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Abstract

The effects of decentralization on public sector outputs is much debated but little agreed upon. This paper compares the remarkable case of Bolivia with the more complex case of Colombia to explore decentralization's effects on public education outcomes. In Colombia, decentralization of education finance improved enrollment rates in public schools. In Bolivia, decentralization made government more responsive by re-directing public investment to areas of greatest need. In both countries, investment shifted from infrastructure to primary social services. In both, it was the behavior of smaller, poorer, more rural municipalities that drove these changes. A key innovation of this paper is a methodology for estimating the effects of decentralization in a data-poor environment.

Keywords: decentralization, education, public investment, Bolivia, Colombia, local government

Authors' Acknowledgements

1. INTRODUCTION

Over the past few decades decentralization has become one of the most debated policy issues throughout both developing and developed worlds. It is seen as central to the development efforts of countries as far afield as Chile, China, Guatemala and Nepal. And in the multiple guises of subsidiarity, devolution and federalism it is also squarely in the foreground of policy discourse in the EU, UK and US. But surprisingly, there is little agreement in the empirical literature on the effects of decentralization on a number of important policy goals. Advocates (*e.g.* Olowu and Wunsch 1990, Putnam 1993, World Bank 1994, UNDP 1993) argue that decentralization can make government more responsive to the governed by "tailoring levels of consumption to the preferences of smaller, more homogeneous groups" (Wallis and Oates 1988, 5). Critics (*e.g.* Crook and Sverrisson 1999, Prud'homme 1995, Samoff 1990, Smith 1985, Tanzi 1995) dispute this, arguing that local governments are too susceptible to elite capture, too lacking in technical, human and financial resources, and too corrupt to produce a heterogeneous range of public services that respond efficiently to local demand. And their profligacy is likely to endanger macroeconomic stability. But neither side is able to substantiate its arguments convincingly with empirical evidence.

Much of the debate has taken place in these pages, similarly without resolution. Of 24 articles on decentralization, local government and responsiveness published in *World Development* since 1997, 11 report broadly positive results, and 13 are negative. Fiszbein (1997), Shankar and Shah (2003), de Oliveira (2002) and Parry (1997) are amongst the most enthusiastic, finding that decentralization can spur capacity building in local government (Colombia), decrease levels of regional inequality through political

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competition (a sample of 26 countries), boost the creation and administration of protected areas (Bahia, Brazil), and improve educational outcomes (Chile), respectively. Rowland (2001) and Blair (2000) find that decentralization improved the quality of democratic governance achieved in both large cities and small towns. And Petro (2001) finds that local government played a pivotal role in raising levels of social capital in Novgorod, Russia by establishing common social values and priorities for the community. Other authors, such as Andersson (2004), Larson (2002), McCarthy (2004) and Nygren (2005), are more cautious, arguing broadly that decentralization is a complex, problematic phenomenon, but may ultimately have positive effects on local welfare.

Amongst skeptics, some of the most striking are Ellis, Kutengule and Nyasulu (2003), Ellis and Mdoe (2003) and Ellis and Bahiigwa (2003), who find that decentralization will likely depress growth and rural livelihoods by facilitating the creation of new business licenses and taxes that stifle private enterprise (Malawi), and propagate rent-seeking behavior down to the district and lower levels, so becoming "part of the problem of rural poverty, not part of the solution"[1] (Tanzania and Uganda), respectively. Similarly, Bahiigwa, Rigby and Woodhouse (2005) and Francis and James (2003) show that decentralization in Uganda has not led to independent, accountable local governments, but rather to their capture by local elites, and hence to the failure of decentralization as a tool for poverty reduction. Porter (2002) agrees for Sub-Saharan Africa more generally. Regarding the environment, Woodhouse (2003) predicts that decentralization will fail to improve access of the poor to natural resources, or reduce ecological damage. Casson and Obidzinski (2002) go further, reporting that decentralization in Indonesia has spurred depredatory logging by creating bureaucratic

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actors with a stake in its proliferation. The cross-country evidence of Martinez-Vazquez and McNab (2003) is similarly unhopeful, showing that we don't know empirically whether decentralization affects growth directly or indirectly, and have no clear theoretical grounds for predicting a relationship either way. Worse, de Mello's (2000) study of 30 countries predicts that failures of intergovernmental fiscal coordination will lead to chronic deficits and, eventually, macroeconomic instability. The papers of Sundar (2001), Thun (2004) and Wiggins, Marfo and Anchirinah (2004) offer more cautious, nuanced arguments, that are on the whole skeptical about the possibility of beneficial change through decentralization.

The larger literature is similarly inconclusive. Amongst studies of Latin America, Campbell (2001) highlights the extraordinary scope of authority and resources that have been decentralized throughout the region, and argues that this "quiet revolution" has generated a new model of governance based on innovative, capable leadership, high popular participation, and a new implicit contract governing local taxation. But Montero and Samuels (2004) argue that the political motives of reformers often combine with ex-post vertical imbalances to make decentralization bad in terms of elite capture, regional inequality and macroeconomic stability. Rodríguez-Posé and Gill (2004) elaborate further on the tension between inequality and stability for the case of Brazil, while Eskeland and Filmer (2002) find econometric evidence that decentralization did lead to improvements in Argentine educational achievement scores.

Amongst the broadest international surveys: Rondinelli, Cheema and Nellis (1983) note that decentralization has seldom, if ever, lived up to expectations. Most developing countries implementing decentralization experienced serious administrative

problems. Although few comprehensive evaluations of the benefits and costs of decentralization efforts have been conducted, those that were attempted indicate limited success in some countries but not others. A decade and a half later, surveys by Piriou-Sall (1998), Manor (1999) and Smoke (2001) are slightly more positive, but with caveats about the strength of the evidence in decentralization's favor. Manor ends his study with the judgment that "while decentralization …is no panacea, it has many virtues and is worth pursuing", after noting that the evidence, though extensive, is still incomplete. Smoke finds the evidence mixed and anecdotal, and asks whether there is empirical justification for pursuing decentralization at all. More recently, in a review of 56 studies published since the late-1990s, Shah, Thompson and Zou (2004) find evidence that decentralization has in some cases improved, and in others worsened, service delivery, corruption, macroeconomic stability, and growth across a large range of countries. The lack of progress is striking.

This paper examines decentralization's effects on educational outcomes in Bolivia and Colombia. We first examine how decentralization changed investment flows across sectors, and across space, in both countries. We then focus much more closely on education. Our analysis is unusual in that it uses large-N, quantitative evidence to explore the link between decentralization and a specific policy outcome (in this case enrollment rates). Most of the literature focusing on such links uses qualitative data (*e.g.* legal and regulatory information; see Parry 1997) or small-N empirics (*e.g.* case studies; see Manor 1999). To our knowledge, this is the first study that links decentralization with school enrollments using nationwide data. We provide evidence for such a link for Colombia, and get as close as the data allow for Bolivia.

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Why focus on these two countries in particular? There are four reasons: (i) in both cases, decentralization was advocated as a remedy for a state whose unresponsiveness to citizens' needs fed serious internal tensions, including armed insurgency in Colombia; (ii) in both cases, decentralizing reforms were pursued in a vigorous and sustained manner; (iii) the broad geographic, institutional and historical similarities these countries share limit problems of data comparability and interpretation; and (iv) although their internal ructions have attracted much international attention recently, both are relatively underrepresented in the literature. Bolivia is particularly deserving of study because reform there consisted of a large change in policy at a discrete point in time, thus rendering it a sort of natural experiment. Colombia is more relevant for many middle-income countries because of its greater wealth, level of development, and relatively high state capacity. And its more complex, multifaceted reform process is more typical of decentralizations around the world. To our knowledge, this is the first comparative study of decentralization in Bolivia and Colombia.

