such as blackboards and textbooks (Hanson 1997; Litvack et al 1998; Crook and Manor 1998). Nonetheless, given the complexity of decentralization reforms, and the challenge in measuring many of these elements, evidence on how specific prerequisites contribute to outcomes is scarce.

In fact, even in the overall literature on education decentralization which has seen a significant improvement, a lot more causal research is required to settle the dispute indefinitely on the student outcomes expected from the reform.

Weighing the SBM Evidence

Instead of reviewing this entire literature in detail, I set the context for this paper by considering some of the rigorous evidence on SBM alone.

The latter body of work is limited in size and geographic scope. In his comprehensive review of over 50 studies on SBM since 1995, Santibanez (2006) argues that few causal studies exist. Almost all the studies he reviews evaluate reforms in developed countries or Latin America, with only scant quantitative evidence from Asia and other developing regions. Further, the World Bank (2007) argues that less than 12 of the studies reviewed by Santibanez (2006) attempt to correct for *endogeneity* and can be considered rigorous.

Endogeneity is a key reason why establishing causality in this area has been difficult. The main contributor to endogeneity in SBM evaluations is *self-selection bias* (WB 2007). Communities or schools that participate may be composed of particularly motivated individuals who *self-select* into the programme. In such cases, improvement in education outcomes may incorrectly be attributed to reforms when it is actually the motivated individuals driving the change. Further, Di Gropello (2006) argues that a *lack of data availability, difficulty in controlling for external factors and the time it takes for outcomes to change* also contribute to the complexity of studies in this arena.

In this section, I highlight the results of ten key SBM studies, summarized in Table 2 below. The reader is also referred to Santibanez (2006) and Barrera-Osorio et al (2009) who provide excellent recent reviews of the literature on SBM, as well as Gertler et al (2007) who evaluate some of the methodological challenges in the evidence.

No or Negative Impact on Achievement

Perhaps the most celebrated success story of SBM is that of the community-run schools, EDUCO, in El Salvador. EDUCO (*Educacion con Participation de la Comunidad*) school councils have the authority to hire and fire teachers and the responsibility of implementing state education policies (Jimenez and Sawada 1999). In one of the first econometric papers in the area, Jimenez and Sawada (1999) use a Heckman correction

Table 2: Impact of Select Studies

Country	Study	Impact	Approach
No or Negative Impact on Achievement, Positive on Dropout, Repetition or Continuation			
El Salvador	Jimenez and Sawada 1999	No impact on Math or English test scores	Heckman correction model
	Sawada and Ragatz 2005	Increased continuation rates in elementary school	Matched comparison design
Brazil	Paes de Barros and Mendonca 1998	Lower repetition rates No impact on scores	Difference-in-differences - state-level
Mexico	Skoufias and Shapiro 2006	Lower dropout and repetition rates	Matching with Difference-in-differences
Several countries	Gunnarsson et al 2004	No impact on test scores	Instrumental variable: principal attributes & legal structure
Positive Impact on Achievement			
Chicago	Hess 1999	Initial slippage in scores, followed by recovery	Difference in means
Argentina	Eskeland and Filmer 2002	Positive impact on Math, no impact on Language	Expanded education production function
Nicaragua	King and Ozler 2000	Positive on Math and Spanish, no impact on Language	Matched comparison design
	Parker 2005	Positive for third grade Math, negative for sixth grade Math and no impact on Spanish	Matched comparison design
Honduras	Di Gropello and Marshall 2005	Positive on science, no impact on Math or Language test scores Marginally lower dropout rates	Heckman correction model

Source: Cited articles; Santibanez (2006); World Bank (2007)

model to address self-selection bias and assess the impact of attending an EDUCO school on test scores. In a sample base of 600 third graders from both traditional and EDUCO schools, they find no significant difference in test scores for Mathematics or Language. In a follow-up study, Sawada and Ragatz (2005), however, do find a positive effect on continuation rates – third graders in EDUCO schools are 64% more likely to still be in school two years later.

Paes de Barros and Mendonca (1998) find similarly non-significant results on achievement but positive effects on repetition rates when assessing Brazil's three SBM innovations of financial autonomy, head teacher election, and school councils. Their findings indicate that of the three innovations, head teacher election does have a marginally positive impact on student performance. The authors use one of the few Difference-in-Differences (DD) techniques in this area, but the rigour of their approach is let down by the data which is aggregated at state-level and uses only a limited number of observations.

Likewise, Skoufias and Shapiro (2006) employ a DD technique to assess the outcomes of Mexico's Quality Schools (PEC – *Programa Escuelas de Calidad*) programme. They find that participation in PEC resulted in a reduction of 0.24, 0.24 and 0.31 percentage points in dropout, failure and repetition rates, respectively. The authors do not assess the impact on achievement.

Finally, Gunnarsson et al (2004) conduct a quantitative cross-country analysis of SBM outcomes. Using instrumental variables to correct for endogeneity, Gunnarsson et al (2004) evaluate the impact of decentralized school decision-making in ten Latin American

countries including Argentina, Bolivia, Brazil, Chile, Colombia, the Dominican Republic, Honduras, Paraguay, Peru and Venezuela. The authors decompose decentralization into the critical components of Autonomy and Participation to find a negative and significant impact of Autonomy, and a positive and significant of Participation on Mathematics and Language scores. The negative effects of Autonomy appear to be marginal, however, with a one standard deviation increase in Autonomy resulting in 0.97 and 0.50 drop in Mathematics and English scores, respectively. The World Bank (2007) study, however, challenges their results, suggesting that the use of legal structure as an instrument may be invalid as it can have an independent effect on student outcomes.

Positive Impact on Achievement

As a result of data restrictions, the studies yielding a positive impact on test scores range from basic to more sophisticated in technique.

Hess (1999), for example, assesses the changes in student achievement in Chicago schools in a five year longitudinal study, finding that after an initial drop, scores recovered and improved after SBM reforms. Though he employs a simple difference in means method, he finds a significant impact of head teacher selection on outcomes much like the Brazil study.

Eskeland and Filmer (2002) employ an expanded production function to examine the effect of Argentina's decentralization on test scores. Using the same decomposed components of Autonomy and Participation as other studies, they find a positive and significant impact of Autonomy on Mathematics scores, but not on Language. They also do not find any impact of Participation alone, but show that the interaction of the two components yields a significant and positive impact on student attainment. Their work is one of the first to suggest that the components of Autonomy and Participation may work together to enhance outcomes.

Both King and Ozler (2000) and Parker (2005) argue favourably for the impact of Nicaragua's devolution on student achievement. Nicaraguan schools can sign a contract with the Ministry to become autonomous. King and Ozler (2000) exploit this provision to compare the impact of *de jure* (dictated by law) against *de facto* (actual number of decisions made by school councils) Autonomy on test scores of over 3000 students in the country. They find that *de facto* Autonomy has a significant and positive impact on achievement in both Mathematics and Language at the primary level. Parker (2005) uses more recent and nationally representative data to show that school Autonomy has positive effects on Mathematics scores for third grade, but negative effects for sixth grade. The impact is not significant for Language.

Finally, Di Gropello and Marshall (2005) evaluate the PROHECO (*Proyecto Hondureno de Educacion*) schools in Honduras which, similar to EDUCO, serve underprivileged communities and function through decisions made by school councils. They find higher test scores for PROHECO schools in Science but no significant impact on Mathematics or Language. The study also finds marginally lower dropout rates.

To summarize, of the ten studies reviewed, almost all show positive association with dropout and repetition rates when assessed. On the other hand, the lack of consistent

impact on student achievement is striking - only half the studies reviewed show favourable results.

Pakistan's Devolution: Suffering from Lack of Systematic Assessment

The literature on Pakistan's 2001 Devolution Reforms is similarly limited. Due to the recency of the devolution, a majority of the literature available focuses either on reviewing its progress (e.g. Jamil 2002; Nayyar-Stone et al 2006) or on providing policy advice on design (e.g. Khan 2001; ADB/WB/DfID 2004).

Given the lack of data, several authors have also concentrated on examining the political economy of the broader decentralization reform instead. Cheema et al (2006), for example, analyze the political precedents of Musharraf's devolution plan to argue that although the reforms are significant enough to have an impact on the delivery of public services, the direction of the impact remains to be seen. In contrast, Keefer et al (2006) offer a more pessimistic outlook on the subject – they analyze the failures of central provision in Pakistan to conclude that distortions such poor electoral incentives to provide public goods may become more pronounced in decentralization. Hasnain (2008) takes the pessimism further, recommending a re-centralization of health and education on the basis of early data that suggests negligence of both sectors by local governments.

The pessimism is, however, not uniform. In their fieldwork, Watson and Qadir (2005) for instance, find early signs of positive changes in schooling outcomes. Furthermore, in a study on school councils in Punjab, Khan (2007) also discerns encouraging signs for local decision-making and participation. Nonetheless, poor data availability has restricted the basis of both favourable and unfavourable views to anecdotal or hypothetical accounts, rather than more concrete statistical analysis.

Gaps in the Literature

In light of the above discussion, I draw the reader's attention to four gaps that are apparent. First, the evidence of SBM's ability to enhance student attainment is mixed, leaving this critical question unanswered. Second, although a large literature suggests prerequisites to successful decentralization outcomes, to my knowledge no studies assess them systematically. Third, the verdict on inputs is still outstanding. And finally, Pakistan's devolution, though an important change in a developing country lagging behind on its education indicators, has never been systematically assessed for its impact.

In this paper, I address each of these four and attempt to add to a small but growing literature that quantitatively evaluates the impact of SBM reforms on student achievement.

Pakistan Goes Local, Again

The World Bank classifies Pakistan as a lower middle income economy (GNI per capita: USD980). For its level of income, however, Pakistan lags behind on most social indicators, including education (Easterly 2001). In 2008, primary Net Enrolment Ratios (NER) stood at 55%, as compared to 85% for Bangladesh and 100% for Sri Lanka (UIS; FBR), casting doubts on the country's ability to achieve the EFA goals of universal primary education by 2015. Besides poor access, quality of education is also an issue. According to the LEAPS survey (2007), *by the end of grade three only 50% of enrolled children had mastered Mathematics at the first grade level*. *In Urdu, less than 20% of students could understand a simple paragraph*.

The general consensus has been that failing on this front is mostly due to state neglect in the public provision of education (Khan et al 2003), which contributes over 65% of the overall enrolment at the primary level (UIS). Public delivery of education has been characterized by inadequate facilities, teacher absenteeism, and political interference.

In response to calls for improved service delivery of public goods, General Musharraf's military government launched an ambitious decentralization programme in 2001 (NRB). In this chapter, I briefly describe the changes made as part of this reform to set the context for the analysis that follows. I begin by discussing the more general political devolution. Next, I highlight the specific education decentralization and SBM reforms implemented. I conclude by placing Pakistan's *de jure* SBM reforms into the Moderate to Somewhat Strong classification on Santibanez's continuum.

Decentralizing Pakistan

The Local Governance Ordinance (LGO) 2001 decentralized decision-making from Pakistan's 4 federating provinces to local governments (LG) comprising of over 100 districts and more than 6000 union councils (Cheema et al 2006). Although the reforms were Pakistan's third experiment in decentralization, they were distinctive. For the first time in the country's history, service delivery of a majority of public goods was devolved to local bodies (ibid.). The devolution was executed fairly rapidly and has been described by many as "big bang" (Bardhan and Mookherjee 2006).

