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# Decentralization of Health and Education in Developing Countries: A Quality-Adjusted Review of the Empirical Literature<sup>1</sup>

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## Abstract

We review empirical evidence on the ability of decentralization to enhance preference matching and technical efficiency in the provision of health and education in developing countries. Many influential surveys have found that the empirical evidence of decentralization's effects on service delivery is weak, incomplete and often contradictory. Our own unweighted reading of the literature concurs. But when we organize quantitative evidence first by substantive theme, and then – crucially – by empirical quality and the credibility of its identification strategy, clear patterns emerge. Higher quality evidence indicates that decentralization increases technical efficiency across a variety of public services, from student test scores to infant mortality rates. Decentralization also improves preference matching in education, and can do so in health under certain conditions, although there is less evidence for both. We discuss individual studies in some detail. Weighting by quality is especially important when quantitative evidence informs policy-making. Firmer conclusions will require an increased focus on research design, and a deeper examination into the prerequisites and mechanisms of successful reforms.

**Keywords:** *Decentralization, School-Based Management, Education, Health, Service Delivery, Developing Countries, Preference Matching, Technical Efficiency*

**JEL:** H41, H75, H77, 01

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## 1. Introduction

Decentralization is a broad policy movement across both the developing and developed worlds (Agnew 1990a, 1990b). In the late 1990s it was estimated that 80 percent of the world's countries were experimenting with one form or another of decentralization (Manor 1999). Since then, new or deepening reforms have been announced in nations as diverse as Bolivia, Cambodia, Egypt, Ethiopia, France, Indonesia, Japan, Mexico, South Korea, Turkey, and many others. By now it is safe to say that experiments with, and enthusiasm for, decentralization are essentially ubiquitous across the globe.

Theories underpinning such enthusiasm are compelling and argue that by taking the government "closer to the people", decentralization can improve the responsiveness and accountability of the state, decrease corruption, increase the political voice and participation of ordinary citizens, and also reduce bureaucracy and lower the unit costs of government expenditure (Faguet 2014; Faguet 2012). The slogan "closer to the people" can be decomposed into three underlying analytical advantages that local governments have over central government: (a) superior information on local conditions and needs, (b) greater participation of citizens in decision making and the production of local services, and (c) greater accountability of public officials to voters (Escobar-Lemmon 2006; World Bank 2004). The local governments possessing such advantages preside over jurisdictions that are smaller and more homogeneous than those of national government. Local governments' decision making will thus be facilitated by not having to cater to a more diverse set of needs and wants. With superior information, participation, accountability, and policy challenges that are less onerous, it follows logically that decentralization should improve public services.

Yet the many surveys of the literature overwhelmingly agree that empirical evidence is inconclusive. In one of the earliest reviews, for instance, Rondinelli et al. (1983) note that decentralization seldom, if ever, lived up to its promise. Shah et al. (2004) concur in a review of 56 studies published since the late 1990s, chronicling that decentralization in some cases improved, and in others worsened, service delivery, corruption and growth across a large range of countries. Treisman's (2007) more recent survey is bleaker still. "To date," he says, "there are almost no solidly established, general empirical findings about the consequences of decentralization" (p. 250). The lack of consensus on decentralization's effects over 25 years and literally hundreds of studies is striking.

One of the main challenges faced by such review efforts is the sheer size and diversity of scholarship. The empirical literature on decentralization originates from a variety of disciplines, including policy studies, public economics, development studies and comparative politics, to name just a few. Evaluations of reforms are done in markedly different ways and focus on very different outcomes, ranging from service delivery to corruption to macro-economic stability and happiness. Any attempt to review these results as a whole quickly loses the forest for the trees in a confusion of particular findings that may appear contradictory, but are more often simply different. To draw firmer conclusions from this vast literature, we argue, a clearer organizing principle is required – a principle that allows students of decentralization to neatly compare the *causal* effects of a similar kind of reform on similar predefined outcomes.

In this review we apply such an organizing principle to assess decentralization's ability to enhance service delivery in developing nations. Decentralization is defined here as “the transfer of authority for decision-making, finance, and management to quasi-autonomous units of local governments” (Litvack and Seddon 1999: p.3). This implies the transfer from national to subnational levels of government of: (i) authority over physical assets and human resources involved in service provision, (ii) responsibility for the quality of public services provided, and (iii) adequate finance to fund such activities – including in many cases authority to raise local taxes. We thus define decentralization as similar to “democratic devolution”, per Manor (1999). As Devarajan et al. (2009) have noted, many decentralizations around the world are at best partial reforms that do not meet all of these criteria. To increase the probability of comparing like with like, we limit this review to studies of decentralizations where authority, resources and responsibility have effectively been devolved, and exclude cases of partial reform.<sup>4</sup>

It is also the case that countries decentralize different specific services and bundles of resources to different hierarchical levels of government. This is not least because countries vary hugely in size and administrative division. Rather than attempt to control for the fact that, for example, Indian states and cities are vastly larger than Bolivian departments and towns, we simply acknowledge that countries' characteristics vary

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<sup>4</sup> Unless explicitly acknowledged to the contrary.

significantly, as do the reforms that are implemented. It is important to keep this in mind when generalizing from specific findings to our overall results.

Decentralization is probably the single most advocated measure for improving the provision of health and education in the developing world. This popularity is not surprising. Of the many arguments in favor of decentralization, the most important is that devolving power and resources to local governments can increase the accountability of public servants, and hence the responsiveness of public services to citizens' needs (Faguet 2008; Faguet 2012). While decentralizers' motives have no doubt differed across different countries, improved delivery of public goods has been at least an implicit goal of most reforms, and usually an explicit one.

To ensure that our conclusions on decentralized public provision of health and education are not influenced by an arbitrarily selected group of studies, we use predefined criteria to identify papers for inclusion in this survey. Specifically, we focus on quantitative studies from the last 20 years that evaluate the causal effects of decentralization on service delivery in developing nations. We exclude qualitative work not because we consider it inferior, but rather for two strong reasons: (a) The need to compare like with like; we know of no credible method for comparing qualitative vs. quantitative studies in terms of quality of evidence; (b) Space constraints.

We group these studies according to the main substantive themes they address as follows: 1) **Preference matching**<sup>5</sup>, defined as the extent to which public goods provided by local governments match citizens' preferences or demands, and/or 2) **Technical efficiency**, meaning the production of more or better public goods by a decentralized government for a given set of inputs. In the latter theme, we further segregate the evidence into sub-categories based on whether it concerns the provision of (i) health, (ii) education to lower tiers of the government, or (iii) education to schools in what is commonly referred to as a School-Based Management (SBM) reform. School-Based Management is a particular kind of decentralization that devolves resources and decision-making authority all the way down to school level, recognizing the individual school as the primary unit of improvement in education.<sup>6</sup> While we would have liked to extend the study to further sectors, especially water and sanitation, we opt instead for

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<sup>5</sup> In the decentralization policy literature, the term allocative efficiency is often used to refer to this same concept.

<sup>6</sup> SBM can be thought of as significantly shortening the route of accountability, as analyzed in the World Bank's 2004 *World Development Report*. For further discussion, see the authoritative treatments of Bruns et al (2011: p. 88) and Malen et al. (1990: p. 290).

greater focus, which permits us to delve more deeply into the particulars of individual studies in these two important sectors.

Another important theme which we cannot address adequately here is the equity effects of decentralization across subnational units. A significant consensus holds that the devolution of public funds and taxation authority should, on its own, exacerbate inequality amongst richer vs. poorer districts. A simple, well-understood measure can solve this problem: redistributive fiscal transfers aimed at decreasing horizontal inequalities. A large strand of the literature analyzes how such transfers can best be structured (Besley et al. 2003). The fact that such transfers are often not implemented implies that central governments choose not to do so. Why governments design such decentralizations falls under the much larger rubric of partial or insincere decentralizations, which incorporate important horizontal inequalities, vertical inequalities (service responsibility is devolved without adequate finance), or are institutionally incoherent in any of a number of ways (e.g. political responsibility for service provision is devolved without legal authority over the same; legal reforms are passed but centralized administrations remain unchanged). Analysis of the political motives behind such decisions is unfortunately beyond the scope of this paper. But it is important to acknowledge that without adequate safeguards, decentralization can be expected to widen the gaps between poorer and better-off regions.

Within our thematic classification, we further classify studies according to the self-reported quality of their data and credibility of their identification strategies, and place greater weight on what high-quality evidence has to say. Distinguishing between studies that are able to tease out the causal effects of decentralization more plausibly than others is the crucial step that allows us to identify patterns in the findings. Earlier empirical contributions on decentralization were commonly plagued by problems of attribution – surveys based on such evidence therefore had similar challenges in isolating the effects of reform. In recent years a deeper appreciation of the pitfalls associated with causal inference has pushed empiricists to find more credible identification strategies that use observational data to construct valid counterfactuals, and thus approximate the ‘gold standard’ of randomized experiments<sup>7</sup>. This is the higher quality literature we focus on in our review.

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<sup>7</sup> See Angrist and Pischke 2010 for a good discussion of identification strategies.

The rest of this paper proceeds as follows. Section 2 describes the criteria used for including and classifying studies in this review. Section 3 discusses the papers included by theme. We conclude by comparing our findings to broad surveys of the literature and suggesting priorities for future research. The papers reviewed are summarized in Tables 1 to 6. Our aim is to provide insights into patterns of findings on one piece of the larger decentralization puzzle. What follows hopefully helps to answer some important question surrounding decentralized service delivery of health and education in developing countries. Even so, we do not pretend that this survey can cover more than a fraction of a huge literature.

## **2. Scope and Methodology of Review**

This section describes the steps we undertook to identify, organize and classify studies from this vast literature for our review. Our strategy was to conduct a wide search and then systematically filter papers that met predefined criteria for relevance. Following this, we arranged the literature first by substantive theme, and then – crucially – by quality of the evidence.