Decentralization is henceforth defined as the devolution by central (i.e. national) government of specific functions, with all of the administrative, political and economic attributes that these entail, to democratic local (i.e. municipal) governments which are independent of the center within a legally delimited geographic and functional domain. We mostly ignore intermediate levels of government (departments) for two reasons: (i) Bolivia decentralized directly to municipalities, by-passing departments entirely at first, and only recently making prefects elected; Colombia did not, but focusing on municipalities facilitates the country comparison. And (ii) the simplicity of the definition thus facilitated aids analytical clarity.

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The rest of the paper is organized as follows. Section 2 reviews the Bolivian and Colombian decentralization programs, focusing on their legal and budgetary aspects. Section 3 examines decentralization's effects on public investment flows in both countries. Section 4 presents our quantitative methodology. Section 5 examines whether decentralization made education investment more responsive to local needs in Bolivia, and whether it increased school enrollment in Colombia, with detailed econometric evidence. And section 6 concludes.

2. THE BOLIVIAN AND COLOMBIAN DECENTRALIZATION PROGRAMS
(a) Popular participation in Bolivia

On the eve of revolution, Bolivia was a poor, semi-feudal country with extreme levels of inequality, presided over by a "typical racist state in which the non-Spanish speaking indigenous peasantry was controlled by a small, Spanish speaking white elite, [their power] based ultimately on violence more than consensus or any social pact" (Klein 1993, 237; our translation). The nationalist revolution of 1952, which expropriated the "commanding heights" of the economy, land and mines, launched Bolivia on the road to one of the most centralized state structures in the region. The government embarked upon a state-led modernization strategy in which public corporations and regional governments initiated a concerted drive to break down provincial fiefdoms, transform existing social relations, and create a modern, industrial, egalitarian society (Dunkerley 1984). To this end the President directly appointed Prefects, who in turn designated entire regional governments and associated dependencies, forming a national chain of cascading authority emanating from the *Palacio Quemado* in La Paz.

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The intellectual trends of the 1950s-1970s – Dependency theory, Import Substitution Industrialization, and Developmentalism – contributed to the centralizing tendency, as did the military governments which overthrew elected administrations with increasing frequency from the 1960s on (Klein 1993). With political power so little dispersed, there was little point in establishing the legal and political instruments of local governance. As a result, beyond the nine regional capitals (including La Paz) and an additional 25-30 cities, local government existed in Bolivia at best in name, as an honorary and ceremonial institution devoid of administrative capability and starved for funds. And in most of the country it did not exist at all.

Although the 1994 reform was sprung on an unsuspecting nation, the concept of decentralization was by no means new. For more than 30 years a decentralization debate focused on Bolivia's nine departments ebbed and flowed politically – at times taking on burning importance, other times all but forgotten. The issue became caught up in the country's centrifugal tensions, as regional elites in Santa Cruz and Tarija consciously manipulated the threat of secession to Brazil and Argentina respectively – with which each is economically more integrated than La Paz – to extract resources from the center. The Bolivian paradox of a highly centralized but weak state, and a socially diverse population with weak national identity, meant that such threats were taken seriously by the political class, which blocked all moves to devolve more power and authority to Bolivia's regions.

So what spurred the change of tack? and why then? Two factors stand out. The less important one arises from Bolivia's failure to achieve sustained, healthy growth despite wrenching economic reform overseen by the IMF and World Bank. Fifteen years

of near-zero per capita economic growth sapped the credibility of the state and fomented

social unrest. The new *Movimiento Nacionalista Revolucionario* (MNR) administration

of Pres. Sánchez de Lozada saw the structure of government itself as an impediment to

growth. Decentralization was an attempt to deepen structural reform in order to make the

state more efficient and responsive to the population, and so regain its legitimacy in the

voters' eyes.

The more important factor arises from the rise of ethnically-based, populist

politics in the 1980s, which undercut the MNR's traditional dominance of the rural vote,

and posed a serious challenge to its (self-declared) role as the "natural party of

government". This rural dominance was itself born out of the MNR's agrarian reforms of

the 1952-3 revolution. Hence a party with a tradition of radical reform, which found

itself in secular decline, sought a second, re-defining moment. In a typically bold move,

it sought to reorganize government, re-cast the relationship between citizens and the state,

and so win back the loyalty of Bolivians living outside major cities. To a very important

extent, decentralization was a gambit to capture rural voters for at least another

generation.[2]

Against this background, the Bolivian decentralization reform was announced in

1994. The Law of Popular Participation, developed almost in secret by a small number

of technocrats (Tuchschneider 1997), was announced to the nation to general surprise,

then ridicule, then determined opposition from large parts of society.[3] It is notable that

opposition to the law, which was fierce for a few months, came principally from the

teachers' union, NGOs and other social actors, and not from political parties. Judged by

their public declarations, this opposition was an incoherent mix of accusations and fears

that denoted a deep suspicion of the government's motives, and not a careful reading of the law. The lack of opposition from parties can largely be attributed to the sweeping reforms that were being enacted by the MNR government at the same time as decentralization. With privatization of the main state enterprises, education reform, and a comprehensive restructuring of the executive branch all being pushed at once, decentralization was relegated to the second tier of political parties' concerns. The opposition focused its attention elsewhere, and it never became a fighting point.

First made public in January of that year, the law was promulgated by Congress in April and implemented from July. The scale of the change in resource flows and political power that it brought about were enormous. The core of the law consists of four points (Secretaría Nacional de Participación Popular, 1994):

1. **Resource Allocation.** Funds devolved to municipalities doubled to 20 percent of all national tax revenue. More importantly, allocation amongst municipalities switched from unsystematic, highly political criteria to a strict per capita basis.

2. **Responsibility for Public Services.** Ownership of local infrastructure in education, health, irrigation, roads, sports and culture was given to municipalities, with the concomitant responsibility to maintain, equip and administer these facilities, and invest in new ones.

3. **Oversight Committees** *(Comités de Vigilancia)* were established to provide an alternative channel for representing popular demand in the policy-making process. Composed of representatives from local, grass-roots groups, these bodies propose projects and oversee municipal expenditure. Their ability to have disbursements of

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Popular Participation funds suspended if they find funds are being misused or stolen can paralyze local government, and gives them real power.

4. **Municipalization.** Existing municipalities were expanded to include suburbs and surrounding rural areas, and 198 new municipalities (out of some 315 in all) were created.

This was followed by the Law of Decentralized Administration (1995) and the Law of Municipalities (1999), which further defined the municipal mandate and located it in a broader governmental architecture.

The change in local affairs that these measures catalyzed is immense. Before reform local government was absent throughout the vast majority of Bolivian territory, and the broader state present at most in the form of a military garrison, schoolhouse or health post, each reporting to its respective ministry. After reform, elected local governments sprouted throughout the land. This is reflected in resources flows between center and periphery. Before decentralization Bolivia's three main cities took 86% of all devolved funds, while the remaining 308 municipalities divided amongst them a mere 14%. After decentralization the shares reversed to 27% and 73% respectively. The per capita criterion resulted in a massive shift of resources to previously neglected areas. Amongst smaller, poorer rural districts, resource increases of 50,000 – 100,000 percent were quite common.

(b) The decentralization process in Colombia

Like Bolivia, Colombia was traditionally a highly centralized country, with mayors and governors directly named by central government. Governors, in particular, were the President's *hombres de confianza,* and carried out his will in the regions. But

unlike Bolivia's "big bang" reform, decentralization in Colombia developed over years as a much more gradual, incremental process. Ceballos and Hoyos (2004) identify three broad phases:

Phase 1 began in the late 1970s and early 1980s, and included a number of fiscal measures aimed at strengthening municipal finances. Most important of these were Law 14 of 1983 and Law 12 of 1986, which assigned to municipalities increased powers of tax collection, including especially sales tax, and established parameters for the investment of these funds.

Phase 2, which began in the mid-1980s, was more concerned with political and administrative matters. Amongst the most important of these measures was Law 11 of 1986, which regulated the popular election of mayors and sought to promote popular participation in local public decision-making via *Juntas Administradoras Locales*, amongst others. Reforms enshrined in the 1991 constitution, such as citizens' initiatives, municipal planning councils, open town meetings, the ability to revoke mayoral mandates, referenda, and popular consultations, further deepened political decentralization. The 1991 constitution also established the popular election of governors.