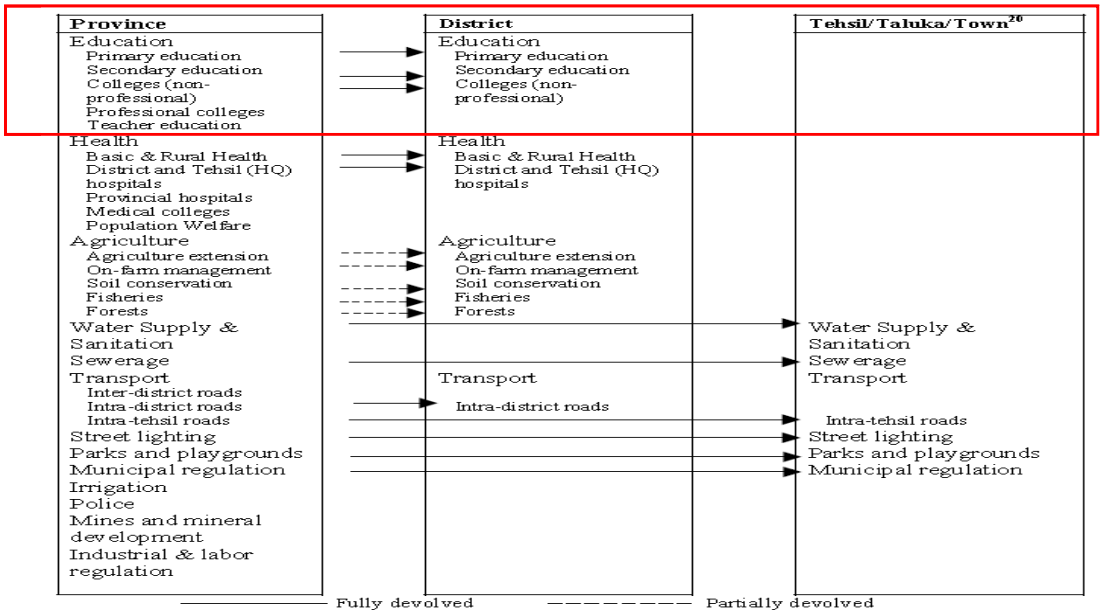
The 2001 devolution entailed significant changes both in fiscal distribution and level of accountability. Districts were given powers to raise additional taxes, and provinces established standard formulas for transferring funds (ADB/WB/DfID 2004). In order to enhance accountability, members of the lowest tier of the electoral structure, union councils, were elected by the adult franchise (ibid.). Elected union council members in turn elected tehsil and district mayors or *Nazims*, with the latter bearing the ultimate responsibility for the district's governance and development.

To maintain horizontal checks on the newly elected LGs, oversight committees and ombudsman services were established. Additionally, to empower communities, over 20k Citizen Community Boards (CCBS) were created across the country with earmarked budgets for development (Watson and Qadir 2005).

Decentralizing Education

Politically, Bardhan and Mookherjee (2006) suggest that the devolution was limited in scope, compared to the more significant administrative decentralization that ensued. Figure 3 depicts the functional reassignment in key areas done as part of the reform, with changes in the education sector highlighted.

Figure 2: Devolved Government Functions



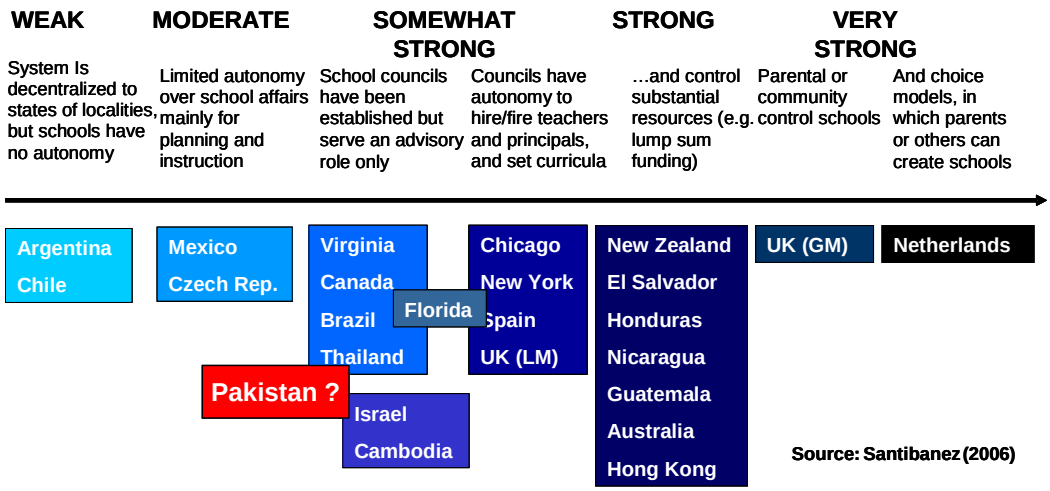
Source: ADB (2004)

As shown, the LGO decentralized responsibility for the delivery of primary and secondary education to districts, making LGs responsible for building new schools, and monitoring and upgrading old ones. In addition, several school-based management reforms were implemented to make schools the centre of decision-making. For instance, authority over personnel management in the form of paying teacher salaries, and assigning teaching responsibilities was devolved not just to local governments, but also to schools and communities (Winkler and Hatfield 2002). However, the hiring of teachers is still a district-level decision, setting of teacher pay scales and allowances remains at the provincial level, while the federal government maintains control over setting norms for the curriculum and testing (Cheema et al 2006).

An important part of the SBM reforms called for the strengthening of school management committees (SMCs) to enhance local decision-making and accountability (Watson and Qadir 2005). SMCs were a pre-devolution initiative implemented in select schools across the public sector, though many never became functional (ADB/WB/DfID 2004). The LGO called for all provinces to develop plans to functionalize SMCs. A SMC was typically meant to consist of nine members including the head teacher or chairperson, along with elected teachers, parents and community members (Khan 2007). Although their original purpose was school maintenance and repairs, post the 2001 reforms, SMCs actively began making decisions regarding school personnel, pedagogy, curriculum and operations as well (Khan 2007). The appointment of head teachers, a decision sometimes delegated to SMCs, was not devolved in Pakistan.

Based on the *de jure* changes made to the educational system described above, it seems adequate to classify the country's SBM as between Moderate and Somewhat Strong. Established school councils have some autonomy over school affairs, similar to Canada or Brazil. However, unlike Chicago or New York, Pakistani school councils cannot hire or fire a majority of teachers and have no control over head teacher selection.

Figure 3: Placing Pakistan in Santibanez's Classification



That said, many authors have highlighted a gap between *de jure* and *de facto* education devolution in many districts. Issues of unclear roles and responsibilities, increased conflict with provinces, and non-availability of funds have led many districts to adopt varying forms of SBM instead of the standard model designed (Shah 2003).

Start-Stop-Start?

On December 31, 2009, the constitutional protection accorded to LGs by the Musharraf rule expired. The incumbent government of President Zardari temporarily handed local bodies back to provinces and postponed the 2009 local elections (Raza 2010). While election dates had still not been set at the time of writing, most experts expect few changes in the LG structure (Gilani 2010). That said, even if the structure is amended, the education sector is unlikely to be affected. Unlike the start-stop devolution of the political system, Pakistan has increasingly decentralized education since the 70's (Shah 2003) and is likely to continue to do so. Local level responsibilities for education are so far unchanged, rendering the analysis that follows relevant even during this transition period.

Methodology

The first chapter highlighted that rigorous and systematic evaluations of SBM's impact on student attainment are scarce. Reasons for the lack of rigour range from poor data availability to concerns of endogeneity.

In this chapter, I outline the methodology employed in this paper, focussing in particular on how I attempt to address the endogeneity challenge arising from restrictions in my own dataset. I begin by describing the conceptual framework. Next, I dedicate space to describing the data and measurement of Autonomy and Participation. I conclude by discussing the paper's empirical strategy, highlighting key caveats that should be kept in mind when viewing the results that follow.

Conceptual Framework

Theory suggests that on the back of increased relevance in decision-making and enhanced accountability, school decentralization in Pakistan should enhance student test scores. To test this hypothesis, I follow Eskeland and Filmer (2002) and employ the use of a second generation education production function.

The traditional education production function postulates that the achievement of individual students is directly related to a series of inputs both in the school attended and from the student's household (Hanushek 1986; 1995). Second generation models build on this basic function by adding factors such as accountability or teacher effort (Fehrler et al 2009). Therefore, following Gunnarsson et al (2004), I add the two measures of decentralized decision-making, Autonomy and Participation, to the traditional function.

I define Autonomy as the ability of the school to choose the level and mix of schooling inputs. Further, I define Participation as the ability of parents and communities to contribute to decision-making, and influence the selection of input level and mix. The expanded equation yields the following:

t = f (x1, x2, A, P, A*P), **where**

t: student test scores
x1: vector representing school characteristics and inputs
x2: vector representing student and household characteristics
A: standardized factor score for Autonomy at school-level
P: standardized factor score for parental Participation at school-level
A*P: series of interaction terms incorporating autonomy and/or participation

While the individual components of x1 and x2 used in the function differ from paper to paper, I employ the use of a rich set of common inputs such as number of textbooks, education level of teachers, parental education and household income. To my knowledge, this is the first attempt to present results of the function from Pakistan[1] and consequently, I spent considerable time in selecting the model. The use of an expanded

[1] Andrabi et al (2009) present select results of the education production function using the same dataset, but focusing on school type as key input

production function also allows me to present indicative results of the relative importance of decentralized decision-making, school and household inputs in outcomes.

In addition, I attempt to examine the sensitivity of Autonomy and Participation to a series of school and household inputs by using multiplicative interaction models. These models are useful in testing conditional hypotheses (Brambor et al 2005) surrounding SBM. Autonomy's impact, for instance, may require adequate school resources as a prerequisite (Barrera-Osorio et al 2009). If schools do not have inputs, the logic goes, providing them with choice in their usage is irrelevant. Consequently, I test the impact of interaction terms for Autonomy and a series of school inputs on test scores.

Furthermore, Banerjee et al (2009) suggest that household factors such as parental education and wealth may dictate not just the level of Participation in schooling decisions, but also its impact. Arising from this, I test the conditional hypothesis that the presence of better household inputs, together with Participation, should have a positive association with test scores.

Data

A rich dataset from the Learning and Educational Achievement in Punjab Schools (LEAPS) survey is used for analysis. The dataset is the result of an ongoing collaboration between Pomona College, Harvard University, the World Bank and the Punjab government to measure attainment levels in the country's largest and most populous province. Student testing was first carried out in 2004, three years after devolution, and covers three districts – Attock, Faisalabad and Rahim Yar Khan - out of a total of 30 in rural Punjab (LEAPS 2007). The districts represent the North, Central and South of the province, respectively. From these districts, a total of 112 villages were randomly selected based on whether they had an existing private school (ibid.).

Detailed questionnaires were administered to educators, students and parents in both rural public and private schools. As a result, the dataset provides:

- Test scores of 12,000 third grade students in English, Mathematics and Urdu
- Responses of third grade class teachers and school head teachers on school inputs and decision-making from all 823 schools surveyed
- Responses of 6,000 tested students on household information
- Responses from 1,800 households on village information

Table 3 below provides select descriptive statistics for the sample. As expected, mean test scores in non-government schools are higher than those in government schools. Additionally, overall absolute Autonomy scores are negative, largely due to the weight of government schools which comprise 60% of the sample and have much lower autonomy than private or NGO schools. Surprisingly, participation is significantly higher in government schools, possibly the result of strong implementation of SMCs in the public schooling system.