### **2.1 Identifying and Organizing the Literature**

Our search focused on published and unpublished working papers from 1992 and onwards. To ensure thorough coverage, we identified these papers using the EconLit bibliography, as well as by consulting other key resources such as Google Scholar, JSTOR, SCOPUS and Web of Knowledge. We also referred to major publications by international organizations such as the World Bank, used citation indices, and reviewed reference lists in identified papers to confirm that no critical contributions were omitted from our review.

Based on the information contained in their abstracts, we short-listed those studies that a) were of a quantitative nature and b) dealt specifically with decentralization of service delivery of health and/or education in developing nations. We then organized this short-listed body of evidence into our two themes: preference-matching, and technical efficiency. The body of scholarship on technical efficiency is larger, and therefore we further segregated the papers examined into sub-categories based on whether they address: (1) decentralization of health, (2) decentralization of education to lower tiers of governments, or (3) decentralization of education to schools or School-Based

Management. Table 1 summarizes the evidence by theme, sub-category, author, publication type, and countries covered.

***Table 1 about here***



### 2.3 Quality of the Evidence

Next we evaluated the quality of the evidence. We did so in the knowledge that researchers attempting to assess the effects of decentralization on education and health services face a number of challenges. These include the difficulty of disaggregating decentralization's effects from those of other reforms that tend to accompany it, the time it takes service delivery outcomes to change, and the difficulty of conducting randomized decentralization experiments. Together these challenges not only impose sizeable data demands on researchers but also make it particularly hard to make plausible claims surrounding causality.

To classify the persuasiveness of each paper's identification strategy, we use a four point scale of *Very Strongly Credible*, *Strongly Credible*, *Somewhat Credible*, and *Less Credible*. In this categorization, we in effect rank papers' empirical methodologies according to their widely accepted abilities to mitigate endogeneity concerns and identify causal effects. We rely primarily on the established hierarchy of identification strategies in economics as widely taught in graduate programs today for this ranking, although we do validate our final categorization by reviewing the covariates included in the analysis, the measures used for decentralization, the self-reported quality of data, and the nature of robustness checks performed in the paper. This scale, along with a snapshot of how papers in this survey have been classified, is presented in Table 2. The categorization is adapted from a similar typology by Santibañez (2006).

*Table 2 about here*

Our top category, *Very Strongly Credible*, consists of randomized control trials (RCTs), the ‘gold standard’ for identifying causal effects. At the other end of the spectrum, work that relies on simpler quantitative methods such as ordinary least squares (OLS), and fails to employ any other sophisticated methodology to control for endogeneity bias, is categorized as having a design that is *Less Credible* in drawing causal inferences. The papers we place in this category are mostly cross-sectional OLS analyses of observational data, often with self-selected populations.

The *Strongly Credible* category on the other hand consists of research that is reasonably successful in producing a valid comparison group. Much of this literature uses quasi-experimental techniques such as instrumental variables (IV) or difference in differences (DID) approaches. The key benchmark for being classed as *Strongly Credible* however is how persuasive studies are in communicating a thorough understanding of the institutional environment and then – importantly – using this understanding to design their empirical strategy. So for instance, *Strongly Credible* papers using IV techniques make plausible claims for the relevance and exogeneity of their instruments. Studies using difference in differences in this category persuade that the treatment is what is responsible for altering a trend between treatment and control groups. This category also contains some panel data estimations using fixed effects and a set of relevant covariates, but only where the case for limited endogeneity based on knowledge of confounding factors is particularly convincing.

The remaining studies are classed as *Somewhat Credible*. In practice, this is the residual category, containing all remaining studies once *Very Strongly*, *Strongly* and *Less Credible* studies have been removed from the sample. What this leaves us, in our view, are studies that are less persuasive in addressing endogeneity than those that are *Strongly Credible*, but more convincing than the *Less Credible* set due to their use of various kinds of comparison groups. This category thus houses diverse econometric methods, from matching to instrumental variables.

It is worth underlining what this survey does not seek to do. We recognize that the identification strategies employed by researchers are largely determined by a combination of the data available, the nature of the reforms implemented, and the nuanced questions they seek to answer. Hence we make no attempt to rank papers’ broader quality *as pieces of research*, nor to comment on the analytical skills of their authors. What we do seek to do, rather, is recognize that there is an established hierarchy

of rigor in econometric identification, and apply that hierarchy to the evidence that the literature provides. This allows us to roughly categorize how convincing studies' results are, and hence how we should weight evidence when making policy.

### **3. The Effects of Decentralization on Education and Health**

We now move on to the heart of our review, and describe the papers included in this survey in some detail. We first discuss preference matching and then turn to technical efficiency. Throughout this section, we make use of our quality distinctions when describing key papers in order to allow readers to understand how our conclusions are drawn.

#### **3.1 Preference Matching**

Although preference matching is one of the classic arguments posited in favor of decentralization (see Oates 1972), the empirical evidence devoted exclusively to testing this proposition is surprisingly small. It also produces somewhat contradictory results for the service delivery of education on one hand, and the provision of health on the other.

The contributions we review with *Strongly Credible* identification strategies examine reforms in Bolivia and Indonesia. Bolivia undertook devolution in 1994, and as part of the reform moved responsibility of key public services to local governments. The shift in responsibility was accompanied by two other critical changes – the doubling of funds available to these devolved units during this period, and the establishment of oversight bodies to monitor local spending.

In one of the first papers to employ a before and after estimation strategy to examine preference matching, Faguet (2004; 2012) studies patterns of investment in public investment projects in a total of ten categories, including education and health. By doing so first for municipal averages, and then one by one for all municipalities examined, he finds a statistically significant increase in investment in education overall, as well as a statistically significant increase in 71% of individual municipalities in just three years after devolution.

This shift in investment patterns was especially evident in poorer regions. As devolution increased funding to previously neglected regions, this finding however is not necessarily an indication of greater preference matching. But Faguet then offers further evidence to support his responsiveness argument – he demonstrates that regions with high illiteracy levels, or where there seemed to be a greater need, invested more heavily

in education. Regions with strong education indicators, on the other hand, prioritized other sectors. This, he contends, “implies that local government is more sensitive to local need than central government” (p. 24). The author’s optimism is supported by similar findings in the sectors of water management and urban development, but noticeably not in our second sector of interest here – health.

However, greater spending on socially oriented sectors does not necessarily imply that preference matching has improved. This is the main contrasting finding in Skoufias et al.’s (2011) recent working paper on Indonesia. The paper exploits an arguably exogenous phasing of local direct elections to conduct a difference in differences analysis of the effect of political decentralization on the pattern of public spending.

Although fiscal and administrative devolution commenced in 1999 in the country, in 2005 Indonesia implemented electoral reforms to enhance accountability in service delivery. Skoufias et al. compare changes in expenditure patterns in districts that held local elections in 2005 to patterns in districts that did not hold elections until 2008. They find that political decentralization was associated with greater overall public spending. When disaggregated, however, they demonstrate that while there was an increase in the education sector, there was no significant difference in health spending. Skoufias et al. then follow Faguet (2004), attempting to use his methodology to establish whether these shifting patterns were based on local needs. In contrast to Faguet, they find no evidence to suggest an improvement in preference matching at all.

The two contributions from the *Somewhat Credible* identification group are also contrary. In the only cross-country study concerned with preference matching that we review here, Arze del Granado et al. (2005) seek to establish that Faguet’s findings on the change in functional composition post decentralization are “not a unique experience of a specific country” (p. 4). Employing a similar before and after strategy, but using data for 45 developed and developing countries over 28 years, the authors analyze the relationship between the ratio of local expenditure to total government expenditure as the measure of decentralization, and the ratio of health and education spending to overall spending. They find a statistically significant relationship between decentralization and expenditure ratios. Because, they assert, “implicit in the argument that decentralization can increase allocative efficiency is the implication that decentralization is likely to alter the composition of public expenditures” (Arze del Granado et al. 2005: p. 2), they conclude in favor of the potential of decentralization to enhance preference matching.

Akin et al. (2005) take a slightly different tack. They attempt to provide a deeper understanding of spending allocations within the health sector after a decentralization reform occurred in Uganda. The authors postulate a model in which users undervalue public-type health goods such as family planning, health education, immunization and infectious disease control. Because local governments will be more responsive to the preferences revealed by their residents for private-type health goods, the authors posit that districts will under-provide public-type health care and ignore spillover effects on neighboring regions if they are not under the same jurisdiction.

Akin et al.'s theory is borne out in the district-level data they examine from Uganda. They find, after controlling for per capita income in a fixed effects model, that decentralization is associated with higher budgeting of private-type health goods. Moreover, Akin et al. also cite evidence in favor of crowding-out effects – districts whose neighbors budget higher amounts on public-type goods budget less on such goods themselves. On the basis of this evidence, Akin et al. (2005: p.3) pessimistically call for “A reappraisal of the central government’s role in providing public goods in developing countries”.

What is interesting, however, is that their argument is not one against the preference matching effects of decentralization per se, as they assume local governments are indeed responding to local inclinations in Uganda. Rather, their pessimism arises from the result of the responsiveness versus spillover effects trade-off. The Oates Decentralization Theorem (1972) suggests that devolution is superior only so long as there are no spillover effects. In the presence of spillover effects, the theoretical prediction for preference matching of decentralization is ambiguous or even negative (Besley and Coate 2003; Bardhan and Mookherjee 1998).