Phase 3 consisted of a number of laws that regulated the new constitution, and other fiscal and administrative reforms of the period These laws assigned greater responsibility to municipalities for the provision of public services and social investment, and provided additional resources for the same by increasing central government transfers to local governments significantly. The laws mandate that the bulk of transferred funds should be spent on education and health, with little discretion left to

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local governments. Automatic transfers to regional governments rose from about 20% to over 40% of total government spending, placing Colombia first in the region amongst countries with a unitary state, and third overall behind the two big federal countries, Brazil and Argentina (Alesina *et al.*, 2000).

The aggregate effect of two decades of political and fiscal reforms was a large increase in the authority and operational independence of Colombia's municipal governments, accompanied by a huge rise in the resources they controlled. Municipalities were allowed to raise and spend significant sums of taxes, central-to-local government transfers increase more than three fold,[4] and municipal governments were permitted to issue public debt. Overall municipal expenditures and investments rose from 2.8% to 8.3% of GDP, as detailed in figure 1. This rise was due entirely to increased investment, while running costs remained stable over the period.[5]

Figure 1

Municipal Expenditures & Investment (%GDP)
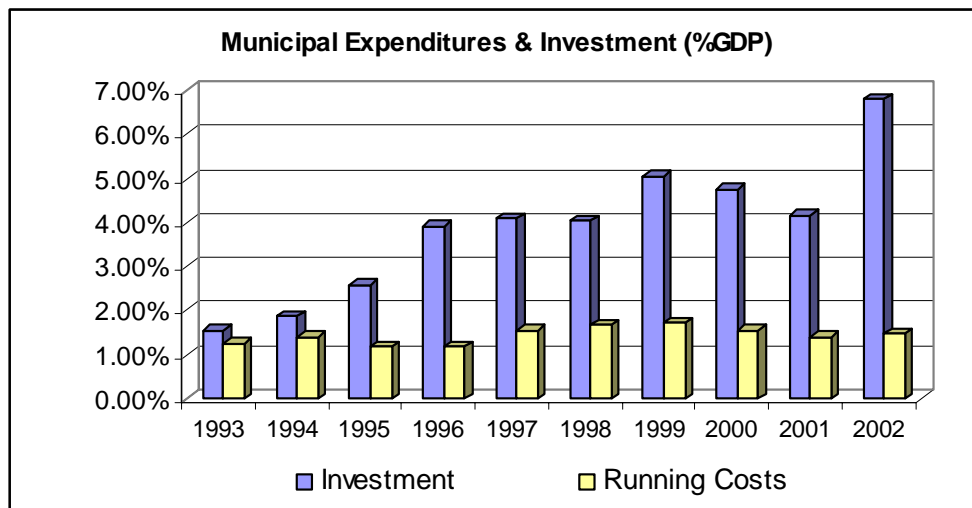
Source: National Planning Department; original calculations.

What drove decentralization in Colombia? As befits a much longer and more elaborate process, we cannot limit the motivating factors of reform to a few discrete goals. Ceballos and Hoyos group the many reasons into two categories. The first of

these is *the challenge of political instability*. Colombia is a violent country – much more so than Bolivia – with a long history of civil conflict, armed rebellion, persistently high levels of "common" crime, and the use of violence as an explicit tool of political mobilization. The late 1970s saw levels of violence rise again as the internal conflict intensified. At the same time, social protests and pressures from regional groups multiplied, linked to the central state's inability to meet demands for social services and public investment. Secondly, *the political hegemony* over the instruments of the state of the traditional Liberal and Conservative parties began to be seen more and more as a liability – less the solution to a previous round of civil violence (*La Violencia*) and more a cause of the next one. Colombians from across the political spectrum became convinced that the inability of the state to respond to society's demands – and its outright absence in many areas (the "internal frontier"), combined with the waning legitimacy of an arbitrarily restricted democracy,[6] were leading to public sector inefficiencies, civic discontent, and ultimately armed violence.

Thus from the start decentralization in Colombia was a multi-faceted tool designed to serve a combination of purposes particular to Colombia's troubled democracy. Through it, policy elites sought to increase the levels of electoral and citizen participation within the existing institutional framework. They sought to open the political system via popular elections at the regional and local levels, where they hoped new political movements would eventually break the liberal-conservative hegemony over the resources of the state. In Colombia's largest cities this has indeed been the case; elsewhere evidence is mixed (see Ceballos and Hoyos 2004).

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3. DID DECENTRALIZATION CHANGE PUBLIC INVESTMENT? DESCRIPTIVE STATISTICS

(a) Data

We analyze databases compiled for each country from official government statistics. Bolivian data comes from the National Electoral Court, National Institute of Statistics, National Secretariat of Popular Participation, National Secretariat of Public Investment and External Finance, and the Social Policy Analysis Unit. Colombian data comes from the Agustín Codazzi Geography Institute, National Electoral Office, National Planning Department, Office of the Vice Presidency, and the National Administrative Department of Statistics.

Our databases cover over 90% of Colombian municipalities and the universe of Bolivian municipalities. Within the Latin American context, Colombian municipal data are relatively abundant and detailed.[7] Compiling that database was thus relatively straightforward. But the same was not true for Bolivia. Before 1994, the vast majority of public investment in Bolivian villages and towns was undertaken by central government. But financial records of these projects – voluminous and very detailed – do not include information on which municipality they (would eventually) belong to. This is not surprising, as most municipalities did not exist even in law. Hence local experts in geographic information systems were engaged to allocate the thousands of public investment projects in the 1987-1993 Public Sector Investment Budget to Bolivia's municipalities, as created or expanded in the 1994 reform. This data was combined with post-reform data reported by municipal governments to create our 1987-1996 municipal investment dataset.

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For both Bolivia and Colombia, all information on budgets and financial flows is panel data. Electoral data is periodic and cross-sectional. All other data (e.g. social, demographic, institutional, infrastructural) is cross-sectional, from national censuses and other national surveys, such as the Bolivian "municipal census", a special exercise that inventoried municipalities' physical and institutional infrastructures. Our database retains data integrity by source[8]. We use similar variables from different sources in as checks on each other, in alternative specifications of the models presented in section 4. Our models prove robust to such tests.

(b) Bolivia

The extent of the change decentralization brought about in Bolivia is perhaps best appreciated by examining how it changed the composition of municipal public investment. Figure 2 compares investment by sector *in* all municipalities during the final three years under centralized rule (1991-3; dark bars), with decentralized investment *by* all municipalities during the first three years after reform (1994-6; light bars). To better compare like with like, we omit sectors such as hydrocarbons, mining and national defense, which are not well suited to local government action (and remained the responsibility of central government in Bolivia). The differences are large. In the years leading up to reform, central government invested most in transport, energy and multisectoral,[9] which together accounted for 65% of public investment during 1991-3. After decentralization, local governments invest most heavily in education, urban development, and water & sanitation, together accounting for 79% of municipal investment. Of the top three sectors in both cases, accounting for the great majority of total investment, central and local government have not one in common. The evidence

implies that local and central government have very different investment priorities. Decentralizing power and resources to municipal governments is associated with a shift in public investment away from economic production and infrastructure, and into social services and human capital formation.