Table 3: Select Descriptive Statistics of Sample

	Total		Attock		Faisalabad		Rahim Yar Khan		Govt school		Other	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
English score	500.0	149.9	481.4	166.4	495.7	141.5	524.6	136.1	453.5	145.0	602.9	101.5
Math score	500.1	149.6	467.5	161.4	528.7	140.3	504.1	139.0	476.9	154.3	551.4	124.3
Urdu score	500.0	150.0	488.4	159.8	509.3	141.5	502.3	147.2	469.3	150.8	567.9	123.5
Autonomy score	-0.19	0.81	-0.15	0.81	-0.20	0.78	-0.21	0.83	-0.67	0.37	0.86	0.44
Participation score	4.71	4.03	4.62	3.69	5.28	4.45	4.20	3.81	6.10	3.61	1.66	3.12
Students	12,110		4,124		4,144		3,842		8,341		3,769	
Students - with hh	6,365		2,011		1,981		2,373		3,977		2,388	
Villages	112		37		43		32		112		112	
Schools	823		239		235		349		496		327	

Measuring Autonomy and Participation

While collected for a different purpose, the LEAPS dataset contains not only the inputs required for the production function, but also a number of variables that can be used to measure the level of Autonomy and Participation.

I consider Autonomy and Participation as two latent traits made up of several individual manifest variables and therefore, conducted latent trait analysis. This analysis uses the correlation between manifest variables to link them to the latent variable (Bartholomew et al 2008), allowing me to calculate school-level scores for both components of decentralized decision-making.

The specific components used in the analysis are given in Table 4. Categories of autonomy are adapted from the OECD methodology presented earlier.

Table 4: Measuring Autonomy and Participation

	Parameter	Total			
		Mean	Std. dev.	Min.	Max.
Autonomy Measures					
Autonomy in Organization of Instruction					
1	Choose textbooks	0.38	0.49	0.00	1.00
2	Determine teaching plan	0.99	0.11	0.00	1.00
3	Define curriculum content	0.23	0.42	0.00	1.00
4	Determine teaching methods	0.94	0.24	0.00	1.00
5	Select teaching materials	0.89	0.31	0.00	1.00
6	Select school attended by student	0.52	0.50	0.00	1.00
Autonomy in Personnel Management					
7	Hire or fire teachers	0.46	0.50	0.00	1.00
8	Assign teaching responsibilities	0.70	0.46	0.00	1.00
9	Determine discretionary bonuses	0.40	0.49	0.00	1.00
Autonomy in Resources					
10	Raise additional resources	2,667	6,673	35.00	90,000
Participation Measures					
Participation in SMCs					
1	How often do the committees meet (annually)	3.75	3.92	0.00	20.00
Participation in other school matters					
2	Parental information dissemination	0.97	0.16	0.00	1.00
3	If parents are allowed to participate	0.98	0.13	0.00	1.00
4	How often do parents visit (Monthly)	17.82	17.09	0.00	99.00

The latent trait analysis for Autonomy yields a best fit model that uses five of the ten autonomy measures given above. The results of the reduced factor model are presented in Table 5 and standardized factor scores calculated from this analysis are used in the regressions that follow.

Table 5: Factor Model for Autonomy

Parameter		Reduced factor model used in regressions		
		R2	Factor	p-value
Autonomy Measures				
Autonomy in Organization of Instruction				
1	Choose textbooks	0.7093	6.7909	0.0001
3	Define curriculum content	0.5971	4.2163	0.0001
6	Select school attended by student	0.0408	0.4210	0.0000
Autonomy in Personnel Management				
7	Hire and fire teachers	0.6279	3.4820	0.0000
8	Assign teaching responsibilities	0.0156	0.2766	0.0028

In contrast, latent trait analysis for Participation yields the contradictory results presented in Table 6. Of the four measures examined, only one has a material R2 but is accompanied by a low p-value. Similarly, the only measure with a significant p-value has a low R2. These results suggest that the factors selected for participation cannot be used to combine into a representative factor score.

Table 6: Factor Model for Participation

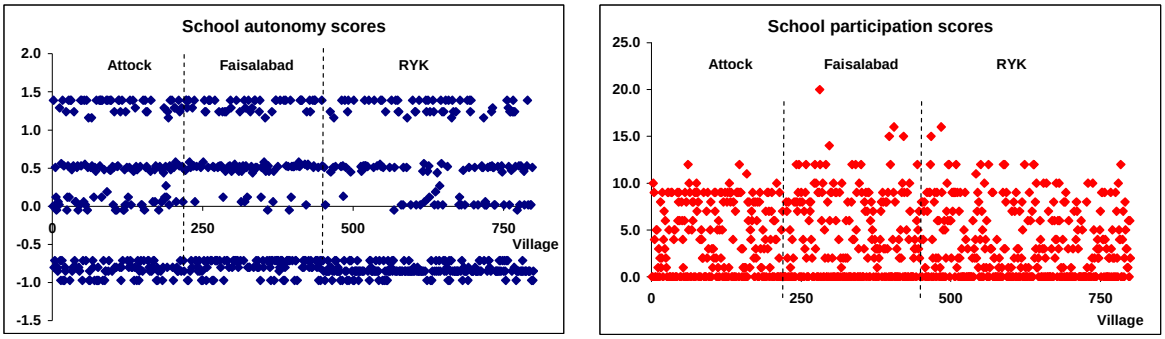
Parameter		All factors		
		R2	Factor	p-value
Participation Measures				
Participation in SMCs				
1	How often do the committees meet	0.0086	0.3636	0.3500
Participation in other school matters				
2	Parental information dissemination	0.5441	4.1271	0.4000
3	If parents are allowed to participate	0.0444	1.2267	0.0330
4	How often do parents visit	0.0032	0.9611	0.5700

Given the limited parameters for Participation in the dataset, I ran regressions using all four measures. Results presented in the main analysis of this paper, however, use the standardized version of the first measure given in the above table only.

Empirical Strategy

My first empirical observation when examining the data is that there is substantial variation in the level of Autonomy and Participation of schools within districts and villages. Figure 6 depicts this, showing that the supposed "big bang" decentralization did not result in uniform devolution. It is this variation between participant and non-participant schools that I exploit to test the main hypothesis of this paper.

Figure 4: Variation in Village and District level Scores



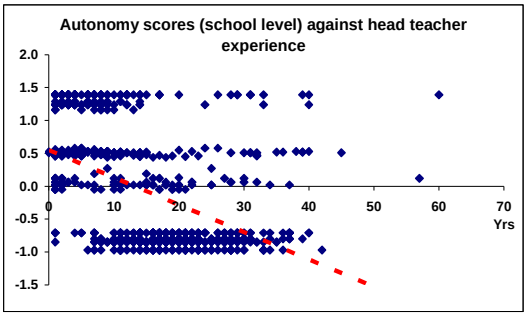
Addressing Endogeneity

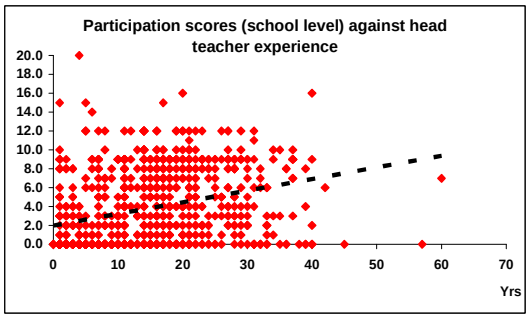
A major challenge in employing this methodology arises from *self-selection bias* (Gertler et al 2007), as mentioned earlier. Schools deciding to participate in the devolution may

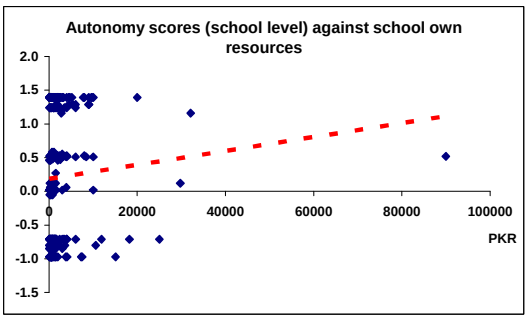
be systematically different from those schools that decided not to participate. Characteristics such as village literacy, for instance, may induce greater parental participation, while also independently resulting in better student educational outcomes. Further, better (or worse) students may choose to participate in more autonomous schools, resulting in *sorting bias* (ibid.). Both biases can confound results.

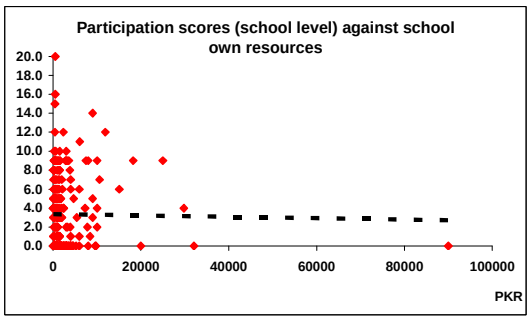
In order to explore the issue of self-selection further, in Figure 7, I plot absolute Autonomy and Participation scores against factors suggested by authors such as Gertler et al (2007) and Barrera-Osorio (2009) as often influencing receptivity towards decentralization. The four common driving factors all show a somewhat mixed and

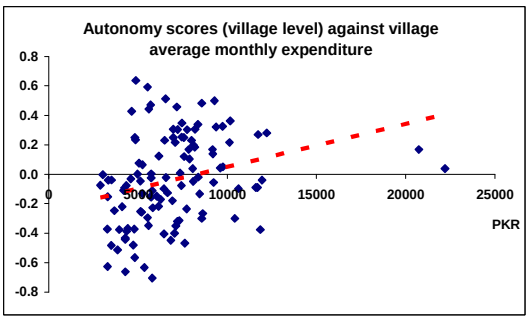
Figure 5: Understanding Trends in Implementation

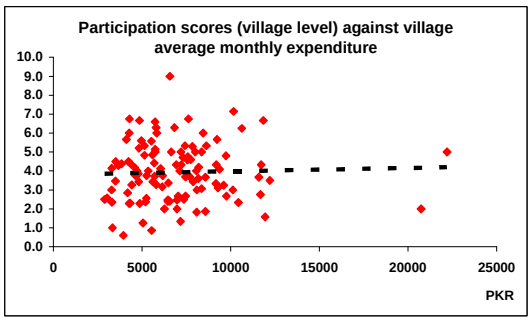


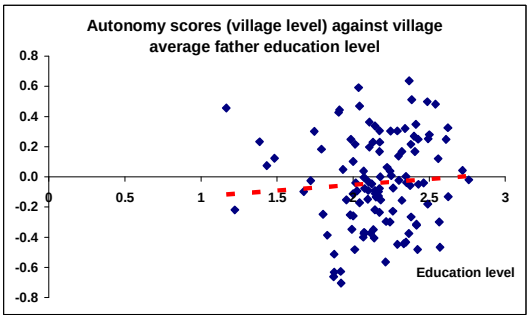


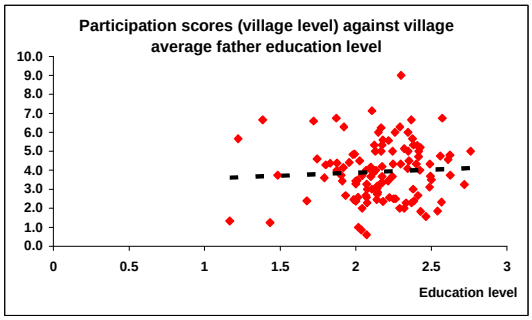












sometimes unexpected correlation with my measures of Autonomy and Participation. Nonetheless, I add them to the production function to reduce biases arising as their consequence.