The papers with *Less Credible* empirical designs take Akin et al.'s pessimism even further. Schwartz et al. (2002), for instance, examine the trends in spending composition of health services in 1600 regions in the Philippines to show, like Akin et al., a shift in local spending composition from public-type health services to private-type curative health care. Along a similar vein, Hasnain (2008) considers budget allocation trends in Pakistan’s province of Punjab and reports that decentralized local governments are prioritizing allocations for infrastructure over those for health and education. And in sharp contrast to all of the studies above, Fienkman and Plekhanov (2009) do not find a change in allocation patterns after decentralization in Russia at all. The authors use a

between effects model on cross-sectional data to conclude that fiscal decentralization is not significantly associated with an investment in education inputs.

So what, if anything, can we take away from this short review of the evidence of decentralization's ability to enhance preference matching? The literature in this theme is small, and the number of high quality contributions is even smaller. But studies across the quality distinctions appear to mostly concur that decentralization changes the patterns of local spending. On the other hand, whether or not these changes are responsive to local needs is an area where there is less agreement. While the evidence appears somewhat encouraging for enhanced preference matching in education, contributions in the area of health are decidedly pessimistic due both to a lack of visible change in allocation patterns and the possibility of externalities in the area.

*Table 3 about here*

### **3.2 Technical Efficiency**

The body of work on the ability of decentralization to enhance technical efficiency in the delivery of education and health fortunately is much larger than that found in the previous theme. Strikingly, it is also more rigorous, and fairly optimistic of the potential of decentralization to improve service delivery.

#### **3.2.1 Health**

The lone paper with a *Strongly Credible* empirical strategy in this sub-category, for instance, provides the first piece of evidence strongly in favor of decentralization's ability to enhance technical efficiency in health delivery.

Uchimura and Jutting (2009) examine the interesting case of China, a country that has had consistently high levels of spending decentralization, but a growing recentralization of revenue decisions since 1994. Improving on previous studies that use only province-level data, Uchimura and Jutting employ data from counties in 26 provinces over a seven year period. Counties in China have responsibility for implementing health programs. However, local government officials are elected through parties, not the adult franchise, which limits political accountability of officials to citizens.

The authors determine the statistical relationship between two measures of county-level fiscal decentralization and the outcome of provincial infant mortality rates (IMR), using a fixed effects model. Finding statistically significant and negative coefficients in most of the other models they tested, the authors conclude that counties in more fiscally decentralized provinces have lower IMR. Interactions between their two measures of decentralization – own expenditure financed and proportion of provincial expenditure – are also positive. This suggests to the authors that IMRs are lower in provinces not only where fiscal capacity is strengthened, but also where counties and provinces have a functional transfer system in place.

Two contributions from the group with *Somewhat Credible* evidence are also positive. In a study quite similar to the above, Asfaw et al. (2007) consider empirical evidence on rural infant mortality rates from India. Decentralization in India has a long history. But, it took its current form with the passing of the 1989 Panchayat Raj bill and later constitutional amendments in the early 1990s that devolved power to the traditional village organizations or Panchayats. Panchayats now form a part of the local government, hold elections, and bear responsibility for health and education delivery.

Evidence suggests, however, that different states have followed differing models of devolution, making comparative analysis of the reform difficult.

Nonetheless, Asfaw et al. attempt to estimate the role of devolution in affecting the outcome of rural infant mortality rates using data from 14 states over seven years. The authors demonstrate a statistically significant and negative relationship between decentralization and IMR in both their random and fixed effects models, but not in the between-effects model. Asfaw et al. (2007) conclude that having an above average decentralization index is associated with a 17.16% reduction as compared to states with below average fiscal decentralization scores. The results hold when the measure of decentralization is altered, when decentralization indices are made continuous measures and also when two year averages of IMR are used.

The final positive single country study we review here is due to Habibi et al. (2003) who consider devolution of basic health and education (see also next section) services in Argentina. In their paper, Habibi et al. use nationwide data from over a 25 year period to examine the relationship between two measures of fiscal decentralization and the infant mortality rate. The authors find a significant and negative relationship between the parameters of interest. On the basis of these findings, they conclude that devolution can have positive effects on human development, especially when there is greater tax accountability in a province.

Less optimistically, Inchauste (2009) reports Bolivian evidence from the first half of the 2000s in the context of the Highly Indebted Poor Countries (HIPC) initiative, which directed resources saved from repayment of debt to local governments based on poverty levels. Although she shows that there has been increased investment in both health and education, she does not find a significant association between the number of poor in a municipality and HIPC transfers, and thus argues that HIPC funds have not been targeted well.

Using a random effects model, Inchauste also examines the relationship between the change in health spending and (1) the change in share of unattended illnesses and (2) the unattended cases of respiratory diseases, finding a significant decline in the former and no significant change in the latter. Inchauste argues that there has been a lack of improvement in social indicators based on this mixed result, as well as on the results on education which we discuss in the next section. But the lack of pre-reform data imply



that her results may say more about administration of the HIPC initiative than about decentralization *per se*.

What cross-country evidence do we have of associations of decentralization and health service delivery? Two notable studies over the past decade investigate the impact of decentralization on health service delivery, finding somewhat mixed results that appear to depend crucially on the level of development of a nation.

In an oft-cited paper, Robalino et al. (2001) perform a cross-country data regression, using IMR as the dependent variable and fiscal decentralization as the independent variable. Their sample, though not expressly given in their paper, comprises between 45-70 low and high income countries and they rely on data from GFS.

Robalino et al.'s fixed effects model yields a significant and negative relationship between the key measures of interest. In their basic model, if a country with a GDP per capita of USD 2000 increases its share of expenditures managed by local governments by 10%, this would be associated with a 3.6% decrease in mortality rates. Robalino et al. also find evidence to show that the benefits associated with fiscal decentralization may have a U shaped curve with respect to GDP per capita, implying that countries with low and high incomes are more likely to benefit from the reform than middle income countries. They conclude that decentralization benefits are “particularly important for poor countries” (Robalino et al. 2001: p. 11).

According to Khalegian (2004), on other hand, the benefit curve is L shaped for immunization. Using data on 140 low and middle income countries over 18 years, he conducts a cross-country regression of a measure of decentralization against immunization rates against measles and diphtheria. Unlike other papers in this area, Khalegian uses a political, not a fiscal measure of decentralization, sourced primarily from the Database of Political Institutions. Here, decentralization is measured as a binary variable, indicating whether or not local governments have authority for taxing, spending and regulation although measures of fiscal decentralization from GFS are also employed in the regression.

The author notes positive and significant coefficients for lower income decentralized countries in his main specification which uses between effects and time dummies – decentralization is associated with 8.8% and 8.3% increase in diphtheria and measles coverage, respectively. In middle income countries, however, this reverses and decentralization is associated with a decrease in diphtheria and measles coverage of

4.9% and 5.5% respectively. Analysis indicates that the turning point is per capita GDP of 1400 (in 1995 USD), after which a negative relationship stabilizes.

Khalegian's outlook based on these results is mixed – after exploring some channels, he proposes that the difference between the results seen in lower and middle income countries can be attributed to the possibility that poorer countries decentralize less fully than middle income ones. This implies that were complete devolution to occur, we would see a negative impact on immunization. The author uses this to encourage continued central government support of health initiatives.

In the *Less Credible* category, Treisman (2002) uses OLS regression on cross-sectional multi-country data to show that decentralization's effects may be sensitive to the income level of a country. Using data on 166 countries, Treisman explores how having constitutional sub-national authority relates to two indicators of health care performance – the share of infants inoculated for diphtheria, tetanus and pertussis, and the share of population for which 20 essential drugs are available and affordable. Once an extensive set of socio-economic controls are added, the paper's findings are not significant for sub-national authority, although greater electoral accountability is correlated with better access to medicines. In his analysis, nations with per capita GNP greater than USD 5000 have worse service delivery performance than their counterparts with lower per capita GNP.

In sum, while the body of scholarship in this sub-category is larger than that in preference matching, it is still rather thin. Moreover, high credibility contributions are also rare. That said, the three country studies of *Strongly Credible* or *Somewhat Credible* empirical strategies all demonstrate the ability of health decentralization to have a positive influence on infant mortality rates. The same is not necessarily true for immunization, although we are forced to draw this conclusion on the basis of two cross-country studies with less convincing methodologies.

*Table 4 about here*

### **3.2.2 Education**

Amongst studies of education, two papers of high quality set the stage for prevalent optimism. In the first, Galiani et al. (2008) examine decentralization in Argentina by comparing changes in student test scores in secondary schools that have always been under provincial control to changes in schools that were under federal control until the

1991 reform. Like many other Latin American countries, Argentina undertook devolution to provinces as part of a broader structural reform, first devolving responsibility for pre-schools and primary schools, and then undertaking the same reform for secondary schools. Provinces now have authority over personnel and budgeting decisions, while schools are largely responsible for textbook selection and teaching methods.

Using average school test scores from a sample of students tested in almost 99% of the secondary school universe, Galiani et al. compare the change in outcomes in those schools that were decentralized to changes in those schools that were always provincial. Because the impact on scores is unlikely to be immediate, the authors estimate the impact of exposure to decentralized schools for up to five years by cohort. Their results show a positive association between decentralization and Mathematics and Spanish scores - after five years, a 4.9% and 6.9% increase compared to the mean, respectively. In a comparable paper with a solid methodological design, Faguet and Sánchez (2008) use changes in enrolment rates in state schools as the measure of student achievement in order to evaluate the impact of decentralization on service delivery in Colombia. They analyze the impact of a phased decentralization reform in the country, which not only left local governments responsible for provision of public services but also provided them increased fiscal powers to fulfill this responsibility. Using both OLS and IV, they find that measures of decentralization have a significant and positive correlation with changes in student enrolment, with the effects being larger for smaller municipalities.