Figure 2
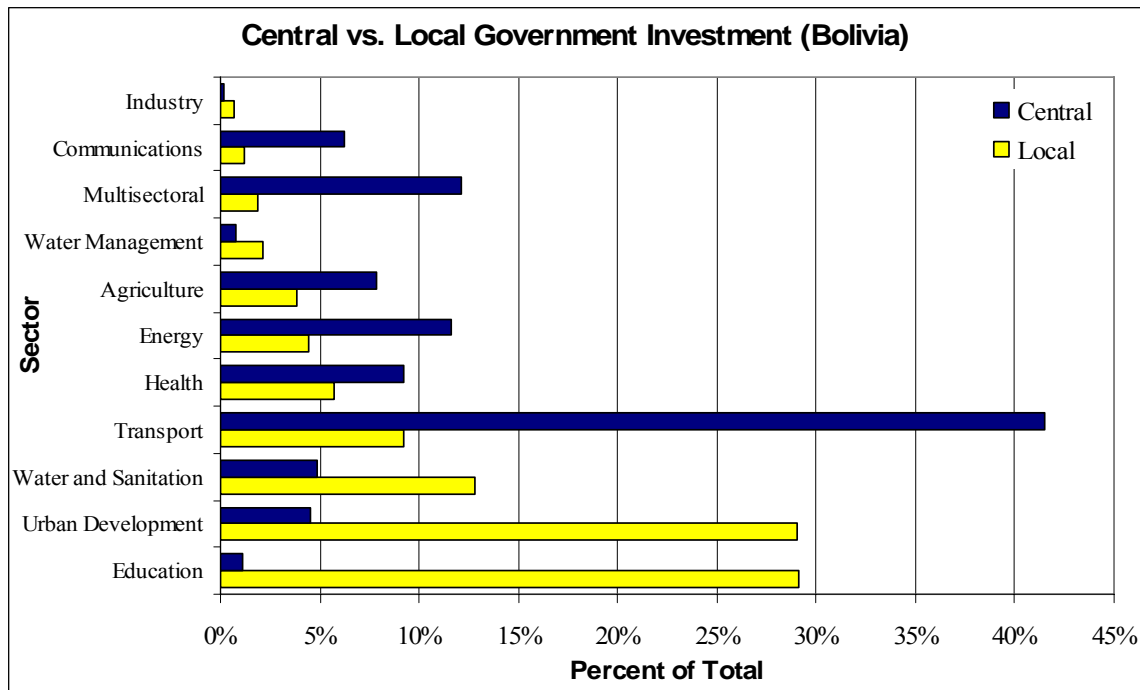
Central vs. Local Government Investment (Bolivia)

Source: National Secretariat of Public Investment and External Finance; original calculations.

Consider also how investment was distributed geographically among Bolivia's municipalities before and after decentralization. Figure 3 shows quasi-histograms of total investment in all of Bolivia's municipalities in per-capita terms, again for the last three years under centralized rule vs. the first three years of decentralization. The vertical bars measure the proportion of Bolivia's municipalities that received investments in the given ranges. The chart shows that central government invested very unequally, with almost half of all municipalities receiving nothing while a small number received huge sums (over Bs.50,000/capita in one case), and the mean well outside the modal range. Under

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local government, by contrast, investment was much more equal: No districts received

zero and none received more than Bs.620/capita, the modal range contains the mean, and

the standard deviation is 97% lower than central government's. Closer inspection of the

leftmost column ("=0") in the left-hand chart below reveals that it is composed

overwhelmingly of the smallest, poorest, most rural districts. These are the

municipalities that were most affected by decentralization.

Figure 3: Distribution of Central and Local Government Investment by Amount
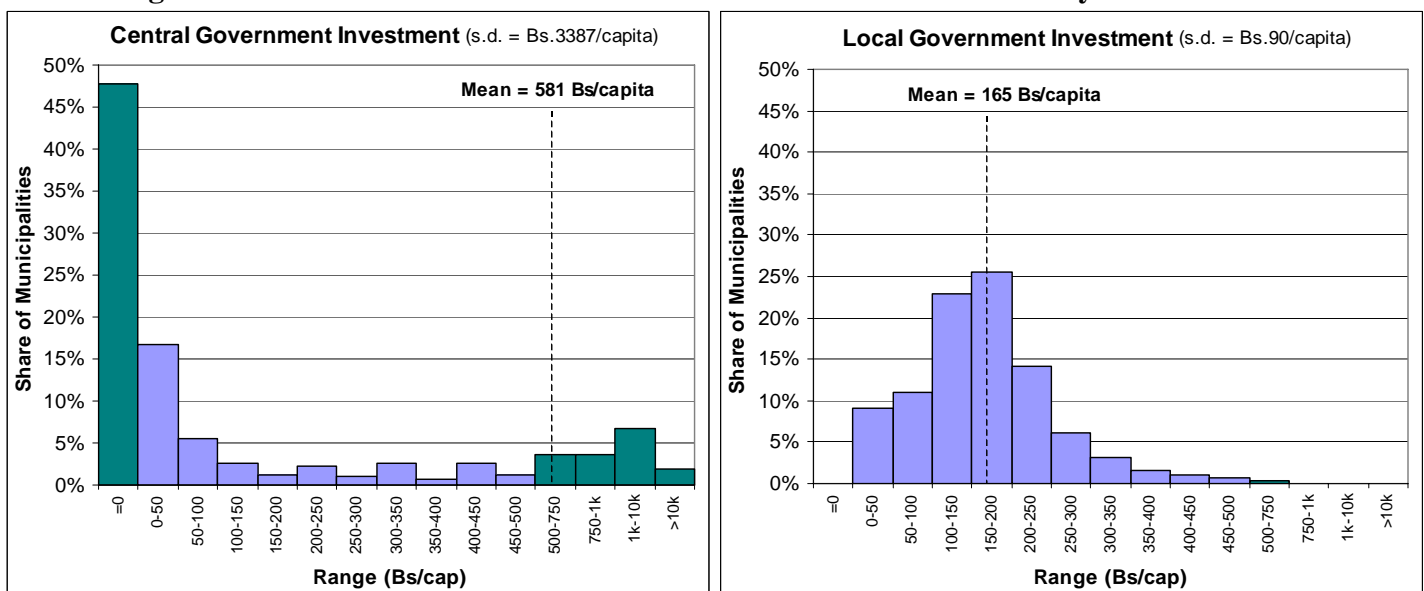
Source: National Secretariat of Public Investment and External Finance; original calculations. Note irregular outer intervals.

So decentralization seems to have changed the sectoral uses of investment and its

distribution across space. Did its effects run any deeper? Figure 4 plots education

investment under central and local government (three-year totals again) vs. local illiteracy

rates for all of Bolivia's municipalities. We use the illiteracy rate as a proxy for a

district's need for more education investment.[10] The most striking thing about the left-

hand plot is how few nonzero observations there are before decentralization – only 15%

of districts recorded any investment at all under central government. The regression line

is negative with a modest slope, although not quite significant at the 10% level (probably

because of so few non-zero observations). Contrast that with decentralized government, where 97% of districts invested in the sector, amounts are larger across the board, and the regression line on illiteracy is positively sloped and significant at the 1% level. Decentralization appears to have transformed education policy from one that ignored most municipalities in order to focus resources in those best-provided, to one that invested essentially everywhere, focusing resources where existing levels of education were worst. Section 5 looks at this question much more rigorously.