Besides self-selection, two other biases may influence results. First, *reverse causality* can be an issue. For example, higher Autonomy may be the cause of improved learning outcomes or conversely, better test scores may have persuaded local governments to provide more decision-making power to such schools. Moreover, *omitted variable bias* can also be a challenge. This occurs when a variable that belongs in the model is omitted from the regression (Ramanathan 1998). I employ a couple of approaches to limit the latter, which are discussed below.

Specifications

Three sets of specifications are run to test the paper's hypothesis. For each specification, I run regressions for English, Mathematics and Urdu test scores.

The first and preferred specification is conducted on the smaller 6,000 sample of students for whom both school and household data is available. In this set, I use a greater variety of school and household inputs when compared to the literature on the education production function to limit the possibility of *omitted variables.* However, one could argue that this smaller sample is systematically different from the larger 12,000 group for whom household data has not been captured. To address this, I check my results by running a second specification on the whole sample, albeit without household inputs. Note that this sample is significantly larger than those employed in similar studies (e.g. Jimenez and Sawada 1999; King and Ozler 2000). To further control for possible *omitted variables,* I use fixed effects for villages and districts in both the first and second specification.

In the final specification, I exploit village level variation by adding a vector of village characteristics, and removing the village fixed effect. This is an improvement on previous studies (e.g. Paes de Barros and Mendonca 1998) that use provincial data only, masking achievement variation at more granular levels.

In this paper, a much stronger option to address endogeneity would have been to use an instrumental variable. Instrumental variables are variables that are uncorrelated with the error term, but highly correlated with the endogenous factors (Ramanathan 1998), in this case Autonomy and Participation. As highlighted in the literature review, Gunnarsson et al (2004) do employ this technique, although their instrument is considered invalid by many. Because of this difficulty in finding a suitable and valid instrument, I continue with my simpler, if fallible, methodology.

Given this fallibility, however, it is important that the results presented next be viewed with two key caveats in mind. First, the results highlight correlations in a large dataset that can provide insights into patterns of association between SBM and student attainment. These associations, however, do not necessarily imply causality. Second, although the use of fixed effects and the inclusion of a greater set of input variables should limit endogeneity bias, its presence cannot be completely ruled out in this analysis.

Results

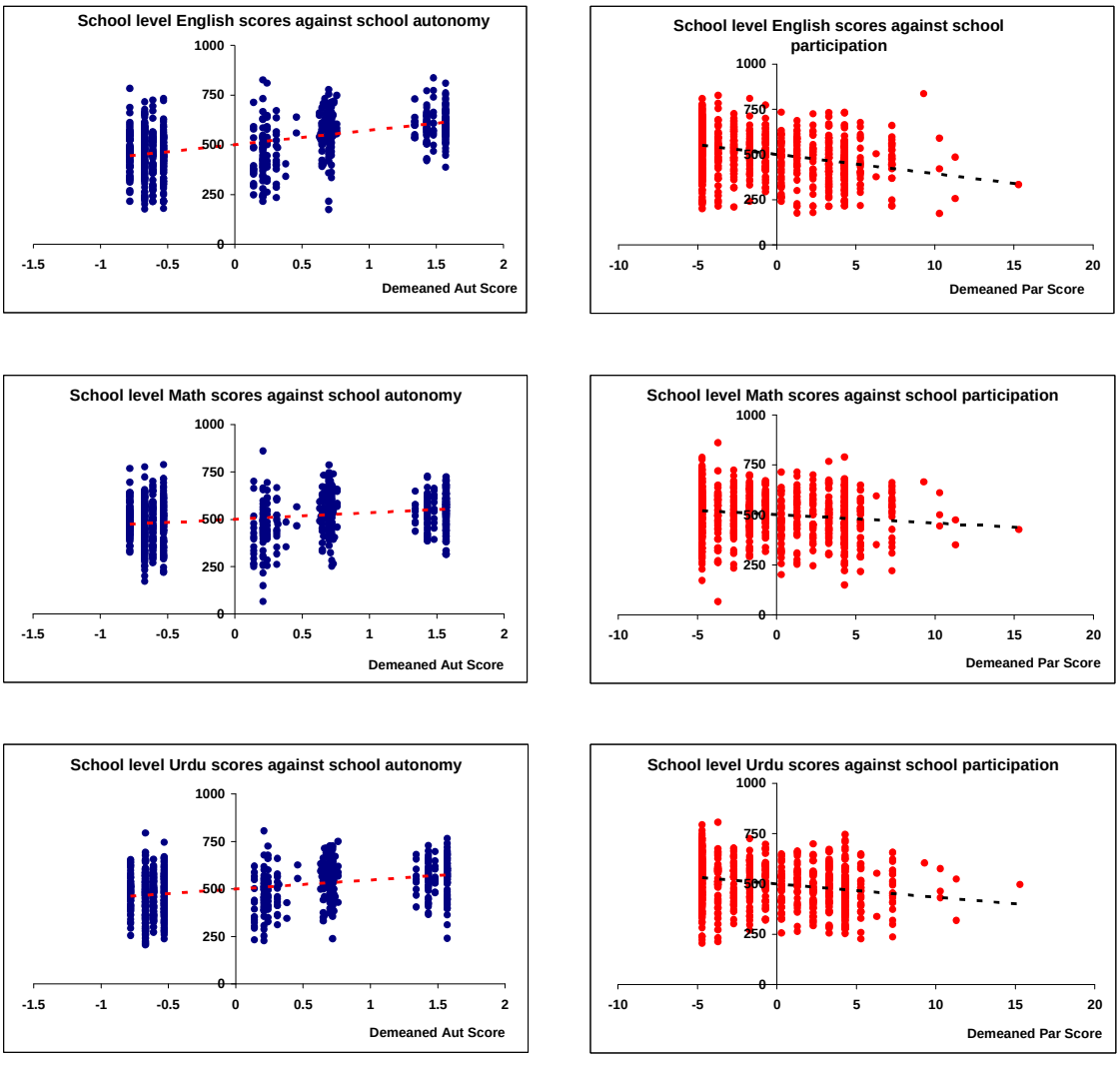
In this final chapter, I present the results of my analysis and discuss the findings.

I begin by considering naïve relationships between Autonomy, Participation and student achievement. Following this, I present the results from the actual regressions run, discussing key variables of both decentralized decision-making, and school and household inputs. I also present indicative results by district and discuss the generalizability of findings. Finally, I conclude by exploring reasons why the SBM may have failed to produce the desired outcomes. Although isolating the causes of these results is beyond the scope of this paper, I offer limited personnel management devolution, poor capacity building and short time since devolution as possible drivers.

Naïve Correlations

In Figure 8, I plot standardized Autonomy and Participation scores against average school test scores for English, Mathematics and Urdu. The naïve relationship between Autonomy and test scores of all three subjects is positive, as would have been expected. Without controlling for inputs, household characteristics or districts, greater Autonomy in schools is positively associated with achievement.

Figure 6: Naïve Relationships of Autonomy, Participation and Test Scores



The naïve relationship of Participation, on the other hand, is negative and correlated with lowered student outcomes. Though unexpected, there is literature to suggest that higher participation by parents in areas where they have no technical expertise can cause such a relationship to occur (see Banerjee et al 2009; Khwaja 2004).

When I run the actual regressions, however, I obtain fairly different findings. Table 5 reports selected results from all nine regressions. Detailed results can be found in the Appendix. P-values are given in parentheses. To limit chances of errors being systematically correlated, they are clustered at school-level.

Autonomy and Participation

In the education production function, coefficients are negative for Autonomy in eight out of the nine regressions run. Comparing this to the naïve correlations shown earlier suggests that the coefficient of Autonomy is biased upwards. *The negative association between Autonomy and student test scores appears to be consistently significant for Mathematics* (see columns (2), (5) and (8))*, but not for English or Urdu.* The effect is marginal however, with having one standard deviation more Autonomy than the average school being associated with 17 to 23 points lower achievement scores in Mathematics. This finding is consistent with Gunnarsson et al (2004), albeit in direct contrast to Hess (1999), King and Ozler (2000) and Eskeland and Filmer (2002). Like many other studies, I find no relationship between Autonomy and Language scores[2].

For Participation, coefficients are negative for the English and Urdu specifications, but positive for Mathematics. In *none of the cases, however, is Participation significant*. Using all four measures of Participation yields similar results (not presented). I explore possible drivers for the broad Autonomy and Participation results later in this chapter.

Theory suggests that Autonomy and Participation may be mutually reinforcing and therefore highly correlated (Gunnarsson et al 2004). This raises concerns of multicollinearity which could bias the significance of results downwards (Ramanathan 1998). Consequently, I analyze their correlation, finding that it is both weak and negative. Dropping Participation but keeping Autonomy or vice versa does not changes the signs, significance or magnitude of the coefficients presented.

Interacting Autonomy and Participation with each other and with common school and household inputs respectively yields no significant or interesting findings on potential prerequisites of SBM. The impact of Autonomy is not conditional on having more textbooks, greater class teacher experience, or living in a wealthier village. The coefficient on the interaction between Autonomy and an index of school inputs does have the expected positive sign in most cases, indicating that school Autonomy, together with basic inputs like blackboards and libraries, would be positively associated with test scores. This, however, is not significant. Perhaps the most striking finding is that neither mother nor father education interacted with Participation is significantly related to achievement either way. The interaction between family wealth or living in a wealthier village with Participation, is also not significant. This suggests that these items are not prerequisites to successful SBM as suggested in the literature.

[2] One reason why associations are generally seen in Mathematics but not in Language may be that Mathematics learning is more receptive to teaching quality than in other subjects