The larger *Somewhat Credible* category fuels further enthusiasm for decentralized education delivery. In a paper discussed earlier under Health Technical Efficiency, Habibi et al. (2003) report the empirical relationship between fiscal decentralization and the ratio of students enrolled in secondary school per 1000 primary students. Using Argentine data from 1970-1994 in a fixed effects model, the authors find that their measure of decentralization - own resources to total resources - has a positive and significant association with their measure of education output.

Freinkman and Plenakanov's (2009) examination of the impact of fiscal decentralization on student scores in Russia presents the only comparison of preference matching and technical efficiency of decentralization that we have come across in this review. The authors evaluate the statistical relationship between test scores of students from 73 regions in Russia tested in 2004 and 2005 and fiscal decentralization of a region.

The 1994 reforms passed responsibility of key public services to local governments, giving them control over 80% of social spending on health and education. The authors exploit regional variances to estimate the impact of decentralization in a between effects model to report results that are rather interesting. They find that the change in spending on education was marginal with no significant impact of decentralization variables on computers, pre-school years or student teacher ratios. However, the relationship between student outcomes, as measured by an average of Language and Mathematics test scores, and decentralization is consistently positive in all of their specifications. A 10 percentage point increase in own revenues of municipalities is significantly correlated with 30 percent of one standard deviation improvement in secondary school exam scores. Taken together, they propose that their results are consistent with a technical efficiency argument arising from accountability and local official incentives, rather than allocative efficiency of increased inputs into the education production process.

Aslam and Yilmaz (2011) are similarly positive about decentralization, and support their arguments with analysis conducted on a unique dataset collected from 183 randomly selected villages in 5 purposively chosen districts in Pakistan. Pakistan embarked on an ambitious decentralization program in 2001, which left local governments responsible for basic service delivery, although many scholars note that devolution over fiscal and personnel management was limited.

The authors construct a measure of education service delivery by collecting retrospective data from villagers on changes in capital improvements, school maintenance and education services during the period 1995 to 2007. They then regress a composite measure of these indicators on a dummy variable for decentralization using a fixed effects model, to find that provision of education increased dramatically after the introduction of the decentralization reform.

Can we conclude that decentralization enhances technical efficiency in education based on the above? Inchauste (2009) would disagree. Her examination of the relationship between changes in education allocations, and children not attending school and un-enrolled children in Bolivia, shows limited support for devolution. Using data over a slightly longer period than her analysis of health indicators (see above), her results for funds made available to local governments through the HIPC initiative are again mixed. She finds that increases in education transfers were associated with a decrease in children not attending school in the 1999-2002 period, but an increase in unenrolled

children in 2002-2005. The impact of education spending in both periods, and on other intermediate education indicators, is not significant.

The lower quality evidence, primarily simple regression analysis on cross-sectional data, is likewise mixed. Some of the contributions, nonetheless, do present noteworthy findings. One example is Di Gropello (2002), which shows conflicting results on the impact of municipality level and school level devolution on student test scores in Chile. Using an education production function design for testing conducted in 1996, Di Gropello regresses the outcome of student test scores on a measure of fiscal decentralization, school level parameters of autonomy and participation, and some controls commonly found in the education economics literature. Both devolved wage incentives and training expenditure at the municipal level are associated with higher test scores, while greater financial autonomy as measured by municipal own funds spent on education to total funds spent on education is not. At the school level, Di Gropello finds that coefficients of involvement in financial and pedagogical decision-making are significant and positively associated with student test scores.

By contrast, Lockheed and Zhao (1993)'s review from the Philippines is decisively negative. By comparing national, private and municipal or *barangay*-run schools and controlling for socio-economic background, they find no significant difference in attitudes or achievement in science or mathematics. They argue that this is due to little actual control and resources being devolved to local schools, presenting the "empty opportunity of decentralization" in the country. Treisman (2002) is equally pessimistic in the only cross-country evidence we review in this sub-category. He finds that the presence of constitutional autonomy and electoral accountability at the local level were both associated with a higher level of youth illiteracy in data from up to 166 nations. In line with his findings in the area of health, the negative associations he reports are stronger for countries with GNP per capita greater than USD 5,000.

In summary, this sub-category is not only larger than the previous ones, but also significantly more positive about decentralization's effects, especially when adjusted for quality of evidence. Although the marginal increase in number of contributions comes from studies falling in the middle quality distinction, they are almost unanimous in their support of decentralization's ability to enhance both the quality and quantity of education.

## *Table 4 about here*

### **3.2.3 School-Based Management (SBM)**

As indicated by a number of recent reviews, the literature in this category has made considerable progress. We provide a basic examination of the most important pieces of works in this literature below, but also refer readers to Galiani and Perez-Truglia (2011); Bruns et al (2011); and Barrera-Osorio et al. (2009) for more comprehensive reviews<sup>8</sup>.

What does ‘gold standard’ evidence tell us about the effectiveness of SBM reforms? Two recent experimental contributions, and the only ones to be categorized as having *Very Strongly Credible* research designs in our review, investigate SBM’s potential in enhancing student attainment. They yield contradictory findings.

The more optimistic evidence comes from Duflo et al.’s (2007) paper on a randomized control trial in Western Kenya. The trial tested a number of interventions on a total of 210 primary schools, one of which involved an SBM component that empowered school councils to hire and monitor contract teachers. Duflo et al. compare the SBM groups to their counterparts in the control group, to show that students in the treatment cell scored 0.18 and 0.24 standard deviations higher in Mathematics and Language than their non-treated counterparts two years following the intervention.

On the other hand, Glewwe and Maiga (2011) present less optimistic experimental results. They examine a randomized trial in Madagascar, which involved management reforms at three levels – district, sub-district and school. In a sample of 30 districts, sub-districts and schools were randomly sorted into treatment and control groups. Glewwe and Maiga document some school improvements in the first six months, but by the end of two years find no discernible impact on aggregated test scores. They conclude not against the reform per se, arguing instead that results may be driven by the short time since intervention. Their conclusion is consistent with suggestions in the SBM literature from the US that reforms may take up to five years to affect student test scores (see Borman et al. 2003).

The four studies that rely on the quasi-experimental technique of difference in differences, on the other hand, are unanimously favorable. The former two we classify under the *Strongly Credible* quality distinction, while the latter two are deemed to have

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<sup>8</sup> For good reviews of this literature from developed countries, see Summers and Johnson (1994) and Borman et al. (2003). See also a related and relatively more rigorous literature on charter and grant-maintained schools from the US and UK respectively e.g. Abdulkadiroglu et al. (2011) and Clark (2009).

*Somewhat Credible* identification strategies primarily as a result of challenges they face with the key parallel trend assumption required in a thorough DID analysis.

The strongest paper of this type is due to Gertler et al. (2011), who consider the AGE (*Apoyo a la Gestión Escolar*) intervention from Mexico. AGE is an SBM reform that provides training and small grants to parent associations in disadvantaged schools to invest in infrastructure and materials. Gertler et al. exploit the phased implementation of the AGE program to achieve identification, comparing schools that adopted AGE earlier to those that adopted it later. Their analysis suggests that participation in the AGE program is associated with a 0.6 and 0.4 percentage point reduction in failure and repetition rates, respectively. This translates to a 4% and 5.4% decrease in these respective indicators. The authors find no significant association between AGE and intra-year drop-out rates. Through qualitative research, the paper also suggests that the channel for improvement is the increased participation of parents in decision-making.

In the second study of this type, Skoufias and Shapiro (2006) also use a difference in differences method but combine it with a matching technique to examine a different intervention from Mexico. They consider the PEC (*Programa Escuelas de Calidad*) program, another SBM type reform which provides annual grants to disadvantaged schools to improve education quality. The program gave up to a five-year USD 15k grant to the 20,000 schools, or 10% of the schooling system, that volunteered to participate. Like other SBM reforms, school councils participated in the design, implementation and monitoring of the improvement plans that the grants financed. The authors use data for approximately 75,000 schools to first conduct a simpler OLS, and then a difference in differences with matching estimation. Employing this mix of methods, they find that PEC participation is significantly associated with a 0.24, 0.24 and 0.31 reduction in dropout, failure and repetition rate, respectively. The impact, it should be noted, is marginal and represents a 6% to 8% reduction relative to the baseline means.

Paes de Barros and Mendonca (1998)'s study of the three key SBM changes in Brazil of financial autonomy of schools, head teacher election and establishment of school councils employs one of the first difference in differences methodologies seen in the field. The authors examine changes in a series of outputs by using data from education censuses during the 1981-1993 period. Their methodology relies on estimating, over this period of time, the change in states that received an innovation

against the change in groups that did not receive an innovation. Their findings suggest that financial autonomy is associated with a significant drop in repetition rates. Similarly positive trends are evident when the authors examine mean level lags in grades attended and share of children with lag – the former is negatively and significantly associated with school financial autonomy and the presence of school councils, while the latter has a negative and significant correlation with school council presence only.

Also supportive is the only investigation from Asia that we review in this sub-category. In a recent World Bank working paper, Khattri et al (2010) evaluate the impact of school-based management reforms implemented in 2003 in 23 districts in the Philippines. The program, sponsored by the World Bank, involved providing training to principals and parents in designing School Improvement Plans, in addition to direct funding for the improvements planned. Implementation of the program was in three phases, with early selection based primarily on a perception of school capability. Using data from the period 2003 to 2005, Khattri et al. compare the test score performance of students in schools that implemented the intervention in the first phase to those that implemented the intervention in a later phase. In comparison to the control group, the treatment group showed a 1.45 percentage point improvement in overall student attainment. For the subjects of Science, English and Mathematics, the improvements were 1.45, 1.32 and 1.88 percentage points, respectively.