Figure 4: Education Investment vs. Illiteracy
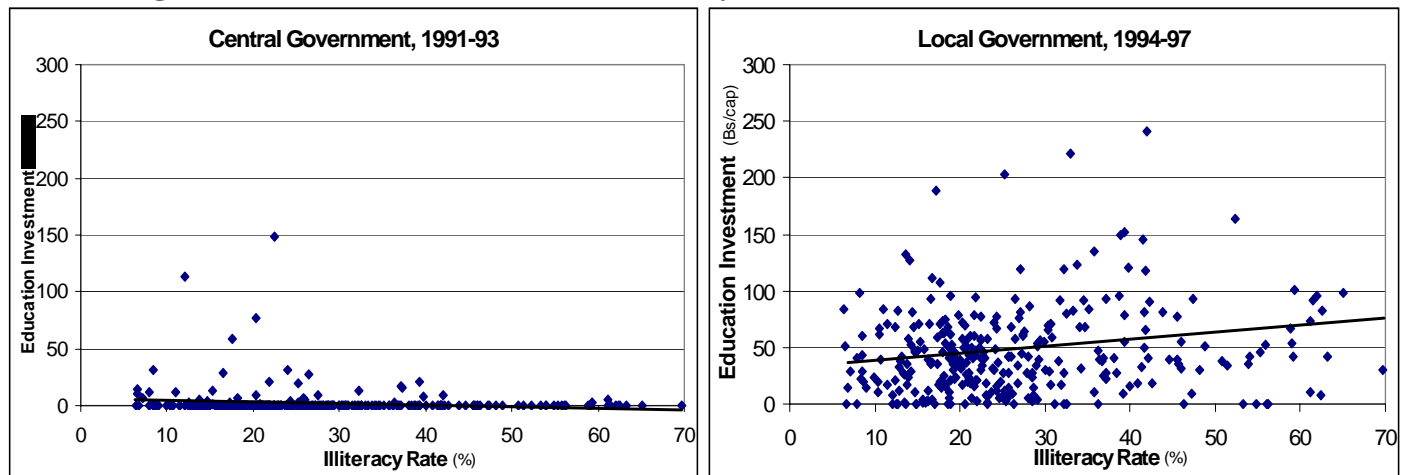
Sources: National Institute of Statistics, National Secretariat of Popular Participation, National Secretariat of Public Investment and External Finance; original calculations.

(c) Colombia

Detailed municipal-level expenditure and investment data are available for Colombia only from 1994. Hence we cannot examine investment priorities under a relatively "pure" centralized regime (i.e. which ended in the mid-1970s), as we did for Bolivia. But the characteristics of Colombia's reform process, marked by gradualism and long-term change, make this less of a problem. As discussed above, a number of key decentralizing mechanisms, such as citizens' initiatives, referenda, mayoral recall, and increased resource transfers, were only put in place with the 1991 constitutional reform and

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accompanying regulations. These transferred resources and authority to municipalities gradually over time. Hence the outlines of Colombia's decentralization "package" became fully clear only in 1992-93, setting off a process that deepened thereafter. Indeed, the empirical measures of decentralization that we use below all show monotonically increasing levels of decentralization throughout the period 1994-2004. Hence hereafter we treat 1993-94 as years with relatively high centralization, and 2003-04 as years with relatively high decentralization.

How did decentralization affect public investment patterns? In order to examine the investment priorities of central vs. local government as closely as we can, figure 5 compares central government investment in 1994 with local government investment *of own resources* (i.e. local taxes and charges) in 2003.[11] As for Bolivia, the differences are large. Central government's largest category, at 38% of the total, is infrastructure, whereas local government's largest is health, followed by education, which together comprise 81% of the local investment budget. The broader pattern of dark and light bars in figure 5 shows a clear shift in public sector priorities, and resources, away from infrastructure and industry and commerce, into health, education, and water and sanitation. The similarity with Bolivia is striking.

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Figure 5

Central vs. Local Government Investment (Colombia)
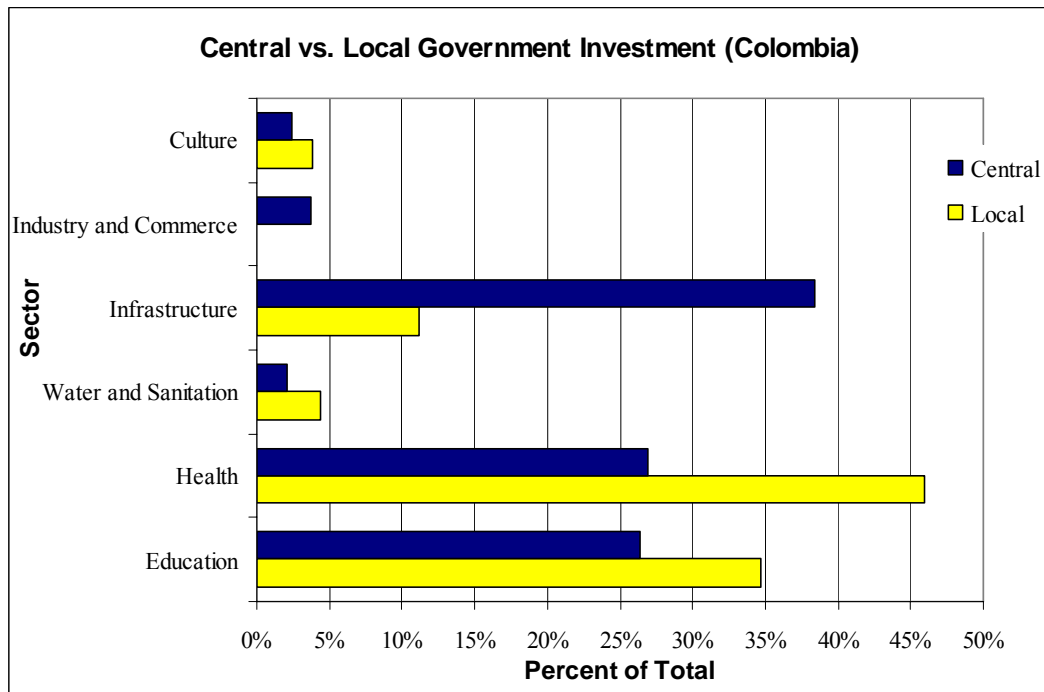
Source: National Planning Department; original calculations.

With respect to the geographic distribution of investment, figure 6 provides histograms of the public investment in Colombia's municipalities in 1994 vs. 2003. Amounts are given in constant 2002 pesos per capita, again divided by source between central and local governments. As decentralization deepened, both central and local investment became more dispersed, especially in the upper tails. This implies increasing inequality in investment, with some municipalities receiving much greater per capita sums than the norm. Both means rose significantly over the period, by 53% in the case of central government, and 105% for local government, implying that districts benefited quite significantly from increasing levels of investment by both central and local governments. Standard deviations were quite similar for central and local government in each period. The charts show clearly that the major differences are between 1994 and 2003, and not between center and periphery.

Figure 6: Distribution of Central and Local Government Investment by Amount

Central Government, 1994 (s.d. = $51,093/capita)
Mean = $144,876/capita

Central Government, 2003 (s.d. = $80,726/capita)
Mean = $221,435/capita

Local Government, 1994 (s.d. = $59,698/capita)
Mean = $71,301/capita

Local Government, 2003 (s.d. = $79,998/capita)
Mean = $145,878/capita
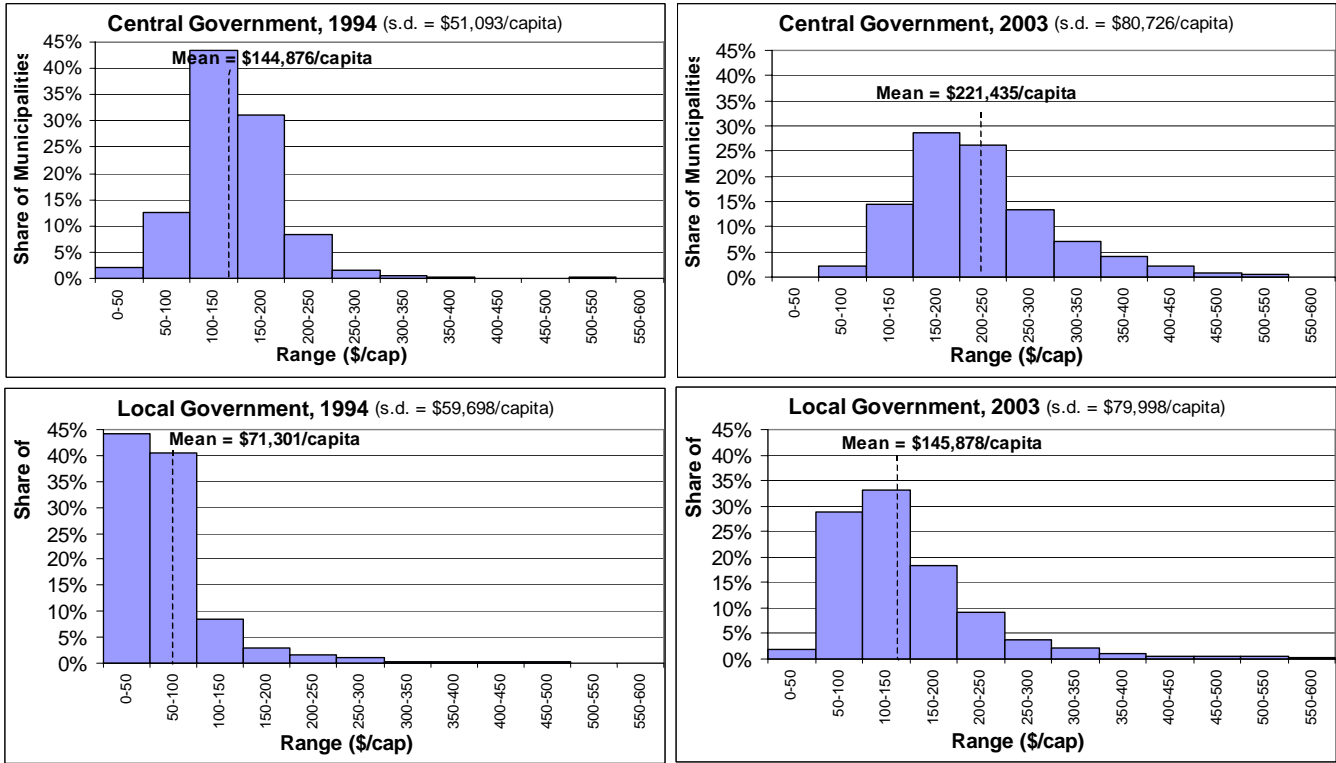
Source: National Planning Department; original calculations.