Table 7: Selected Results

	(1) Eng1	(2) Math1	(3) Urdu1	(4) Eng2	(5) Math2	(6) Urdu2	(7) Eng3	(8) Math3	(9) Urdu3
Autonomy	-5.273	-18.84*	-8.785	-7.058	-17.48*	2.066	-5.7	-22.63*	-16.04
	(0.53)	(0.04)	(0.29)	(0.41)	(0.04)	(0.81)	(0.50)	(0.01)	(0.06)
Participation	-4.047	0.934	-1.764	-3.078	2.134	-1.9	-3.992	0.716	-1.512
	(0.18)	(0.74)	(0.49)	(0.38)	(0.50)	(0.52)	(0.13)	(0.80)	(0.53)
Interaction Results									
Interaction	2.075	0.849	1.796	2.104	0.225	2.297	2.244	0.813	2.015
	(0.38)	(0.71)	(0.41)	(0.44)	(0.93)	(0.28)	(0.33)	(0.72)	(0.35)
Autonomy * Subject Textbook Today	-0.578	-0.2146	0.296	-0.2091	-0.1321	0.486	-0.9419*	-0.7068	-0.302
	(0.13)	(0.56)	(0.39)	(0.57)	(0.71)	(0.11)	(0.02)	(0.07)	(0.42)
Autonomy * Class Teacher Exp.	-1.216	-1.490*	-0.873	-1.007	-1.24	-0.972	-0.586	-1.24	-0.461
	(0.07)	(0.03)	(0.20)	(0.19)	(0.14)	(0.15)	(0.37)	(0.09)	(0.53)
Autonomy * School Input Index	-2.652	28.11	-1.203	0.00897	23.99	5.237	-2.152	40.08	17.89
	(0.90)	(0.23)	(0.96)	(1.00)	(0.31)	(0.81)	(0.92)	(0.10)	(0.43)
Autonomy * Village Monthly Expenses							-0.00186	-0.00312	-0.00430**
							(0.31)	(0.06)	(0.01)
Participation * Mother Education	0.00916	-0.62	0.581				0.0933	-0.745	0.318
	(0.99)	(0.32)	(0.33)				(0.88)	(0.28)	(0.62)
Participation * Father Education	0.339	-0.229	-0.251				0.258	-0.271	-0.559
	(0.47)	(0.65)	(0.59)				(0.61)	(0.62)	(0.25)
Participation * Asset Wealth	-0.342	-0.482	-0.277				-0.327	-0.752	-0.424
	(0.28)	(0.17)	(0.41)				(0.35)	(0.06)	(0.24)
Participation * Village Monthly							-0.000501	-8.07E-05	-0.000563
							(0.27)	(0.84)	(0.13)
Select Input Results									
Number of blackboards	5.300**	3.514*	5.013***	4.962**	2.77	4.878**	4.870**	3.641*	4.510**
	(0.00)	(0.02)	(0.00)	(0.00)	(0.11)	(0.00)	(0.00)	(0.02)	(0.00)
Library	30.34**	13.54	26.13**	39.90***	29.08**	39.06***	22.06*	5.371	14.6
	(0.00)	(0.18)	(0.01)	0.00	(0.01)	0.00	(0.01)	(0.58)	(0.12)
Computer	38.80**	21.91	42.58**	35.21*	18.28	33.06*	35.52**	11.59	28.91*
	(0.01)	(0.13)	(0.00)	(0.01)	(0.23)	(0.02)	(0.01)	(0.39)	(0.03)
Select Household (HH) Results									
Asset wealth index	7.125***	6.119**	5.021*				5.917**	7.060**	5.475*
	0.00	(0.00)	(0.02)				(0.01)	(0.00)	(0.02)
Mother education	0.114	-1.912	0.709				0.0873	-1.34	1.468
	(0.96)	(0.43)	(0.76)				(0.97)	(0.61)	(0.56)
Father education	9.687***	8.359***	10.03***				9.713***	8.218***	9.701***
	0.00	0.00	0.00				0.00	0.00	0.00
Number of elder siblings	-2.477**	-2.723**	-2.557**				-2.441**	-2.883**	-2.260*
	(0.00)	(0.00)	(0.01)				(0.01)	(0.01)	(0.02)
N	5,703	5,694	5,704	11,194	11,137	11,216	5,658	5,649	5,659
R2	0.397	0.228	0.26	0.368	0.22	0.236	0.331	0.137	0.171
Joint significance of A, P and interactions	0.4627	0.1068	0.5321	0.6148	0.1138	0.725	0.3832	0.0606	0.1788
Joint significance of Inputs	0.0000	0.0023	0.0000	0.0000	0.0005	0.0000	0.0000	0.0004	0.0000
Joint significance of Household (HH) factors	0.0000	0.0000	0.0000				0.0000	0.0000	0.0000
Controls	24 Inputs, 8 HH	24 Inputs, 8 HH	24 Inputs, 8 HH	24 Inputs	24 Inputs	24 Inputs	24 Inputs, 8 HH, 8 Village	24 Inputs, 8 HH, 8 Village	24 Inputs, 8 HH, 8 Village
Fixed effects village	Y	Y	Y	Y	Y	Y	N	N	N
Fixed effects district	Y	Y	Y	Y	Y	Y	Y	Y	Y

p-values in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Errors clustered at school-level, Dependent Variable: Student Test Scores

The marginal impact seen in the Mathematics results is also evident when I test the joint significance of Autonomy, Participation and their basic interaction. This is not significant in any of the equations. The above findings hold for the larger 12,000 sample as well – see columns (4), (5) and (6).

Inputs

The impact of school inputs is often positive and significant, in line with other studies from developing countries (e.g. Fehrler 2009 c.f. Hanushek 1995). *The 24 school inputs employed in the model are jointly significant at the 1% level.* Having a library, computers, subject textbooks and a greater number of blackboards is significantly and positively associated with test scores in all three subjects for most specifications. The magnitude of both libraries and computers is material for English and Urdu, with one standard deviation related to up to 40 and 43 points higher scores, respectively.

The point estimate is largest in magnitude for the public school dummy, which is significant at the 1% level and associated with 70 to 126 points lower test scores. This points to the existence of other school or household inputs that set public school students apart but have not been captured by the model. The reader is referred to Andrabi et al (2009) who present comprehensive findings in this area.

Surprisingly, few teacher or head teacher characteristics have significant results. One explanation for the lack of correlation could be that while public school teachers are better qualified than their private school counterparts (LEAPS 2007), they exert lower effort. Recall that Pakistani public schools have limited personnel management autonomy, which is why accountability mechanisms may remain weak in this area. Another explanation could be that poor quality of training of teachers means that neither their qualifications, nor their experience, translate into a better ability to teach (ibid.).

The 8 household factors employed in the models are jointly significant at the 1% level. As per conventional wisdom, the wealth of a household has a positive and significant relationship with achievement, holding other things constant. On the other hand, a greater number of elder siblings has a negative and significant association with attainment. In parental education, I find that it is father, and not mother, education level that is significantly correlated with scores.

Lack of joint significance of the village characteristics in the third specification, together with a lowered R2 for the equation, indicate that the factors chosen do not capture village characteristics well – see columns (7), (8) and (9). Due to the limited number of variables available at this level, I therefore prefer my first specification instead.

Finally, note that R2 of the preferred education production function is in the range of 0.2 to 0.3. This is in line with similar studies, but highlights that there are various factors contributing to student achievement that are not yet understood in the literature (Eskeland and Filmer 2002).

Generalizing Results

But are these findings generalizable to other parts of the country, or even similar developing nations?

I first briefly consider if the use of district fixed effects is masking geographic differences within the sample itself. Table 8 shows selected results of the preferred specification for Mathematics. As before, findings are suggestive only and bear chances of endogeneity.

Table 8: Selected Results by District

	(1) Math1	(2) Attock	(3) Faisalabad	(4) Rahim Yar Khan
Autonomy	-18.84*	-38.39*	7.391	-20.15
	(0.04)	(0.01)	(0.65)	(0.16)
Other Inputs				
Public School Dummy	-80.21***	-122.2***	-53.57	-86.22*
	0.00	(0.00)	(0.17)	(0.02)
Number of blackboards	3.514*	6.489*	0.841	4.447*
	(0.02)	(0.04)	(0.76)	(0.04)
Father education	8.359***	12.84***	7.165*	3.997
	0.00	(0.00)	(0.02)	(0.21)
Number of elder siblings	-2.723**	-6.175**	-0.697	-1.885
	(0.00)	(0.00)	(0.61)	(0.18)
N	5,694	1,839	1,815	2,040
R2	0.228	0.331	0.257	0.204

I find that the association between Autonomy and Mathematics scores does not hold for all districts. While Attock and Rahim Yar Khan both have negative coefficients, Faisalabad shows a positive, albeit not significant, estimate for Autonomy. Results for Participation and interaction factors remain the same and therefore are not presented here.

Though some other reasons for this geographic difference are explored in the next section, an obvious starting point is that there may be differences in access indicators in these districts. Given limited government resources, in areas where access is already high we could expect a greater focus on schooling quality and vice versa. NERs for Faisalabad, for instance, stand at 72 against 49 for Rahim Yar Khan, complying with this expectation.

But are these districts representative of the province and Pakistan in general? Yes and no. While they do reflect the geographic disparities in education indicators in Punjab, the villages themselves are richer than the average village in the country (LEAPS 2007). That said, a large part of the rural population currently resides in similar villages both in the provinces of Punjab and Khyber Pakhunkhwa (previously NWFP), implying that results should hold well in these areas. External validity for rural Sindh or Balochistan, however, would be limited due to significant institutional and social differences (ibid.), as would be validity for urban areas and secondary schools.

Nonetheless, LEAPS (2007) suggests that villages surveyed are similar to many others in Bangladesh, Nepal and India. This means that the results of this paper may help inform education policymaking in these nations, in addition to having broader implications for other countries trailing behind on their EFA goals.

Exploring the Drivers of Poor SBM Outcomes

SBM's theoretical promise to enhance learning outcomes is strong. But, as this paper demonstrates, SBM in practice does not necessarily produce the desired outcomes. In this section, along Bardhan and Mookherjee (2006), I argue that this is because decentralization's impact usually depends on context, design and implementation. Due to limited space, I consider only the most relevant elements of each of these three items.

Consider context for instance. In many countries, the failure of decentralization to live up to its promise is attributed to the *contextual* presence of an elite class that "captures" the devolution process. In SBM, this can occur when special interest groups take over school governance and implement policies for their own ends, rather than those for improving education. Evidence of SBM elite capture is not uncommon – Borges (2007) for instance, shows that in Brazil, teachers exchange their votes in the head teacher election for personal favours. Similar capture occurrences are documented in Nigeria, where schools post SBM focus solely on the learning needs of the elite class (Geojaja 2004).

Is there evidence of the same in Pakistan? Some, though not a lot. Although local government elections have been fair and well contested (Hasnain 2008), elections of SMC members have been less so. Khan (2007) reports that often head teachers select, rather than elect, prominent community members and landowners to participate. With regards to the former, this is not necessarily damaging - prominent community members often use their influence to contribute positively to school management (ibid.). With regards to the latter, the outcome is less clear.

Kurosaki (2006) finds a negative relationship between land inequality and CCB participation, but Gazdar (2001) and Keefer et al (2003) argue that the "feudal power thesis" is not the key cause of poor public delivery of education in Pakistan. Large landlords do exert considerable personal influence; however, because the feudal class is non-cohesive, individual landlords are more likely to lobby for more, rather than less, education to win over the community (ibid.). (See also Olson 1965 and Fritzen 2007 who suggest that capture by a small elite group is beneficial).

To consider these claims, I ran regressions on sub-samples of rich and poor children (not presented), finding that my results hold for both sub-samples. This implies that decisions are not in favour of the rich group either, as advocates of elite capture would have contended. On the basis of this, one could argue that though SMC elite capture is a possibility, it is unlikely to be the main cause of the negative outcomes of SBM.

The more likely suspect is *design* of the reform. Di Gropello (2006) argues that the exact type of decision decentralized to each level may determine how education outcomes are affected. Although a number of authors suggest the ideal matrix of decision and devolution level, Pritchett and Pande (2006) use the "First Principles of Accountability and Finance" to present the most theoretically persuasive model. They contend that all matters of school operations including personnel management and non-wage expenditures should rest with schools and committees, while LGs should assume responsibility for building new schools and monitoring school processes.

Herein may lie the problem with the Pakistani SBM reform. Although some personnel management decisions have been given to schools, many lie with the district and many more continue to be the responsibility of the province. Yet, as the results show, teacher characteristics are not significant in student attainment which may imply weak local accountability mechanisms. Similarly, the financial autonomy of schools is rather limited and LGs continue to wield power over resource usage (Shah 2003).

Without having more authority over these items, schools may be unable to affect attainment positively. If we refer back to Santibanez's classification and the favourable SBM studies presented, this trend is confirmed. Chicago, Nicaragua and Honduras have given considerable personnel management and financial autonomy to schools and show positive SBM outcomes (Argentina may be an exception).

To assess whether this is a likely driver, I run regressions using the individual ten components of Autonomy identified in the Methodology chapter[3]. I find that all three parameters of personnel management autonomy and the one parameter for resources autonomy have positive, although not significant, coefficients (not presented). This change in signs suggests that there may be some weight in this particular line of argument. Considering this possibility, the Punjab government is currently piloting councils with greater personnel management autonomy (Watson and Qadir 2005).