In contrast to the above papers, the rest of the *Somewhat Credible* identification strategy category has mixed findings. The two cross-country studies on SBM are negative. Gunnarsson et al. (2009) evaluate the effects of School-Based Management reforms in 10 Latin American countries. School autonomy and participation, two indicators that have been popularly used by many other authors working on SBM, are measured for the various countries using survey data from 1997 and then quantified using factor analysis. The authors support their OLS analysis by instrumenting for autonomy and participation using principal attributes and legal structure. After first noting the variation in autonomy and participation across countries, they find a negative and significant association between school autonomy and test scores. They do, however, find a positive relationship of test scores with parental participation.

The second cross-country study comes from a recent contribution by Hanushek et al. (2011) who use data from four waves of PISA test scores to establish the relationship between student achievement and autonomy in curricular, personnel and budgeting



areas. Their dataset contains test scores and background data on 1 million students from 42 countries, of which 25 are classified as high income nations. Using a two way fixed effects model, Hanushek et al. find the relationship between the parameters of interest to be negative, albeit heterogeneous across countries based on income levels. A disaggregated analysis suggests that school autonomy is related to positive outcomes in developed and high-performing nations, but to negative ones in developing and low-performing nations.

Hanushek et al.'s study suggests that understanding when SBM can be effective is critical. King and Ozler's (2000) paper on Nicaragua's reform provides an interesting answer to this question by arguing that it is *de facto* and not *de jure* school autonomy that improves student performance. Nicaragua's school autonomy intervention was implemented in 1991 and allowed Nicaraguan schools to sign contracts with the Ministry of Education to become autonomous. Autonomous schools were meant to work through school councils, which had *de jure* control to hire and fire teachers, manage school budgets and maintain infrastructure. King and Ozler use a number of models to estimate the impact of both *de jure* autonomy measured by the signing of a contract, and *de facto* autonomy measured by factor analysis of teacher's responses. Their matched comparison design strategy compares similar treated and non-treated schools to show that *de facto* autonomy is associated with higher test scores in Mathematics and Spanish, but *de jure* autonomy has no significant impact.

Parker (2005) provides more support for the case of the Nicaraguan autonomy reform, using more nationally representative data that she contends is less prone to student attrition bias than King and Ozler's (2000) analysis. Her results are however mixed – after controlling for the standard components of an education production function, she finds that third graders in autonomous schools scored significantly higher than their counterparts in centralized schools in Mathematics. But for sixth graders the effect is negative for Mathematics, and in neither case are results significant for Spanish.

Also relying on cross-sectional analysis, Jimenez and Sawada (1999) study EDUCO, perhaps the most celebrated case of SBM, and find no significant difference in test scores. EDUCO (*Educación con Participación de la Comunidad*) was first implemented in 1991 and has served as a model for many of the community-run schools in the Latin American region. The program established community schools to enhance access in rural areas in El Salvador following the end of civil war. EDUCO schools are run by

councils consisting of elected community members called Associations for Community Education (ACE), which have considerable authority in hiring/firing teachers, setting school curriculum and monitoring school performance. The authors employ one of the first education production functions in the field to assess the impact of decentralization on student test scores, albeit for a fairly small sample of 600 students tested in 1996. They find no significant difference in test scores between traditional and EDUCO students. Given that EDUCO students come from disadvantaged backgrounds, the authors consider this a positive result. They also find evidence that student absenteeism is lower in EDUCO schools.

In a more recent paper, Sawada and Ragatz (2005) use propensity score matching on the same dataset, and still find no impact on student test scores. They do, nonetheless, report evidence of significantly lower teacher absenteeism in EDUCO schools. The authors propose that lower absenteeism arises as the result of improved community monitoring, and the authority of councils to hire/ fire teachers. Evidence shows that ACEs of EDUCO schools use incentives for renewable contracts to motivate this outcome among teachers. Their finding is supported by other studies that compare absenteeism rates of permanent and contract teachers, especially in India, to show that the community monitoring aspect is critical in enhancing outcomes (see for example Ramachandran et al. 2005; Banerjee and Duflo 2006).

Di Gropello and Marshall (2005) employ a methodology similar to Jimenez and Sawada (1999) to assess the impact of participating in a PROHECO (*Proyecto Hondureño de Educación Comunitaria*) community school in Honduras. PROHECO schools were first established in 1999 in order to enhance primary school access in rural areas. Unlike more traditional schools, they are run almost entirely by school councils which are legal entities that set budgets, maintain school infrastructure and perform key personnel management functions including hiring, monitoring and paying. Their results point to marginally lower dropout and repetition rates in SBM schools.

The only study in this category with a *Less Credible* identification method is one from Argentina, which nonetheless demonstrates findings of interest. Eskeland and Filmer (2007) perform a simple OLS regression using an expanded education production function to investigate the impact of an education devolution reform that left many key education decisions decentralized to the municipal and school level. Exploiting cross-sectional data containing test scores of over 24,000 6<sup>th</sup> and 7<sup>th</sup> grade students across the

nation, the authors present one of the first attempts to explore the interdependent nature of autonomy and participation by using an interaction model. Eskeland and Filmer find that autonomy is significantly associated with student test scores in Mathematics, but not in Language. They contend that participation has no independent effect on scores, but that its interaction with autonomy is positive and significant.

In summary, studies with credible identification strategies appear to consistently support school decentralization's ability to improve repetition, failure and even drop-out rates. Results on student test scores, however, are mixed in both higher quality and medium quality evidence. Interestingly, authors have as a consequence tried to consider when SBM may be successful. This effort has yielded diverse results suggesting efficacy particularly in developed countries, or in schools with *de facto* autonomy, or even in the presence of both autonomy and participation together. The scholarship on this latter aspect, however, is too small to draw firmer conclusions.

*Table 6 about here*

## 4. Conclusions

Many scholars have noted that the evidence on decentralization's effects is weak, incomplete and generally inconclusive (Rondinelli, Cheema and Nellis 1983, Manor 1999, Smoke 2001, Litvack et al. 1999, Treisman 2007). But when we organize the empirical literature first by theme and then – crucially – by quality of evidence provided, we are able to identify patterns of empirical results that previous surveys – including our own<sup>9</sup> – have missed. Admittedly, these patterns are not conclusive across all areas of interest. But in many instances they show that reforms can have clear, positive consequences – in some cases remarkably so, as we have attempted to outline above. This is very different from the general indeterminacy that previous surveys find, and particularly important to the extent that evidence informs real world policy-making.

Our findings can be summarized as follows:

### ***The overall evidence base is thin, although this varies by category***

We find that the overall evidence base on decentralized health and service delivery in developing countries is thin. Only 35 studies meet the selection criteria detailed in section 2. We also find that the distribution of scholarship is skewed by theme (preference matching vs. technical efficiency) and sub-category (health, education, SBM). For example, many more studies focus on how decentralization affects technical efficiency than preference matching. Likewise, education and SBM have been the subject of examination much more often than health.

### ***The econometric techniques used are less sophisticated than we would prefer***

Fewer than a third of the papers reviewed can be classified as having a highly credible identification strategy. Our categorization hinges on the ability of the methodologies employed to mitigate endogeneity concerns, in accordance with the established hierarchy of econometric techniques. Hence, for example, randomized and quasi-randomized evidence are considered to have stronger identification strategies than cross-sectional work. In this particular sense, the “quality” of the studies reviewed also varies substantially by theme and sub-category. Papers in the technical efficiency theme, and specifically studies investigating school decentralization reforms, appear to have a greater number of high quality contributions. By contrast, contributions in the preference

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<sup>9</sup> See for example Faguet (2008), Faguet and Ali (2009), and Faguet and Sánchez (2008).

matching category are not only fewer but also less rigorous, making the task of drawing conclusions from this group difficult.

***Externalities in health drive pessimism in the preference matching theme***

Our review indicates that pessimism in the small preference matching literature is due primarily to the externalities that characterize the health sector. Decentralized local governments often match local preferences more efficiently while ignoring spillover effects on neighboring regions, as some of the classic public economics literature predicts (Oates 1972; Rubinfeld 1987), thus reducing overall social welfare. The evidence of preference matching in education delivery, on the other hand, appears to be somewhat positive. But the small size of this body of work limits firmer conclusions.

***Higher quality work on technical efficiency appears to be favorable***

Importantly, evidence on technical efficiency is on the whole optimistic. This optimism rises with the quality of the evidence. The highest quality empirics show that decentralization can enhance a variety of service delivery outcomes, from student test scores to infant mortality rates. Although such results are not conclusive, they do demonstrate the potential of decentralization to enhance service delivery in developing countries. Stronger conclusions are not possible until the field sees a more general shift towards better research design, and the development of a deeper understanding of the prerequisites and mechanisms of successful reforms.

It is difficult to step away from our review without reiterating the methodological challenges faced by empiricists in this arena. Undoubtedly, scarce data, big bang implementation and all-encompassing reform packages make it difficult to disentangle the causal effects of decentralized service delivery. The weaknesses of evidence pointed out above are not shortcomings of logic, less still of skill on the part of researchers. Rather, they are direct consequences of a combination of the data limitations that we all work under, plus the complexity of the questions we seek to answer.

The last decade has seen great improvements in identification as better data has become available, and more recently years have brought us the first randomized trials in the field. Understandably, implementing RCTs in the broader education and health decentralization reform is a challenging task, but one with great potential moving forward. For political and administrative reasons, RCTs have particular potential for assessing decentralization at lower administrative levels, such as municipalities and SBM. Other possibilities could add to the credibility of the research base. Early

involvement of researchers together with cooperation with government agencies, for example, can allow for quasi-randomized design in decentralization to regional, local and school levels. And the use of panel data can help mitigate many of the econometric challenges associated with cross-sectional work. Along these lines, subnational variation can be exploited to ask further, deeper questions about the effects of citizen organization and mobilization (i.e. “social capital”) at local and school levels, and their effects on such variables as corruption, accountability, service efficiency and health and education outcomes. As this body of work grows, it will become possible to draw firmer conclusions on the effects of decentralization on service provision.