Lastly, is there any evidence that these broad changes in resource flows affected development outcomes of interest? We focus again on education, and in particular on school attendance figures. Figure 7 shows enrollment data for the period in question, for both public and private schools, with enrollment in 1994 indexed to 1. At the outset, public and private enrollment trends are quite similar. After 1996 an increasing gap opens up between them, although they continue to trend up and down in parallel. After 1999, however, the slopes diverge, leading to a large gap between the two educational systems. Decentralization seems to coincide with a 20 percent increase in school enrollment. The concentration of improvement in public schools, where enrollment increased 30 percent while the private system's fell seven percent, suggests that local governments may have been able to run schools and promote attendance better than central government had before. But such descriptive evidence is far from conclusive.

We return to this question with much more rigor in section 5. But before we can do so,

we must lay out our methodology.

Figure 7: Decentralization and School Enrollment
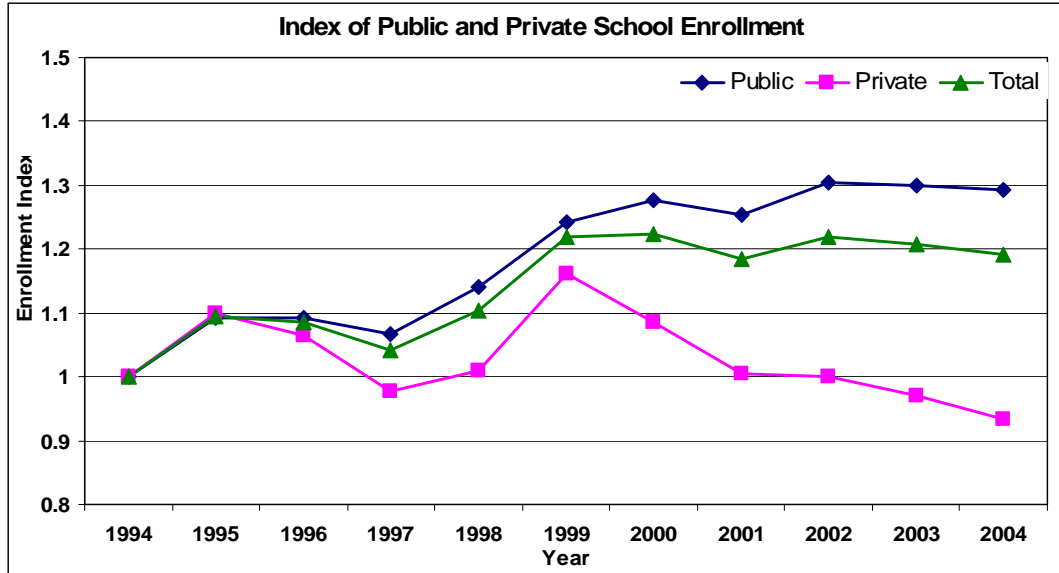
Source: National Planning Department; original calculations.

4. METHODOLOGY

The evidence thus far suggests that decentralization changed both countries'

public investment patterns in important ways, and may have improved the targeting of

public services as well. But stronger evidence is needed if we are to reach firm

conclusions. Ideally such a comparison would be based on very similar regression

equations for both countries. But the different nature of reform in the two countries – a

massive decentralization shock versus more gradual reform – demands that we use

different empirical approaches, even though we ask similar questions of each case. In

addition, there is simply more and higher-quality data available for Colombia, which

allows us to push the analysis further into the realm of public sector outputs. Hence for

Colombia we investigate decentralization's effect on the number of children attending

public schools. For Bolivia, the data restricts us to examining whether decentralization

made investment allocations more responsive to local need.[12] Due to space constraints,

we present detailed results for education only. It is worth mentioning that we have

similar estimations for health and water and sanitation in both countries, and for urban

development and agriculture in Bolivia as well. Those findings are closely consistent

with the results presented below.

(a) Bolivia

We need an empirical strategy that can cope with the generalized shock to Bolivia

of reform. Our aim is to test whether decentralization made public investment more

responsive to local needs. This can be separated into two questions: (i) did public sector

investment patterns change with decentralization? and if so, (ii) do indicators of need

determine that change? The problem with asking such questions for Bolivia is the

absolute lack of time-series data for social, demographic, and institutional variables.

How can we investigate decentralization's effects given good time-series data on national

and local investment flows, but cross-sectional-only data for other variables? One of the

main contributions of this paper is to provide a methodology for doing so, which is as

follows.

Using the panel data described above, we estimate the model

$$G_{mt} = \beta_1 \alpha_m + \beta_2 \alpha^*_m + \beta_3 \delta_t + \varepsilon_{mt} \tag{1}$$

where G_{mt} denotes public investment by sector (Education, Health, etc.) in each locality,

α_m and δ_t are vectors of state and year dummy variables, and $\alpha^*_m = \alpha_m D_t$, where D_t is a

decentralization dummy variable that takes the values 0 before 1994 and 1 after,

subscripted by municipality m and year t.[13] Investment patterns are thus decomposed

into three terms: a year effect, δ_t, which captures year shocks and time-specific

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characteristics; a state effect, α_m, which captures all of the characteristics of a state fixed in time; and a decentralization-interacted state effect, α^*_m, which captures state-specific characteristics that begin in 1994.

Any systemic changes in Bolivia's politics or economy that affect all municipalities similarly, such as a national policy initiative or an external shock, will be captured by the year term, δ_t. Effects related to municipalities' fixed characteristics, such as their size, location, or environment, will be captured by the state term, α_m. And any locally-specific effects that kick in only after decentralization are captured by the α^* term. Knowing what we do about Bolivia as described in section 2(a), the most reasonable interpretation of this last term is that it captures two kinds of effects: (i) local governments, local civic associations and other local institutions created by the reform, and (ii) pre-existing local actors and forces made relevant by decentralization – that is to say, those able to affect policy-making at the local, but not central, level. Note that this is so by construction, and not by assumption. We use Tobit estimations for equation (1).

Because α_m and α^*_m are dummy variables, one for each of Bolivia's 310 municipalities, equation (1) will produce 310 separate β_1's, and 310 β_2's. We then perform three tests:

1. $\beta_1 = \beta_2$ A t-test of whether the means of the coefficients of α_m and α^*_m are significantly different, for each sector. We interpret significance as evidence that decentralization changed national investment patterns through the actions of local governments and newly-empowered local actors.