Poor capacity building during *implementation* is yet another area that has garnered attention as restricting the ability of SBM to deliver on its promise. What evidence do we have of this in Pakistan? Consider the participation results. SMC members in public schools meet more regularly than in private schools, as indicated by the data. But, their contribution is not enhancing outcomes. Some argue this could be attributed to illiteracy or poverty as a result of which parents do not have the ability or time to contribute positively (Barrera-Osorio et al 2009). However, this argument does not hold up in light of the Participation interaction results presented earlier. Besides the two channels discussed above, one other plausible explanation for why parental contribution is not effective emerges based on the literature: lack of adequate training.

Di Gropello (2006) shows that all SBM countries in Central America spent considerable time training committee members on administration and budgeting. In contrast, Shah (2003) points to a lack of SMC training in Pakistan. In their comprehensive review of education capacity building, Watson and Qadir (2005) take this argument further, suggesting that training of both schools and districts on budget preparation, monitoring of teachers, and pedagogical matters are critical to enhancing the effectiveness of Pakistan's devolution.

Capacity building and training may be particularly important in the country, which as a highly fractionalized society, has a limited history of collective action (Easterly 2001). Yet, the ability to act collectively towards common education goals is integral to how well stakeholders work together in a decentralized education system (Miguel and Gugerty 2005). This line of argument may partially explain why Faisalabad – a district with a history of self-reliance and collective action (Watson and Qadir 2005) – has a positive

[3] Note that because all Autonomy parameters are self-reported, I prefer to use the latent trait analysis factor scores rather than individual components in the main analysis

coefficient for Autonomy as opposed to the other districts which do not have this history (see also Putnam 1993). In its absence, nonetheless, training can provide an alternate route through which communities build systems of working together.

The above said about context, design and implementation, it is entirely possible that capacity to work collectively and manage schools better will evolve naturally in Pakistan over time. My assessment may simply be premature. Putnam (1993), for instance, argues that the impact of decentralization should be evaluated not even over years, but over decades. Further, the Chicago study offers an interesting precedent, where Hess (1999) demonstrates that after an initial drop, student scores improved. Moreover, studies from the US indicate that SBM needs eight years before changes to scores are witnessed (Borman et al 2003).

Yet, this is not a universal guideline – Paes de Barros and Mendonca (1998) saw no impact on scores after 11 years of implementation in Brazil, while Skoufias and Shapiro (2006) present positive impacts of SBM on repetition rates in Mexico after just 2 years. Furthermore, SMCs were implemented in Pakistan in 1994 and my assessment captures the effect of these reforms as well. In light of this, one can argue that by now some positive outcomes should have been visible.

Regardless of this, without more research we cannot rule out the possibility that Pakistan's schools were actually spending this early period experimenting with Autonomy and Participation, and adjusting to SBM changes. While it is possible that positive effects have followed by now, unless challenges in the area of design and capacity building were also addressed, a change in this negative association with test scores seems unlikely.

In contrast, if we go back to consider the significant results for inputs, together with the fact that four fifths of the schools in the sample do not have a library, nine tenths do not have computers, and almost a third of the students do not have textbooks, then increasing inputs does seem to offer a more solid policy option to enhance learning in the country.

Conclusion

Development policymakers and governments agree that education is important for development. Yet, despite a significant improvement in access over the past few decades, the quality of education continues to be so low that children often emerge from schools without having acquired basic skills. In Sub-Saharan Africa, for instance, the probability of young adults with five years of education being illiterate is 40% (UNESCO 2010); in India, two thirds of primary school students cannot read a simple paragraph, while almost half cannot perform basic subtraction (Pratham 2006).

School-Based Management is a strategy that is growingly being adopted by governments to address these poor learning outcomes. However, there is little empirical backing for its supposed promise in this area. To address this gap, I set out to explore the association between SBM and student achievement using a rich dataset from rural Pakistan.

I found that in contrast to the paper's hypothesis on the benefits of SBM, my two measures of school decentralization – Autonomy and Participation – were not positively associated with achievement. Therefore, in answering my primary question *Can SBM enhance learning? I found no support to argue in favour of SBM*. On the contrary, for Mathematics I saw a significant negative association. Furthermore, I also found no support for suggestions made in the literature that the impact of Autonomy on achievement is conditional on having more school inputs, or that the impact of Participation is conditional on better household inputs. *This implies that if there are prerequisites to successful SBM reforms, the items tested are not representative of them*.

Finally, in the results for my secondary line of inquiry *What is the relative importance of SBM and inputs in enhancing student attainment? I found support for the traditional argument that inputs play a larger role in achievement*. Both school and household inputs were jointly significant at the 1% level, while Autonomy and Participation were not. Taken together, these results should raise questions on the effectiveness of Pakistan's devolution reform in enhancing student outcomes.

Regardless of these findings, I do not argue against school decentralization in this paper per se - even decentralization's strongest advocates are quick to highlight that devolution is not a panacea for all evils. Instead, my argument is much more modest – I examine the early impact of an important education reform to highlight, like many others, that the outcome of decentralization depends on context, design and implementation. I offer limited personnel management devolution, poor capacity building and short time since devolution as possible drivers of the failure of SBM to live up to its promise in Pakistan. And, on the basis of the above analysis, I conclude that where the context, design and implementation of Pakistan's SBM is concerned, the traditional approach of providing inputs appears to be more relevant in enhancing student attainment.

That said, focus on inputs is unlikely to be enough on its own; incentives and governance of the education system are also integral to improving outcomes. However, in its current form, my results indicate that Pakistan's SBM reform is not producing the desired effects. One reason highlighted is timing, as analysis was carried out on data three years after the reform. Validation of my findings using more current data, consequently, is an

important area for further research. Moreover, because a number of studies point to the promise of SBM in reducing dropout and failure rates, understanding how Pakistan's other indicators have been affected can help paint a broader picture of the reform's effectiveness. Just as important is the need to validate, through more qualitative work, the drivers of the results seen in this paper. This validation could assist policymakers in best addressing the pitfalls of decentralization and in improving the design of the reform. Finally, more research that systematically assesses the different regional outcomes of devolution in the same country could prove invaluable in identifying prerequisites of SBM beyond those considered in this paper. This should ensure that SBM lives up to its theoretical promise more often than not.

On a final note, a key caveat to my results and those of similar studies is endogeneity. Because randomized trials are best suited to establishing causality, a number of trials are underway in Indonesia, Kenya, and even Pakistan (Gertler et al 2007). The results of these trials should go a long way in establishing the ability of SBM to enhance learning in a controlled environment. In the real world, however, the differences in context, design and implementation of SBM mean that we are going to continue seeing heterogeneity in student outcomes.

Bibliography

ADB/WB/DfID. 2004. *Devolution in Pakistan*. Asian Development Bank, World Bank, DfID. Available at http://www.adb.org/Documents/Studies/Devolution-in-Pakistan/default.asp (Accessed August 08, 2010)

Andrabi, T., J. Das, A. Khwaja, T. Vishwanath, T. Zajonc and the LEAPS team. 2007. *Leaning and Educational Achievements in Punjab Schools (LEAPS): Insights to Inform the Education Policy Debate*. Available at http://leapsproject.org/site/publications/ (Accessed July 19, 20, 21, 2010)

Andrabi, T., J. Das, A. Khwaja and T. Zajonc. 2009. *Here Today, Gone Tomorrow? Examining the Extent and Implications of Low Persistence in Child Learning.* Kennedy School of Government Faculty Research Working Paper Series. RWP09-001

Banerjee, A. and M. Kremer. 2002. *Teacher Student Ratios and School Performance in Udaipur, India: A Prospective Evaluation*. Washington DC: Brookings Institution.

Banerjee, A., S. Cole, E. Duflo and L. Linden. 2007. Remedying Education: Evidence from Two Randomized Experiments in India. *Quarterly Journal of Economics. p*p 1235 - 1264

Banerjee, A., R. Banerji, E. Duflo, R. Glennerster, S.Khemani. 2009. *Pitfalls of Participatory Programs.* Working Paper, Poverty Action Lab.

Bardhan, P. and D. Mookherjee. 2000. Capture and Governance at Local and National Levels. *The American Economic Review.* Vol. 90, No. 2: pp 135 – 139

Bardhan, P. and D. Mookherjee. 2006. The Rise of Local Governments: An Overview. In Bardhan and Mookerjee, *Decentralization and Local Governance in Developing Countries: A Comparative Perspective.* Cambridge, MA: MIT

Barrera-Osorio, F., T. Fasih, H. Patrinos, L. Santibanez. 2009. *Decentralized Decision-Making in Schools. The Theory and Evidence on School-Based Management.* Washington DC: World Bank

Bartholomew, D., F. Steele, I. Moustaki and J. Galbraith. 2008. *Analysis of Multivariate Social Science Data*. Taylor and Frank: New York.

Behrman, J., A. Deolalikar and L. Soon. 2002. *Promoting Effective Schooling through Education Decentralization in Bangladesh, Indonesia and Philippines.* ERD Working Paper Series, Asian Development Bank. No. 23

Borges, A. 2007. From Patronage Politics to Community Deliberation: The Recent Experience of Democratic School Management in Brazil. *Public Administration and Development.* Volume 27: pp 273-282.

Borman, G., G. Hewes, L. Overman and S. Brown. 2003. Comprehensive School Reform and Achievement: A Meta-analysis. *Review of Educational Research.* 73 (2): pp 125 - 230

Brambor, T., W. Clark and M. Golder. 2005. Understanding Interaction Models: Improving Empirical Analyses. *Political Analysis.* Vol. 14: pp 63 - 82

Cheema, A., A. Khwaja and A.Qadir. 2006. Local Government Reforms in Pakistan: Context, Content and Causes. In Bardhan and Mookerjee, *Decentralization and Local Governance in Developing Countries: A Comparative Perspective.* Cambridge, MA: MIT

Crook, R. and J. Manor. 1998. *Democracy and Decentralization in South Asia and West Africa.* Cambridge: Cambridge University Press.

Di Gropello, E. 2006. *A Comparative Analysis of School-Based Management in Central America.* World Bank Working Paper No. 72. Washington DC: World Bank

Di Gropello, E and J. Marshall. 2005. Teacher Effort and Schooling Outcomes in Rural Hounduras. In E. Vegas, *Incentives to Improve Teaching*. Washington DC: The World Bank.

Easterly, W. 2001. *The Political Economy of Growth without Development: A Case Study of Pakistan*. Development Research Group. World Bank.

Eskeland, G. and D. Filmer. 2002. *Autonomy, Participation, and Learning in Argentine Schools.* Policy Research Working Paper, The World Bank Development Research Group. No. 2766

Faguet, JP. 2008. *Governance from Below in Bolivia: A Theory of Local Government with Two Empirical Tests*. STICERD Political Economy & Public Policy Discussion Paper No. 12.

Faguet, JP and F. Sanchez. 2008. Decentralization's Effects on Educational Outcomes in Bolivia and Colombia. *World Development*. Vol. 36, Issue 7: pp 1294 - 1316

Federal Bureau of Statistics (FBR). 2008. Pakistan Social and Living Standards Measurement (PSLM) Survey 2007-2008. http://www.statpak.gov.pk/depts/fbs/statistics/statistics.html (Accessed July 16, 2010)

Fehrler, S., K. Michaelowa, A. Wechtler. 2009. The Effectiveness of Inputs in Primary Education: Insights from Recent Student Surveys for Sub-Saharan Africa. *Journal of Development Studies.* 45:9, pp 1545-1578

Fiske, E. 1996. *Decentralization of Education: Politics and Consensus*. Washington DC: The World Bank

Fizsbein, A. 2001. *Decentralizing Education in Transition Societies: Case Studies from Central and Eastern Europe*. Washington: World Bank Institute.