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Table 1: Summary of Evidence Reviewed												
No.	Region/ Country	Author	By Theme		By Sector			By Type of Publication				
			PM	TE	Health	Educ.	SBM	Journal	Book	Working Paper	Other	
<b>Africa</b>												
1	Kenya	Duflo et al (2007)		X				X				X
2	Madagascar	Glewwe and Maiga (2011)		X				X	X			
3	Uganda	Akin et al (2005)	X		X				X			
<b>Asia</b>												
4	China	Uchimura and Jutting (2009)		X	X				X			
5	India	Asfaw et al (2007)		X	X				X			
6	Indonesia	Skoufias et al (2011)	X		X	X						X
7	Pakistan	Hasnain (2008)	X		X	X						X
8	Pakistan	Aslam and Yilmaz (2011)		X		X			X			
9	Philippines	Schwartz et al (2002)	X		X							X
10	Philippines	Jimenez and Paqueo (1996)		X		X			X			
11	Philippines	Lockheed and Zhao (1993)		X		X			X			
12	Philippines	Khattari et al (2010)		X				X				X
13	Russia	Frienkman and Plekhanov (2009)	X	X		X			X			

**Table 1: Summary of Evidence Reviewed**

No.	Region/ Country	Author	By Theme		By Sector			By Type of Publication			
			PM	TE	Health	Educ.	SBM	Journal	Book	Working Paper	Other
<b>Latin &amp; Central America</b>											
14	Argentina	Habibi et al (2003)		X	X	X		X			
15	Argentina	Galiani et al (2008)		X		X		X			
16	Argentina	Eskeland and Filmer (2007)		X			X			X	
17	Bolivia	Faguet (2004)	X		X	X		X			
18	Bolivia	Inchauste (2009)		X	X	X				X	
19	Brazil	Paes de Barros and Mendonca (1998)		X			X	X			
20	Chile	Di Gropello (2002)		X		X	X	X			
21	Colombia	Faguet and Sanchez (2008)		X		X		X			
22	El Salvador	Jimenez and Sawada (1999)		X			X	X			
23	El Salvador	Sawada and Ragatz (2005)		X			X			X	
24	Honduras	Di Gropello and Marshall (2005)		X			X			X	
25	Mexico	Gertler et al (2011)		X			X	X			
26	Mexico	Skoufias and Shapiro (2006)		X			X			X	
27	Nicaragua	King and Ozler (2000)		X			X			X	
28	Nicaragua	Parker (2005)		X			X			X	

**Table 1: Summary of Evidence Reviewed**

No.	Region/ Country	Author	By Theme		By Sector			By Type of Publication			
			PM	TE	Health	Educ.	SBM	Journal	Book	Working Paper	Other
<b>Cross-country</b>											
29	Various	Arze del Granado et al (2005)	X		X	X				X	
30	Various	Gunnarsson et al (2009)		X		X		X			
31	Various	Hanushek et al (2011)		X				X		X	
32	Various	Khaleghian (2004)		X	X			X			
33	Various	Robalino et al (2001)		X		X				X	
34	Various	Treisman (2002)		X	X	X					X
<b>Total</b>			<b>7</b>	<b>28</b>	<b>12</b>	<b>16</b>	<b>14</b>	<b>18</b>	<b>4</b>	<b>9</b>	<b>3</b>

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Table 2: Quality Distinctions and the Weight of the Evidence				
Scale	Criteria		Preference Matching	Technical Efficiency
			Generally Positive Findings	Generally Insignificant or Negative Findings
			Generally Insignificant or Negative Findings	Generally Positive Findings
				Generally Insignificant or Negative Findings
<b>RANK 1:</b> <b>Very Strongly Credible Identification Strategy</b>	<ul style="list-style-type: none"> <li>Research that contains a valid comparison group</li> <li>Work that is likely to have extremely limited endogeneity concerns</li> <li>Studies such as randomized control trials fall in this category</li> </ul>	<p>Health</p> <p>Education</p> <p>SBM</p>		<ul style="list-style-type: none"> <li>Duflo et al (2007)</li> <li>Glewwe and Maiga (2011)</li> </ul>
<b>RANK 2:</b> <b>Strongly Credible Identification Strategy</b>	<ul style="list-style-type: none"> <li>Research that is able to construct a reasonable comparison group</li> <li>Work that specifically attempts to address sources of endogeneity and is mostly successful in its attempt</li> <li>Studies using quasi-experimental designs such as difference in differences and</li> </ul>	<p>Health</p> <p>Education</p>	<ul style="list-style-type: none"> <li>Faguet (2004)</li> <li>Skoufias et al (2011)</li> </ul>	<ul style="list-style-type: none"> <li>Uchimura and Jutting (2009)</li> <li>Galiani et al (2008)</li> <li>Faguet and Sanchez (2008)</li> </ul>

**Table 2: Quality Distinctions and the Weight of the Evidence**

Scale	Criteria	Preference Matching		Technical Efficiency		
		Generally Positive Findings	Generally Insignificant or Negative Findings	Generally Positive Findings	Generally Insignificant or Negative Findings	
	instrumental variables fall in this category ▪ Studies using panel estimates in a fixed effects model while controlling for more than one socio-economic covariate and more than one covariate from the health/education production function may also fall here	<b>SBM</b>			▪ Skoufias and Shapiro (2006) ▪ Gertler et al (2011) ▪ Hanushek et al (2011)	
<b>RANK 3:</b> <b>Somewhat Credible Identification Strategy</b>	▪ Research that attempts to construct a comparison group but with limited success ▪ Work that is likely to continue to suffer from some endogeneity biases in spite of efforts at mitigation ▪ Studies based on cross-sectional data but using specific techniques to create a comparison groups fall in this category	<b>Health</b>	▪ Arze del Granado et al (2005)	▪ Akin et al (2005)	▪ Asfaw et al (2007) ▪ Robalino et al (2001) ▪ Habibi et al (2003)	▪ Inchauste (2009) ▪ Khaleghian (2004)
		<b>Education</b>	▪ Arze del Granado et al (2005)		▪ Aslam and Yilmaz (2011) ▪ Freinkman and Plekhanov (2009)	▪ Inchauste (2009)

**Table 2: Quality Distinctions and the Weight of the Evidence**

Scale	Criteria	Preference Matching		Technical Efficiency	
		Generally Positive Findings	Generally Insignificant or Negative Findings	Generally Positive Findings	Generally Insignificant or Negative Findings
	<ul style="list-style-type: none"> <li>▪ Studies using panel data with random effects or between effects models may fall in this category</li> <li>▪ Papers using difference in differences but without providing support of parallel trends, papers using IV not considered particularly strong and papers using fixed effects but with very limited covariates may fall in this category</li> </ul>	<b>SBM</b>		<ul style="list-style-type: none"> <li>▪ Paes de Barros and Mendonca (1998)</li> <li>▪ King and Ozler (2000)</li> <li>▪ Khattri et al (2010)</li> <li>▪ Parker (2005)</li> <li>▪ Di Gropello and Marshall (2005)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Gunnarsson et al (2009)</li> <li>▪ Jimenez and Sawada (1999)</li> <li>▪ Sawada and Ragataz (2005)</li> </ul>
<b>RANK 4:</b>	<ul style="list-style-type: none"> <li>▪ Research that bases findings on self-selected populations</li> <li>▪ Work that is likely to suffer from serious endogeneity challenges</li> <li>▪ Studies based on cross-sectional data that do not use any other sophisticated methodology to address endogeneity fall in</li> </ul>	<b>Health</b>	<ul style="list-style-type: none"> <li>▪ Hasnain (2008)</li> <li>▪ Schwartz et al (2002)</li> </ul>		<ul style="list-style-type: none"> <li>▪ Treisman (2002)</li> </ul>
<b>Less Credible Identification Strategy</b>		<b>Education</b>	<ul style="list-style-type: none"> <li>▪ Hasnain (2008)</li> <li>▪ Freinkman and Plekhanov (2009)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Di Gropello (2002)</li> <li>▪ Jimenez and Paqueo (1996)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lockheed and Zhao (1993)</li> <li>▪ Treisman (2002)</li> </ul>



**Table 2: Quality Distinctions and the Weight of the Evidence**

Scale	Criteria	Preference Matching		Technical Efficiency	
		Generally Positive Findings	Generally Insignificant or Negative Findings	Generally Positive Findings	Generally Insignificant or Negative Findings
this category	SBM			▪ Eskeland and Filmer (2007)	

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<b>Table 3: Selected Empirical Evidence of Preference Matching</b>									
No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
<b><i>RANK 2: Strongly Credible Identification Strategy</i></b>									
1	Faguet (2004); Faguet and Sanchez (2008) Faguet (2012)	Bolivia	1994	Increase in devolved funds to LG, responsibility for public services, establishment of oversight committees	OLS using a fixed effects model	Universe of 311 regions over 1987 - 1996	▪ Binary measure of before and after D implementation	Responsiveness claim based on greater investment in regions with high illiteracy	<ul style="list-style-type: none"> <li>▪ Investment in education increases significantly post D</li> <li>▪ Investment increases are associated with illiteracy levels</li> <li>▪ Investment in health did not change significantly post D</li> </ul>
2	Skoufias et al (2011)	Indonesia	1999	Increase in devolved funds to LG, responsibility for public services. In 2005, direct election of local government	Difference in differences  Pre-implementation parallel trends validation provided	200 out of 400 districts during 2001 to 2006	▪ Binary measure of election date	Authors contend date local elections held exogenous based on illness, death, no confidence votes or new district creation	<ul style="list-style-type: none"> <li>▪ Overall public expenditure increased post D</li> <li>▪ Increase in spending on education post D</li> <li>▪ No significant change in health spending post D</li> <li>▪ No evidence of responsiveness</li> </ul>
<b><i>RANK 3: Somewhat Credible Identification Strategy</i></b>									
3	Arze del Granado et al (2005)	Cross-country	Various	Various	Various including OLS using fixed and random, also QMLE models	45 developed and developing countries - Unbalanced panel over 1973 - 2000	▪ Share of LG expenditure in total government expenditure	Key controls include per capita income, budget balance, and population. Country and time effects used in some models	<ul style="list-style-type: none"> <li>▪ Higher D associated with higher proportion of spending on health and education</li> </ul>