2. $\beta_{1m} = \beta_{2m}$ An F-test of whether the coefficients of α_m and α^*_m are different municipality by municipality. Significance implies that decentralization changed

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local investment patterns in a particular municipality. Significance in many municipalities constitutes stronger evidence that decentralization changed national investment patterns in that sector.

3. Lastly, we use the values of β_{1m} and β_{2m} to estimate the model

$$\beta_{2m} - \beta_{1m} = \zeta\mathbf{S}_m + \eta\mathbf{Z}_m + \gamma\mathbf{P}_m + \varepsilon_m \tag{2}$$

where the LHS is the *differences* in state dummy coefficients from equation (1), $\mathbf{S}$ is a vector of the existing stock of public services at an initial period; $\mathbf{Z}$ is a vector of measures of civil institutions, private sector dynamism, and municipal project planning procedures, all local and only relevant after decentralization; and $\mathbf{P}$ is a vector of political participation and the prevalence of left-wing ideology. All are indexed by municipality m. This approach isolates the changes in investment patterns resulting from decentralization, and then examines their determinants.

By construction, $\beta_{2m} - \beta_{1m}$ should be unrelated to all factors which remain constant between the two periods, and thus we omit socio-economic, regional and other variables that do not change with decentralization. Our interpretation of the term is that it captures the effects on investment patterns of the new institutions and political economy dynamics created by decentralization, net of municipalities' fixed characteristics, such as size, region, ethnic composition, etc. Given the lack of time series data on $\mathbf{Z}$ and $\mathbf{S}$ variables, an additional advantage of our methodology is that it provides a natural way to hold these terms constant in equation (2). We will interpret $\mathbf{S}$ as an indicator of need at an initial period (see below), and so it is reasonable to hold it constant. It is less satisfying to hold $\mathbf{Z}$ constant, although the briefness of the period in question, 1994-1996, makes this less problematic than it may initially seem.[14] We report results for tests 1 and 2 for 10 sectors

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(as defined by Bolivia's finance ministry). We report results from test 3 only for education.

There are literally dozens of variables that might be included in the **Z** vector, covering such specific items as municipal employee characteristics and decision-making processes, and how investment projects are planned and written into the local budget.[15] We use principal component analysis to reduce a large set of very specific **Z**-type variables into a smaller number of indicators that are conceptually coherent. The objective of this technique is to find the unit-length combinations of explanatory variables with highest variance. We follow Maddala (1977) and Greene (1997) in calculating variables z_1 to z_k where z is a linear combination of explanatory (x) variables

$z_1 = a_1x_1 + a_2x_2 + \ldots + a_Lx_L$

$z_2 = b_1x_1 + b_2x_2 + \ldots + b_Lx_L$ etc.

ranked in order of variance, with highest first. Principal component analysis regresses y on $z_1, z_2, \ldots, z_k$, where $k < L$ and z's are constructed so as to be orthogonal. So long as the z's chosen represent combinations of variables that can be interpreted meaningfully, this provides a method for estimating parsimonious models with limited loss of information. We construct principal component variables (PCVs) for three categories of explanatory variables, and use the largest eigenvector for each (i.e. z_1). These are characterized as follows:

Principal Component Variables

Category	Interpretation: Variable increases in…
Private sector	Dynamism of the local private sector
Project planning	Informed project planning that follows open and consensual procedures
Civil institutions	Strength of local civil institutions and organizations

The main variable of interest in test 3 is **S**, which we interpret as a district's need for additional public investment at the outset of decentralization. We use three measures of illiteracy and literacy rates, plus the existence of a functioning local education authority, as rough indicators of the level of education provision in each municipality. Assuming that the marginal utility of a public service falls as the level of that service rises, we interpret high illiteracy (low literacy) rates as indicative of a greater need for additional education investment. The existence of a properly constituted local education authority similarly indicates higher provision, and hence lower need. We thus expect coefficient ζ to be positive when illiteracy rates are used, and negative when the literacy rate is used. This would imply that decentralization led government to invest more heavily in places where initial levels of education were low. A positive coefficient, by contrast, would imply that decentralization accentuated educational disparities, as better provided municipalities received higher levels of additional investment.

The variables in **Z** are not only controls. Their coefficients, η, are of interest insofar as they help explain the mechanisms by which local government is more (or less) responsive than central government to real local need. The case put forward by political scientists[16] for local government's superior assessment of local preferences includes greater sensitivity to grass-roots demand, greater accessibility of local lobby groups to local government, and greater political accountability to the local populace. Some of the ways in which this can happen include the use of open, informed planning techniques, and the existence of private sector and civic organizations that are strong and dynamic. Remember that such local factors were not relevant to central decision-making, which occurred at the center. Variables **P** capture another local feature that changed

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significantly with decentralization: the power of relatively small groups of voters to influence policy makers' decisions via local elections. We expect districts where electoral participation increased with decentralization to be less subject to the sort of elite capture that Bardhan and Mookherjee (2000) analyze. And left-wing parties' share of the vote captures an underlying local ideological characteristic that should increase education investment independently of need.

(b) Colombia

Reform in Colombia was more gradual, phased in over a number of years. We take advantage of this to construct continuous variables that capture advancing reform in Colombia, and use panel estimations that incorporate much more information than is possible for Bolivia. And as noted above, the availability of higher-quality data further allows us to investigate decentralization's effects on real policy outputs, and not just changes in resource inputs. Section 3 showed that decentralization in Colombia was associated with a marked increase in the number of state-school students. In order to investigate this relationship more rigorously, we estimate the model

$$\Delta S_{mt} = \alpha + \zeta \mathbf{D}_{mt} + \beta \mathbf{R}_{mt} + \gamma \mathbf{P}_{mt} + \delta \mathbf{C}_{mt} + \varepsilon_{mt} \tag{3}$$

where ΔS is the year-on-year increase in student enrollment in state schools, $\mathbf{D}$ is a vector of measures of where municipalities lie on the decentralization-centralization continuum, $\mathbf{R}$ is a vector of measures of resource availability (*i.e.* supply factors) that might independently increase student enrollment, $\mathbf{P}$ is a vector of variables measuring political participation and engagement, and $\mathbf{C}$ is a vector of socioeconomic and geographic controls, all indexed by municipality m and year t.

Our measures of decentralization, **D**, are based on municipal expenditures in education broken down by source of revenue. They measure different levels of autonomy in municipal decision-making and resource commitment. The first is own resources – revenue raised from local taxes and charges – as a share of total expenditure. Such funds have no strings attached, and are at the free disposal of local governments to spend as they like. The second variable, Municipal Independence, is the product of a dummy variable that records which municipalities are "certified", multiplied by the resource transfers that certification triggers to each municipality. Certified municipalities receive transfers directly from central government, and not via the departmental (i.e. regional) level. Departments have discretion in how they pass on funds destined for municipal uses, and so certified municipalities are more independent of departmental influence and meddling. By interacting the certification dummy with resource flows, we generate an indicator that can distinguish relatively small differences in municipal discretion and independence. Local governments that score higher in these two variables are substantively more decentralized than the rest.

The third variable records the share of total educational expenditure accounted for by central transfers allocated according to poverty indices, for the period 1994-2001.[17] In 2001, Law 715 changed this allocation mechanism to one based on the number of state school students. Hence the fourth **D** variable, which records central transfers based on student numbers as a share of total expenditure, for the period 2002-04. Municipalities with higher values in these indicators face stronger incentives set by the center, and are thus much more "centralized". The coefficients of these four **D** variables, $\zeta_1 ... \zeta_4$ are our

main interest in this regression. If decentralization drives increases in enrollment, then we would expect ζ_1 and ζ_2 to be positive, and ζ_3 and ζ_4 to be negative.

Other factors which might affect student enrollment independently of decentralization include how richly a municipality funds its schools, and the general buoyancy of municipal revenues. We control for such effects with **R**, which includes two terms for municipalities' general expenditure growth (separated into the periods before and after Law 715), a term for per capita expenditure on public education, and one for the student-teacher ratio.