Fritzen, S. 2007. Can the Design of Community-driven Development reduce the Risk of Elite Capture? Evidence from Indonesia. *World Development*. 35 (8): pp 1359 - 1375

Gamage, D. and P. Sooksomchitra. 2004. Decentralization and School-Based Management in Thailand. *International Review of Education.* Vol.50. No.3/4: pp 289:305

Gazdar, H. 1999. *Policy Failure, Political Constraints and Political Resources: An Agenda for Research on Basic Education in Pakistan.* Asia Research Center, Working Paper 5. London School of Economics.

Geojaja, M. 2004. Decentralization and Privatization of Education in Africa: Which Option for Nigeria? *International Review of Education.* Vol.50. No.3/4: pp 307-323

Gertler, P., H. Patrinos and M. Rubio-Codina. 2007. *Methodological Issues in the Evaluation of School-Based Management Reforms*. Mimeo. Available at http://www.ifs.org.uk/edepo/rubio_methodological.pdf

Gilani, I. 2010. PA passes Local Government Amendment Bill 2010. *The Nation*, February 05, 2010. http://www.nation.com.pk. (Accessed August 08, 2010)

Glewwe, P., M. Kremer, M. Moulin and E. Zitzewitz. 2003. Retrospective vs. Prospective Analysis of Flip Charts in Kenya. *Journal of Development Economics.* 74(1): pp 251 - 268

Glewwe, P. and M. Kremer. 2005. Schools, Teachers and Education Outcomes in Developing Countries. In Hanushek and Welsh, *Handbook on the Economics of Education.* North Holland: Elsevier

Grindle, M. 2007. *Going Local: Decentralization, Democratization, and the Promise of Good Governance.* New Jersey: Princeton University Press

Gunnarsson, V., P. Orazem, M. Sanchez, and A. Verdisco. 2004. *Does School Decentralization Raise Student Outcomes? Theory and Evidence on the Roles of School Autonomy and Community Participation.* Working Paper 04005, Iowa Stata University Department of Economics.

Hanson, E. 1997. Educational Decentralization: Issues and challenges. Available at http://www.thedialogue.org/PublicationFiles/PREAL%209-English.pdf

Hanushek, E. 1986. The Economics of Schooling: Production and Efficiency in Public Schools. *Journal of Economic Literature.* Volume 24. No. 3: pp 1141 - 1177

Hanushek, E. 1995. Interpreting Recent Research on Schooling in Developing Countries. *The World Bank Research Observer.* Volume 10. No. 2: pp 227-246

Hasnain, Z. 2008. *Devolution, Accountability, and Service Delivery: Some Insights from Pakistan.* Policy Research Working Paper, The World Bank South Asia Region. No. 4610

Hess, G. 1999. Understanding Achievement (And Other) Changes under Chicago School Reform. *Educational Evaluation and Policy Analysis.* Vol. 21. No. 1. pp 67 -83

Jamil, B. 2002. *Decentralization and Devolution: Educational Implications of the Praetorian Interpretation*. Lahore: Aagahi Trust.

Jimenez, E. and Y. Sawada. 1999. Do Community-managed Schools Work? An Evaluation of El Salvador's EDUCO Program. *World Bank Economic Review* 13(3): pp 415 - 441.

Keefer, P., A.Narayan and T. Vishwanath. 2003. *The Political Economy of Decentralization in Pakistan.* Mimeo. Available at http://sticerd.lse.ac.uk/dps/decentralisation/Pakistan.pdf

Keefer, P., A.Narayan and T. Vishwanath. 2006. Decentralization in Pakistan; Are Local Governments likely to be More Accountable than Central Governments. In Bardhan and Mookerjee, *Decentralization and Local Governance in Developing Countries: A Comparative Perspective.* Cambridge, MA: MIT

Khan, F. 2007. School Management Councils: A Lever for Mobilizing Social Capital in Rural Punjab, Pakistan? *Prospects.* Vol. XXXVII, No.1: pp 57 - 79

Khan, S. 2001. Promoting Democratic Governance: The Case of Pakistan. *The European Journal of Development Research.* Vol.13, No.2: pp 81 - 96

Khan, S., S. Kazmi and Z. Latif. 2003. *A Comparative Institutional Analysis of Government, NGO and Private Rural Primary Schooling in Pakistan*. Mimeo.

Khwaja, A. 2004. Is Increasing Community Participation Always a Good Thing? *Journal of European Economic Association.* 2: pp 427 - 436

King, E. and B. Ozler. 2000. *What's Decentralization Got To Do With Learning? Endogenous School Quality and Student Performance in Nicaragua.* The World Bank Development Research Group

Kremer, M. 1995. Research on Schooling: What we Know and what we Don't: A Comment on Hanushek. *The World Bank Observer*. Vol. 10. No. 2: pp 247 - 254

Kremer, M. 2003. Randomized Evaluations of Educational Programs in Developing Countries: Some Lessons. *The American Economic Review*. Volume 93. No. 2: pp 102-106

Kurosaki, Takashi. 2006. *Determinants of Collective Action under Devolution Initiatives: The Case of Citizen Community Boards in Pakistan.* Paper prepared for the JICA Devolution Support Seminar, Lahore.

LEAPS Project Dataset. 2005. Available at http://leapsproject.org/site/data/ (Accessed on July 20 – 31, 2010)

Litvack, J., J. Ahmad and R. Bird. 1998. *Rethinking Decentralization in Developing Countries.* The World Bank Sector Studies Series. No. 21491

Malen, B., R. Ogawa and J. Kranz. 1990. What do we know about Site-based Management: A Case Study of the Literature – a Call for Research. In Clune and

White, *Choice and Control in American Education: The Practice of Choice, Decentralization and School Restructuring*. London: Falmer Press.

Miguel, E. and M. Gugerty. 2005. Ethnic diversity, social sanctions, and public goods in Kenya. *Journal of Public Economics*. No. 89: pp 2325-2368

Ministry of Education. 2009. *National Education Policy 2009.* Islamabad: Government of Pakistan.

National Reconstruction Bureau (NRB), http://www.nrb.gov.pk. (Accessed August 03, 2010).

Nayyar-Stone, R., R. Ebel, S. Ignatova and K. Rashid. 2006. *Assessing the Impact of Devolution on Healthcare and Education in Pakistan.* Washington DC: The Urban Institute

Olson, M. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups.* Cambridge: Cambridge University Press.

Paes de Barros, R. and R. Mendoca. 1998. The Impact of Three Institutional Innovations in Brazilian Education, In W.D. Savedoff, ed., *Organization Matters. Agency Problems in Health and Education in Latin America*. Washington DC: Inter-American Development Bank.

Parker, C. 2005. Teacher Incentives and Student Achievement in Nicaraguan Autonomous Schools, In E. Vegas, *Incentives to Improve Teaching*. Washington DC: The World Bank.

Parry, T. 1997. Achieving Balance in Decentralization: A Case Study of Education Decentralization in Chile. *World Development.* Volume 25. No. 2: pp 211-225

Pratham. 2006. *Annual Status of Education Report, 2005*. New Delhi: Pratham Resource Center.

Pritchett, L. and V. Pande. 2006. *Making Primary Education Work for India's Rural Poor: A Proposal for Effective Decentralization.* Social Development Papers, South Asia Series. Paper No. 95, World Bank.

Putnam, R. 1993. *Making Democracy Work: Civic Traditions in Modern Italy.* New Jersey: Princeton University Press.

Raza, S. 2010. Nazim's reign ends in three provinces. *Dawn*, January 01, 2010. http://www.dawn.com. (Accessed January 02, 2010)

Ramanathan, R. 1998. *Introductory Econometrics with Applications*. Harcourt College Publishers: Orlando.

Santibanez, L. 2006. *School-Based Management Effects on Educational Outcomes: A Literature Review and Assessment of the Evidence Base*. Washington DC: The World Bank

Sawada, Y. and A. Ragatz. 2005. Decentralization of Education, Teacher Behaviour and Outcomes: The Case of El Salvador's EDUCO Program, In E. Vegas, *Incentives to Improve Teaching*. Washington DC: The World Bank.

Shah, D. 2003. *Country Report on Decentralization in the Education System of Pakistan: Policies and Strategies.* Academy of Educational Planning and Management, Ministry of Education. Islamabad: Government of Pakistan.

Skoufias, E. And J. Shapiro. 2006. *Evaluating the Impact of Mexico's Quality Schools Program: The Pitfalls of Using Nonexperimental Data.* Impact Evaluation Series 8, Policy Research Working Paper 4036, Washington DC: The World Bank

Winkler, D. 1989. *Decentralization in Education: An Economic Perspective.* Working Paper, Population and Human Resources Department, The World Bank. No. 143

Winkler, D., and A. Gershberg. 2000. *Education Decentralization in Latin America: The Effects on the Quality of Schooling,* LCSHD Paper Series No. 59. Washington DC: The World Bank.

Winkler, D. and R. Hatfield. 2002. *The Devolution of Education in Pakistan*. Washington DC: World Bank.

UNESCO. 2010. *EFA Global Monitoring Report: Reaching the Marginalized.* Oxford and Paris: Oxford University Press and UNESCO.

UNESCO Institute for Statistics (UIS). http://stats.uis.unesco.org/unesco. (Accessed May 21, 2010)

Watson, D. and A. Qadir. 2005. *Capacity building for Decentralized Education Service Delivery in Pakistan.* European Center for Development Policy Management. Discussion Paper No. 57G.

World Bank. 2003. *World Development Report 2004: Making Services Work for Poor People.* New York: Oxford University Press.