**Table 3: Selected Empirical Evidence of Preference Matching**

No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
4	Akin et al (2005)	Uganda	1993 - 1994	Fiscal decentralization, with rule-based unconditional grants given to regions	OLS using a fixed effects model	30 out of 45 regions during 1995 - 1998	<ul style="list-style-type: none"> <li>▪ Years since unconditional grant given to LG</li> <li>▪ Proportion of LG expenditure financed by LG revenues</li> </ul>	Key control includes per capita income. Authors attempt to provide validation that groups undergoing D earlier versus later do not differ systematically	<ul style="list-style-type: none"> <li>▪ Share of allocation to health decreased in local budgets, esp. in preventive and primary health care areas</li> <li>▪ Some evidence of spillover, where neighbours of high health spending districts have lower health spending</li> </ul>
<b>RANK 4:</b>									
<b>Less Credible Identification Strategy</b>									
5	Schwartz et al (2002)	Philippines	1991	Increase in devolved funds to LG, responsibility for public services	Spending trend analysis	1600 LG - period includes 4 yrs before and 6 yrs after	<ul style="list-style-type: none"> <li>▪ Binary measure of before and after D implementation</li> </ul>	-	<ul style="list-style-type: none"> <li>▪ Greater % spend allocated to health post D</li> <li>▪ Higher spend on private health goods, explained by expenses arising from devolution of hospitals</li> </ul>
6	Hasnain (2008)	Pakistan	2001	Limited financial devolution but implementation of rule-based transfers, responsibility for public services, political devolution	Allocation trend analysis	33 out of 35 districts in Punjab over 2006-2007	<ul style="list-style-type: none"> <li>▪ Budget allocations to sectors</li> <li>▪ Relative size of LG spend on sector</li> </ul>	-	<ul style="list-style-type: none"> <li>▪ LG spend focused on infrastructure and away from education &amp; health</li> <li>▪ Provinces driving education interventions, providing incentives to shift away budgets</li> </ul>

**Table 3: Selected Empirical Evidence of Preference Matching**

No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
7	Freinkman and Plekhanov (2009)	Russia	Phased beginning in 1994	Increased fiscal powers with rule-based transfers, responsibility for public services	OLS using a between effects model	73 out of 83 regions, with data collection in 2003	<ul style="list-style-type: none"><li>▪ Share of LG education expenditure financed by own revenue</li><li>▪ Type of decentralization arrangement</li></ul>	-	<ul style="list-style-type: none"><li>▪ No significant impact on inputs</li></ul>

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<b>Table 4: Selected Empirical Evidence of Technical Efficiency - Health</b>									
No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
<b><i>RANK 2: Strongly Credible Identification Strategy</i></b>									
1	Uchimura and Jutting (2009)	China	1970s	Devolved expenditure but growingly centralized revenue authority, responsibility for delivery of health services, no political devolution	OLS using a fixed effects model	26 provinces over period 1995 - 2001	<ul style="list-style-type: none"> <li>▪ LG expenditure / LG own revenue</li> <li>▪ LG expenditure / provincial expenditure</li> </ul>	Key controls include illiteracy rates, fertility rates and per capita income	<ul style="list-style-type: none"> <li>▪ Higher LG expenditure is associated with lower IMR</li> </ul>
<b><i>RANK 3: Somewhat Credible Identification Strategy</i></b>									
2	Asfaw et al (2007)	India	1980s	Rule-based fiscal transfers to LG, responsibility for public services, political devolution	OLS using between, fixed and random effects models	14 States over period 1990 - 1997	<ul style="list-style-type: none"> <li>▪ Index determined by factor analysis - share of LG expenditure in state, total LG expenditure per person, share of LG own revenue in LG expenditure</li> </ul>	Key controls include per capita income of state, share of literate women and index of political decentralization. No controls for fertility	<ul style="list-style-type: none"> <li>▪ D significantly associated with lower IMR in fixed and random effects model but not in the between effects model</li> </ul>
3	Habibi et al (2003)	Argentina	1991	Decentralized financing, staff management and budgeting to LG.	OLS using a fixed effects model, GLS	23 of 23 provinces over 1970 to 1994	<ul style="list-style-type: none"> <li>▪ Share of resources in provincial control to total resources</li> <li>▪ Share of locally generated resources to locally controlled resources</li> </ul>	Key controls include per capita income, per capita expenditure and number of public sector employees	<ul style="list-style-type: none"> <li>▪ Share of locally generated to locally controlled resources is associated with lower infant mortality rates</li> </ul>
4	Inchauste (2009)	Bolivia	1994	Increase in transfers to LGs following HIPC initiative - 2000 onwards	OLS using a random effects model	300 municipalities over period 1999 - 2002	<ul style="list-style-type: none"> <li>▪ Change in spending in health</li> </ul>	Entire sample is in post-decentralization period	<ul style="list-style-type: none"> <li>▪ Decrease in share of unattended illness during period</li> <li>▪ No significant change in cases of respiratory diseases</li> </ul>

**Table 4: Selected Empirical Evidence of Technical Efficiency - Health**

No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
5	Robalino et al (2001)	Cross-country	Various	Various	OLS using a fixed effects model	Low and High Income countries over period 1970 - 1995	▪ Expenditures managed by LG / managed by CG	Key controls include GDP per capita, institutional variables such as corruption and political rights. No controls for fertility	▪ 10% increase in share of locally managed expenditures is associated with 3.6% reduction in IMR for USD2k per capita country ▪ Benefits U shaped - higher for high and low income countries and low for middle income
6	Khaleghian (2004)	Cross-country	Various	Various	OLS using between effects model with time fixed effects	140 Low and Middle Income countries over period 1980 - 1997	▪ Presence of taxing, spending or regulatory authority by LGs	Key controls include GDP per capita, population density, illiteracy, ethnic fractionalization and income inequality	▪ D associated with higher coverage in lower income countries, and lower coverage in higher income countries - L shape suggested
<b>RANK 4:</b>									
<b>Less Credible Identification Strategy</b>									
7	Treisman (2002)	Cross-country	Various	Various	OLS	Up to 166 countries with cross-sectional data collected from mid-90s	▪ Presence of LG exclusive authority on any one item ▪ Some other measures of fiscal and political decentralization also used	Extensive socioeconomic controls included	▪ No significant association of sub-national autonomy with either indicator ▪ Electoral accountability associated with greater access to medication

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<b>Table 5: Selected Empirical Evidence of Technical Efficiency - Education</b>									
No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
<b><i>RANK 2: Strongly Credible Identification Strategy</i></b>									
1	Faguet and Sanchez (2008)	Colombia	Phased beginning in 1970s - key reform in 1991	Increase in devolved funds to LG, greater responsibility for public services, political devolution	OLS and 2SLS	90% of municipalities universe over period 1994 to 2004	<ul style="list-style-type: none"> <li>▪ LG own revenue sources / LG expenditure</li> <li>▪ Binary factor of Municipal Certification</li> <li>▪ Share of transfers to education expenditure</li> </ul>	-	▪ D positively associated with higher enrolment in public school
2	Galiani et al (2008)	Argentina	1991	Decentralized financing, staff management and budgeting to LG. Schools choose textbooks and teaching methods.	Difference in differences  Matching with difference in differences	Almost all secondary schools over period 1994 to 1999	▪ Actual transfer from province to LG	No validation of pre-implementation parallel trends	▪ D associated with higher Math and Spanish scores
<b><i>RANK 3: Somewhat Credible Identification Strategy</i></b>									
3	Aslam and Yilmaz (2011)	Pakistan	2001	Limited financial devolution but implementation of rule-based transfers, responsibility for public services, political devolution	OLS using a fixed effects model	183 villages from 5 districts out of 120+. Retrospective data collected for 1995 to 2007	▪ Binary measure of before and after D implementation	Only control included is estimate of village population	▪ Magnitude of education services increases after introduction of D

**Table 5: Selected Empirical Evidence of Technical Efficiency - Education**

No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
4	Freinkman and Plekhanov (2009)	Russia	Phased beginning in 1994	Increased fiscal powers with rule-based transfers, responsibility for public services	OLS using a between effects model	Secondary school results from 73 out of 83 regions, tested in 2004 and 2005	<ul style="list-style-type: none"> <li>▪ Share of LG education expenditure financed by own revenue</li> <li>▪ Type of decentralization arrangement</li> </ul>	Key controls include socioeconomic controls as well as control for initial stock of education inputs	▪ D associated with higher test scores
5	Habibi et al (2003)	Argentina	1991	Decentralized financing, staff management and budgeting to LG.	OLS using a fixed effects model, GLS	23 of 23 provinces over 1970 to 1994	<ul style="list-style-type: none"> <li>▪ Share of resources in provincial control to total resources</li> <li>▪ Share of locally generated resources to locally controlled resources</li> </ul>	Key controls include per capita income, per capita expenditure and number of public sector employees	▪ Share of locally generated to locally controlled resources is associated with higher enrolment
6	Inchauste (2009)	Bolivia	1994	Increase in transfers to LGs following HIPC initiative - 2000 onwards	OLS using a random effects model	300 municipalities over period 1999 - 2005	<ul style="list-style-type: none"> <li>▪ Change in transfers for education</li> <li>▪ Change in spending in education</li> </ul>	-	<ul style="list-style-type: none"> <li>▪ Increase in share of unenrolled children associated with increase in transfers</li> <li>▪ No significant impact of change in spending</li> </ul>
<b>RANK 4: Less Credible Identification Strategy</b>									
7	Di Gropello (2002)	Chile	Early 1980s	Some increase in devolved funds to LG, greater responsibility for public services. In 1990s, greater pedagogical devolution to schools	OLS	50 municipalities (out of 355) - Student tests conducted in 1996	<ul style="list-style-type: none"> <li>▪ LG own funds / Total funds spent on education</li> <li>▪ School level parameters on participation, autonomy</li> </ul>	-	<ul style="list-style-type: none"> <li>▪ Municipal financial autonomy not significant</li> <li>▪ Municipal training spend and wage incentives positively associated with test scores</li> <li>▪ School involvement in financial decision-making</li> </ul>