World Bank. 2007. *What do we know about School-Based Management?* Washington DC: World Bank

Appendix: Complete Results

Detailed Regression Results

	(1) Eng1	(2) Math1	(3) Urdu1	(4) Eng2	(5) Math2	(6) Urdu2	(7) Eng3	(8) Math3	(9) Urdu3
Autonomy	-5.273	-18.84*	-8.785	-7.058	-17.48*	2.066	-5.7	-22.63*	-16.04
	(0.53)	(0.04)	(0.29)	(0.41)	(0.04)	(0.81)	(0.50)	(0.01)	(0.06)
Participation	-4.047	0.934	-1.764	-3.078	2.134	-1.9	-3.992	0.716	-1.512
	(0.18)	(0.74)	(0.49)	(0.38)	(0.50)	(0.52)	(0.13)	(0.80)	(0.53)
Interactions									
Interaction	2.075	0.849	1.796	2.104	0.225	2.297	2.244	0.813	2.015
	(0.38)	(0.71)	(0.41)	(0.44)	(0.93)	(0.28)	(0.33)	(0.72)	(0.35)
Autonomy * Subject Textbook Today	-0.578	-0.2146	0.296	-0.2091	-0.1321	0.486	-0.9419*	-0.7068	-0.302
	(0.13)	(0.56)	(0.39)	(0.57)	(0.71)	(0.11)	(0.02)	(0.07)	(0.42)
Autonomy * Class Teacher Exp.	-1.216	-1.490*	-0.873	-1.007	-1.24	-0.972	-0.586	-1.24	-0.461
	(0.07)	(0.03)	(0.20)	(0.19)	(0.14)	(0.15)	(0.37)	(0.09)	(0.53)
Autonomy * School Input Index	-2.652	28.11	-1.203	0.00897	23.99	5.237	-2.152	40.08	17.89
	(0.90)	(0.23)	(0.96)	(1.00)	(0.31)	(0.81)	(0.92)	(0.10)	(0.43)
Autonomy * Village Monthly Expenses							-0.0019	-0.0031	-0.00430**
							(0.31)	(0.06)	(0.01)
Participation * Mother Education	0.00916	-0.62	0.581				0.0933	-0.745	0.318
	(0.99)	(0.32)	(0.33)				(0.88)	(0.28)	(0.62)
Participation * Father Education	0.339	-0.229	-0.251				0.258	-0.271	-0.559
	(0.47)	(0.65)	(0.59)				(0.61)	(0.62)	(0.25)
Participation * Asset Wealth	-0.342	-0.482	-0.277				-0.327	-0.752	-0.424
	(0.28)	(0.17)	(0.41)				(0.35)	(0.06)	(0.24)
Participation * Village Monthly Expenses							-0.0005	-8E-05	-0.000563
							(0.27)	(0.84)	(0.13)
Participation * Public School	3.255	-1.979	0.454	1.054	-5.163	-0.577	3.378	-2.448	0.0506
	(0.42)	(0.62)	(0.90)	(0.82)	(0.22)	(0.88)	(0.37)	(0.54)	(0.99)
Inputs									
Public school dummy	-124.6***	-80.21***	-89.30***	-125.9***	-77.47**	-87.97***	-122.4***	-77.38***	-93.22***
	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	(0.00)	0.00
Total No. of Students	-0.0599	-0.0377	-0.0214	-0.104**	-0.0742*	-0.0673*	-0.0664	-0.0379	-0.0171
	(0.12)	(0.35)	(0.59)	(0.01)	(0.04)	(0.05)	(0.06)	(0.31)	(0.66)
No. of Grade3 Students	0.0318	-0.0038	0.0427	0.231*	0.00369	0.0797	0.086	-0.0256	0.0916
	(0.87)	(0.99)	(0.77)	(0.02)	(0.97)	(0.42)	(0.58)	(0.89)	(0.51)
Medium of Teaching	-2.303	-1.651	-0.619	-0.919	-0.0052	0.282	0.0782	0.937	-0.55
	(0.54)	(0.67)	(0.86)	(0.82)	(1.00)	(0.94)	(0.98)	(0.80)	(0.88)
No. of Govt Schools in 5min Distance	-5.492	1.459	-0.0951	-4.314	3.299	1.243	-3.519	0.641	3.767
	(0.24)	(0.77)	(0.98)	(0.39)	(0.52)	(0.79)	(0.47)	(0.90)	(0.43)
Number of Permanent classrooms	-3.245	-1.3	-4.741*	-1.512	-0.144	-3.406	-0.363	0.365	-2.156
	(0.11)	(0.53)	(0.01)	(0.48)	(0.95)	(0.08)	(0.85)	(0.86)	(0.27)
Number of Semipermanent classrooms	-3.24	-2.48	-6.014*	-2.341	-1.276	-6.119*	-1.7	-2.247	-4.883
	(0.22)	(0.38)	(0.03)	(0.38)	(0.65)	(0.02)	(0.50)	(0.41)	(0.08)
Number of Toilets	5.374	4.954	2.674	-0.115	2.261	-2.326	7.149	5.164	5.834
	(0.22)	(0.26)	(0.52)	(0.98)	(0.63)	(0.59)	(0.09)	(0.27)	(0.20)

Number of blackboards	5.300**	3.514*	5.013***	4.962**	2.77	4.878**	4.870**	3.641*	4.510**
	(0.00)	(0.02)	(0.00)	(0.00)	(0.11)	(0.00)	(0.00)	(0.02)	(0.00)
Library	30.34**	13.54	26.13**	39.90***	29.08**	39.06***	22.06*	5.371	14.6
	(0.00)	(0.18)	(0.01)	0.00	(0.01)	0.00	(0.01)	(0.58)	(0.12)
Computer	38.80**	21.91	42.58**	35.21*	18.28	33.06*	35.52**	11.59	28.91*
	(0.01)	(0.13)	(0.00)	(0.01)	(0.23)	(0.02)	(0.01)	(0.39)	(0.03)
Wallfence	10.77	12.7	6.515	17.21	18.96	11.72	15.2	13.42	5.393
	(0.32)	(0.26)	(0.52)	(0.13)	(0.10)	(0.25)	(0.19)	(0.25)	(0.61)
Fans	8.03	-26.96	-3.441	2.44	-30.58	-6.165	13.09	-17.05	11.08
	(0.62)	(0.10)	(0.83)	(0.90)	(0.13)	(0.73)	(0.44)	(0.35)	(0.54)
Electricity	-7.783	30.95	11.48	6.605	32.51	20.83	-20.91	18.67	-7.748
	(0.61)	(0.07)	(0.46)	(0.71)	(0.10)	(0.23)	(0.21)	(0.33)	(0.67)
Subject textbook	1.145*	0.739	1.234**	0.914*	0.941*	1.292***	0.668	0.458	0.709
	(0.01)	(0.10)	(0.00)	(0.03)	(0.03)	0.00	(0.11)	(0.33)	(0.09)
Condition of textbook	-1.233	-1.224	-2.524**	-0.393	-0.807	-1.977*	-0.495	-0.335	-1.452
	(0.13)	(0.16)	(0.00)	(0.61)	(0.34)	(0.01)	(0.53)	(0.70)	(0.08)
Coverage of curriculum	0.719***	0.387*	0.0418	0.896***	0.323	0.0756	0.828***	0.623**	0.289
	0.00	(0.04)	(0.81)	0.00	(0.10)	(0.69)	0.00	(0.00)	(0.12)
Gender of Classteacher (1=female)	8.831	-16.24	2.225	13.29	-14.13	4.943	7.351	-16.71	0.597
	(0.29)	(0.07)	(0.78)	(0.14)	(0.11)	(0.57)	(0.41)	(0.09)	(0.95)
Classteacher experience	-1.657	-0.723	-0.609	-1.473	-0.0259	-0.351	-1.538	-0.433	-0.692
	(0.05)	(0.49)	(0.48)	(0.08)	(0.98)	(0.66)	(0.09)	(0.68)	(0.48)
Classteacher Training: primary	3.867	2.678	0.92	3.79	4.18	3.777	3.842	4.889	2.585
	(0.53)	(0.69)	(0.88)	(0.58)	(0.55)	(0.53)	(0.54)	(0.48)	(0.70)
Classteacher Training: secondary	-6.866	-7.728	-2.863	-10.99*	-2.288	-3.101	-7.682	-5.405	-0.527
	(0.20)	(0.24)	(0.61)	(0.04)	(0.71)	(0.55)	(0.18)	(0.51)	(0.94)
Age of Classteacher	1.878**	1.096	1.127	1.928**	0.738	0.972	1.697*	0.957	1.554
	(0.01)	(0.23)	(0.12)	(0.01)	(0.38)	(0.17)	(0.03)	(0.28)	(0.05)
Head teacher Years in Teaching	0.0768	0.505	0.246	0.019	0.765	0.327	-0.105	0.104	-0.147
	(0.86)	(0.24)	(0.58)	(0.97)	(0.09)	(0.50)	(0.81)	(0.82)	(0.74)
Head teacher Duration in Position	-0.876	-1.526*	-1.429*	-0.413	-1.07	-1.463*	-1.125	-2.014**	-1.879**
	(0.16)	(0.03)	(0.02)	(0.51)	(0.10)	(0.02)	(0.09)	(0.01)	(0.01)
Child Gender (1=female)	7.477	-5.15	25.62***	7.761	-5.865	24.67***	8.797	-0.849	28.94***
	(0.15)	(0.36)	0.00	(0.15)	(0.29)	0.00	(0.12)	(0.89)	0.00
Household Factors									
Asset wealth index	7.125***	6.119**	5.021*				5.917**	7.060**	5.475*
	0.00	(0.00)	(0.02)				(0.01)	(0.00)	(0.02)
Motorcycle	8.938	13.03*	15.16**				9.709	13.40*	13.91*
	(0.07)	(0.02)	(0.01)				(0.08)	(0.04)	(0.02)
TV	2.839	0.743	3.379				7.3	0.834	4.851
	(0.50)	(0.87)	(0.45)				(0.10)	(0.87)	(0.31)
Mother education	0.114	-1.912	0.709				0.0873	-1.34	1.468
	(0.96)	(0.43)	(0.76)				(0.97)	(0.61)	(0.56)

Father education	9.687***	8.359***	10.03***				9.713***	8.218***	9.701***
	0.00	0.00	0.00				0.00	0.00	0.00
Number of Elder Siblings	-2.477**	-2.723**	-2.557**				-2.441**	-2.883**	-2.260*
	(0.00)	(0.00)	(0.01)				(0.01)	(0.01)	(0.02)
Age of Child	0.714	5.058**	0.334				0.989	5.284**	1.934
	(0.66)	(0.01)	(0.84)				(0.57)	(0.01)	(0.30)
Body Mass Index	0.84	-0.836	-0.491				-0.0778	-1.719	-0.743
	(0.40)	(0.41)	(0.61)				(0.94)	(0.12)	(0.49)
Village Characteristics									
Male Members in Politics							3.861	-14.76	-5.918
							(0.89)	(0.60)	(0.84)
Female Members in Politics							-52.02	-15.99	-37.18
							(0.33)	(0.75)	(0.40)
Ownership of Agricultural Land							-5.388	-30.45	-12.99
							(0.81)	(0.19)	(0.56)
Separate Kitchen in House							10.7	-13.41	-29.91
							(0.70)	(0.64)	(0.27)
Toilet in House							-28.82	-29.68	-8.76
							(0.20)	(0.22)	(0.71)
Monthly Expenditure							-0.0024	-0.0002	0.0000241
							(0.17)	(0.92)	(0.99)
Village Mother Literacy							20.98	-13.9	-15.62
							(0.36)	(0.58)	(0.48)
Village Father Literacy							-12.99	-21.35	-3.307
							(0.54)	(0.33)	(0.88)
Constant	409.0***	402.3***	455.4***	468.9***	438.8***	470.1***	441.8***	499.2***	465.8***
N	5,703	5,694	5,704	11,194	11,137	11,216	5,658	5,649	5,659
R2	0.397	0.228	0.26	0.368	0.22	0.236	0.331	0.137	0.171
Joint significance of A, P and interactions	0.4627	0.1068	0.5321	0.6148	0.1138	0.725	0.3832	0.0606	0.1788
Joint significance of Inputs	0.0000	0.0023	0.0000	0.0000	0.0005	0.0000	0.0000	0.0004	0.0000
Joint significance of Household (HH) factors	0.0000	0.0000	0.0000				0.0000	0.0000	0.0000
Joint significance of Village Factors							0.6930	0.6599	0.0004
Controls	24 Inputs, 8 HH	24 Inputs, 8 HH	24 Inputs, 8 HH	24 Inputs	24 Inputs	24 Inputs	24 Inputs, 8 HH, 8 Village	24 Inputs, 8 HH, 8 Village	24 Inputs, 8 HH, 8 Village
Fixed effects village	Y	Y	Y	Y	Y	Y	N	N	N
Fixed effects district	Y	Y	Y	Y	Y	Y	Y	Y	Y

p -values in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Errors clustered at school-level, Dependent Variable: Student Test Scores