**Table 5: Selected Empirical Evidence of Technical Efficiency - Education**

No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
									positively associated with test scores ▪ School pedagogical and curricular autonomy positively associated with test scores
8	Jimenez and Paqueo (1996)	Philippines	1987	School councils raise funds, while LGs earmark taxes for supplemental school compensation	OLS	600 elementary schools over period 1982 to 1983	▪ Proportion of school revenues from local sources	-	▪ Locally financed schools have lower financial expenditure, indicating cost efficiency
9	Lockheed and Zhao (1993)	Philippines	1987	School councils raise funds, while LGs earmark taxes for supplemental school compensation	OLS comparison of private, national and local government schools/ HLM	8k 9th grade students in 214 schools	▪ Local government school status	-	▪ No significant impact
10	Treisman (2002)	Cross-country	Various	Various	OLS	Up to 166 countries with cross-sectional data collected from mid-90s	▪ Presence of LG exclusive authority on any one item ▪ Some other measures of fiscal and political decentralization also used	Extensive socioeconomic controls included	▪ Negative and significant relationships between measures of decentralization and illiteracy

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<b>Table 6: Selected Empirical Evidence of Technical Efficiency – School-based Management</b>									
No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
<b>RANK 1: Very Strongly Credible Identification Strategy</b>									
1	Duflo et al (2007)	Kenya	2005	Randomized trial which gave school councils money and autonomy to hire extra teachers and monitor their performance	OLS comparison of treatment and control groups. Alternate specification uses covariates	21k students from 210 schools	▪ Dummy variable indicating treatment group	-	SBM associated with ▪ Increase in Mathematics scores of 0.24 standard deviations ▪ Increase in Language scores of 0.18 standard deviations
2	Glewwe and Maiga (2011)	Madagascar	2005	Randomized trial in which materials, training and greater accountability is given to three levels of districts, sub-districts and schools	OLS comparison of treatment and control groups.	20k students from 30 districts over period 2006 to 2007	▪ Dummy variable indicating treatment group	-	▪ No significant association with test scores
<b>RANK 2: Strongly Credible Identification Strategy</b>									
3	Gertler et al (2011)	Mexico	1996	Small grants to parent councils and parental training targeted at disadvantaged areas - AGE	Difference in differences  Pre-implementation parallel trends validation provided	30,000 students from 6,000 schools over 1997 - 2001	▪ Dummy variable indicating whether school received AGE intervention	-	SBM associated with ▪ Reduction in failure rates by 4% ▪ Reduction in repetition rates by 5.4% ▪ No impact on drop-out rates
4	Skoufias and Shapiro (2006)	Mexico	2001	Annual grants of up to USD 15k given to schools/SMCs to improve education quality	OLS and Difference-in-differences with matching	75000 schools over period 2001 - 2004	▪ School received PEC grant in all three years ▪ School received PEC grant in any one year	No parallel trends validation provided	SBM associated with ▪ 0.24 lower dropout rates ▪ 0.24 lower failure rates ▪ 0.31 lower repetition rates

**Table 6: Selected Empirical Evidence of Technical Efficiency – School-based Management**

No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
<b>RANK 3: Somewhat Credible Identification Strategy</b>									
5	Hanushek et al (2011)	Cross-country	Various	Various	OLS with country and time fixed effects	1mn students from 42 countries - 4 waves of PISA from 2000 to 2009	<ul style="list-style-type: none"> <li>▪ Autonomy over curriculum and pedagogy</li> <li>▪ Autonomy over personnel management</li> <li>▪ Autonomy over budgeting decision</li> </ul>	-	<ul style="list-style-type: none"> <li>▪ Overall negative association between autonomy and scores</li> </ul>
6	Jimenez and Sawada (1999)	El Salvador	1991	Community schools where SMCs can hire/ fire teachers, manage school funds and maintain infrastructure	OLS with Heckman correction model	605 3rd grade students from 162 municipalities - data from 1996	<ul style="list-style-type: none"> <li>▪ Binary indicating whether it is an EDUCO school or not</li> </ul>	-	<ul style="list-style-type: none"> <li>▪ No association with Math or English test scores</li> <li>▪ Students in EDUCO schools have lower absenteeism</li> </ul>
7	Khatti et al (2010)	Philippines	2003	Training and direct funding for school improvement	Difference in differences with matching	5k schools from 23 districts over 2003 to 2005	<ul style="list-style-type: none"> <li>▪ Dummy variable indicating whether school received intervention in first year</li> </ul>	Pre-implementation trends show differences between treatment and comparison group	<ul style="list-style-type: none"> <li>▪ SBM associated with</li> <li>▪ 1.45 percentage points overall improvement</li> <li>▪ 1.82 percentage points improvement in Science</li> <li>▪ 1.32 percentage points improvement in English</li> <li>▪ 1.88 percentage points improvement in Mathematics</li> </ul>

**Table 6: Selected Empirical Evidence of Technical Efficiency – School-based Management**

No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
8	King and Ozler (2000)	Nicaragua	1991	Autonomous schools with SMCs that can hire/ fire teachers, manage school funds and maintain infrastructure	Matching + validation using fixed effects and IV	3000 students from primary and secondary schools over period 1995 - 1997	<ul style="list-style-type: none"> <li>▪ De jure autonomy - binary variable of whether the school is autonomous by law or not</li> <li>▪ De facto autonomy - actual school autonomy in various areas</li> </ul>	-	<ul style="list-style-type: none"> <li>▪ No impact of de jure Autonomy</li> <li>▪ Positive association of de facto Autonomy with Math and Spanish, no association with Language</li> </ul>
9	Paes de Barros and Mendonca (1998)	Brazil	1982	SBM with three key innovations: <ul style="list-style-type: none"> <li>▪ Financial autonomy of schools</li> <li>▪ Ability to elect principals</li> <li>▪ Presence of school councils</li> </ul>	Difference in differences - state-level	18 states over period 1981 - 1993	<ul style="list-style-type: none"> <li>▪ Financial autonomy of schools</li> <li>▪ Ability to elect principals</li> <li>▪ Presence of school councils</li> </ul>	No parallel trends validation provided	<ul style="list-style-type: none"> <li>▪ Lower repetition rates associated with financial autonomy</li> <li>▪ Lower mean grade level lag associated with financial autonomy and school councils</li> <li>▪ Lower proportion of students with lag associated with school council presence.</li> <li>▪ Proportion of students with lag negatively associated with principal election</li> </ul>
10	Parker (2005)	Nicaragua	1991	Autonomous schools with SMCs that can hire/ fire teachers, manage school funds and maintain infrastructure	Matching	1000 3rd and 6th grade students - tested in 2002	School autonomy in various areas	-	<ul style="list-style-type: none"> <li>▪ SBM associated with</li> <li>▪ Higher third grade Math scores</li> <li>▪ Lower sixth grade Math scores</li> <li>▪ No association with Spanish scores</li> </ul>

**Table 6: Selected Empirical Evidence of Technical Efficiency – School-based Management**

No.	Author (Date)	Country of Study	Date Implemented	Programme Description	Method of Analysis	Sample	Measure/s of Decentralization	Other Key Details	Results
11	Sawada and Ragatz (2005)	El Salvador	1991	Community schools where SMCs can hire/ fire teachers, manage school funds and maintain infrastructure	Matching	605 3rd grade students from 162 municipalities - data from 1996	▪ Binary indicating whether it is an EDUCO school or not	-	▪ No association with scores ▪ Lower teacher absenteeism in EDUCO schools
12	Gunnarsson et al (2009)	Cross-country	Various	Various	OLS and 2SLS	17k students from 10 Latam countries - 1997 survey data	▪ Autonomy of school in decisions regarding hiring, budget allocation, curriculum design, etc. ▪ Participation of parents and communities in school	Instruments used include principal attributes and legal structures which could plausibly have independent impact on attainment	▪ Autonomy associated with lower test scores ▪ Participation associated with higher test scores
13	Di Gropello and Marshall (2005)	Honduras	1999	Community schools where SMCs can hire/ fire teachers, manage school funds and maintain infrastructure	OLS with Heckman correction model	200 rural schools tested in 2002 and 2003	▪ Probit model predicting participation in PROHECO school	Inconsistent data collection challenges	SBM associated with ▪ Higher science scores but with no change in Math or Language test scores ▪ Marginally lower dropout rates
<b>RANK 4: Less Credible Identification Strategy</b>									
14	Eskeland and Filmer (2007)	Argentina	1978	Decentralized financing, staff management and budgeting to LG. Schools choose textbooks and teaching methods.	OLS with province fixed effects	24000 6th and 7th grade students from urban schools	▪ Autonomy of school in various decisions ▪ Participation of parents	-	SBM associated with ▪ Higher Math but no change in Language scores ▪ Effect is stronger for poorer households