Political controls **P** include overall turnout, the mayor's electoral support, a dummy variable indicating electoral years, and the share of total municipal personnel who are university graduates, as a measure of local government's institutional capacity. Lastly, the variables in **C** control for municipal size, wealth, inequality, unemployment, and what region it is in, as well as the 1999 recession. We also include measures of a municipality's displaced population, separated between those that receive migratory flows and those that expel them, as rough proxies for how much a locality has been impacted by Colombia's armed conflict. Two final terms, the gross enrollment rate and the proportion of the school-age population attending private education, capture level effects and complementarities between public and private enrollment.

The specification in (3) is based on the theory that a given level of expenditure will produce improved outputs when allocated and executed locally rather than centrally. In this case, outputs are measured as student enrollment rates, and inputs are measured as locally-controlled resources. But there is the possibility of the opposite relationship, and hence endogeneity, if instead it is increasing enrollment rates that are causing

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municipalities to spend more of their own resources on education. Hence we also estimate equation (3) instrumenting for D_1 with the log of local tax revenues per capita in periods t-1 and t-2. The economic logic for this instrument is that lagged per capita taxes should have a high correlation with Own Resources/Total Education Expenditures, but a low correlation with increases in student enrollment. This is because there is no sense in which the level of local taxes per capita should be associated with changes in school enrollments. Pairwise correlations of the variables bear this out, with ten-fold difference in the respective correlations. We use 2SLS panel estimations.[18] A Sargan test confirms that lagged per-capita taxes are suitable instruments for the share of own resources in total education spending. Both sets of results are presented below.

5. DECENTRALIZATION'S EFFECTS – MORE RIGOROUS EVIDENCE

This section lays out econometric evidence that decentralization made public investment in education more responsive to real local needs in Bolivia, and led to substantive improvements in service delivery in Colombia.

(a) Bolivia

Figure 8 shows the results for tests 1 and 2. Using national mean values, the null hypothesis, $\beta_1 = \beta_2$, can be rejected for eight of the 10 sectors tested. Only in health and energy did decentralization appear to make no difference to public investment patterns. Test 2 shows the number of municipalities where we can reject the hypothesis $\beta_{1m} = \beta_{2m}$. Five sectors pass this more demanding test: education, water & sanitation, agriculture, urban development and water management. In three sectors, $\beta_1 \neq \beta_2$ with high levels of confidence when national means are used, whereas using local values, $\beta_{1m} = \beta_{2m}$ almost

everywhere. This combination of results implies that reform led to very large shifts in investment flows in a small number of municipalities, and insignificant changes everywhere else.

| Sector | Test 1 National Means | | | Test 2 Individual Municipality Tests Significant, by | |
	$\beta_2-\beta_1$	Test t-statistic	Test P Value	Number	Percent
Education	0.01558	22.798	0.0000	209	71%
Water & Sanitation	-0.01548	-17.343	0.0000	224	76%
Agriculture	-0.01402	-8.667	0.0000	65	22%
Urban Development	0.00484	5.324	0.0000	107	36%
Water Management	0.00107	2.932	0.0034	105	36%
Transport	-0.10616	-5.967	0.0000	29	10%
Communication	-0.00246	-4.011	0.0001	7	2%
Industry & Tourism	-0.00171	-3.768	0.0002	7	2%
Health	-0.00117	-1.540	0.1238	49	17%
Energy	-0.00475	-1.281	0.2004	7	2%

N = 295 for all sectors

Figure 8: Did decentralization change Bolivian investment patterns?

So decentralization is associated with changes in national investment patterns, and these changes were strongest in education, water, urban development and agriculture. Section 3 showed that education's share of local investment rose impressively after decentralization, and test 1 concurs. Was this rise a function of local educational need? Test 3 explores this question by investigating the determinants of the difference in state dummy variables, $\beta_{2m} - \beta_{1m}$, equivalent to the investment increase attributable to decentralization (see figure 9).

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Test 3: $\beta_{2m} - \beta_{1m} = \zeta S_m + \eta Z_m + \gamma P_m + \varepsilon_m$

	Model			
Independent Variable	1	2	3	4
Illiteracy Rate (Adult)	0.00017 ***			0.0001637 **
	(2.910)			(2.020)
Illiteracy Rate (Over-6)		0.0001838 **		
		(2.500)		
Literacy Rate			-0.000106 *	
			-1.84	
Local Education Authority	0.0056	0.0054333	0.005337	0.0060453
	(1.420)	(1.380)	(1.360)	(1.350)
Civil Institutions PCV	0.00097 *	0.0010271 *	0.0010123 *	0.0009862
	(1.750)	(1.840)	(1.770)	(1.540)
Private Sector PCV	-0.00098 **	-0.00106 ***	-0.001211 ***	-0.000851 **
	(-2.470)	(-2.690)	(-3.000)	(-2.100)
Project Planning PCV	-0.00054	-0.000548	-0.000488	-0.000537
	(-0.920)	(-0.930)	(-0.830)	(-0.910)
Change in Electoral Absenteeism (1993-95)				-2.55E-05 (*)
				(-1.620)
Left-Wing Parties Share of the Vote, 1995				-0.000128
				(-0.860)
constant	0.00758 *	0.0080641 *	0.0203711 ***	0.0101111 ***
	(1.810)	(1.820)	(3.730)	(3.650)
R-squared	0.0176	0.0162	0.0136	0.021
Prob > F	0.001	0.002	0.003	0.001
N	295	295	295	291

OLS regressions reported with robust standard errors; t-statistics in parentheses
PCV1 = 1st pricipal component variable
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Figure 9: Decentralization's Effect on Education Investment in Bolivia

Under decentralization, investment rises as illiteracy rises and as literacy falls.
This implies that local governments invested more than central government in education
services in places where the stock of education was lower. The existence of a functioning
local education authority appears to have no effect. These results are insensitive to
different measures of illiteracy, and to different specifications, as figure 9 shows. Hence
in a context of rising education investment nationwide, municipalities where education
indicators were disproportionately poor made disproportionately large investments in
new or improved schooling. Conversely, those where education indicators were
unusually good saw increases below the mean, choosing instead to prioritize other

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sectors.[19] We interpret this as evidence that decentralization made education investment more responsive to real local need than it had been under central government.

Education investment rises where civil institutions are more vigorous, but falls where the private sector is stronger. Both institutional features are examples of local actors that would have had almost no voice under centralized policy making, but whose influence was greatly increased by decentralization. We interpret these results as a sign of local political competition between opposing forces: on one hand grass roots civic support for better education services – *i.e.* parents worried about their children; and on the other, private firms lobbying for resources to flow to other sectors where they stand to profit more.[20] Informed, participative project planning methodologies appear to have no effect. Left-wing parties' share of the vote is also insignificant. The change in electoral absenteeism has the expected sign, and is thus consistent with the civil institutions variable, but is not significant at the 10% level. These results confirm those of Faguet (2004) and extend them with the inclusion of political variables.

(b) Colombia

Our results from estimating equation (3) appear in figure 10. Model 1 is a panel (OLS) estimation. Model 2 is an IV estimation, instrumenting for own resources with the level of lagged per capita taxes. Models 3 and 4 provide IV estimates of the same model for municipalities with fewer than 20,000 and 50,000 inhabitants, allowing us to focus on smaller, overwhelmingly rural localities. A Sargan test of overidentifying restrictions confirms that instruments and residuals are uncorrelated, and hence lagged local taxes are associated with exogenous variation in own resources. First-stage regressions for the IV models are provided in the appendix.

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Dependent Variable: Increase in Student Enrollment in Public Schools

Independent Variable		Model		
	1	2	3	4
		Instrumenting for Own Resources		
		IV	IV Sample: < 20,000	IV Sample: < 50,000
	OLS	Full Sample	Inhabitants	Inhabitants
Decentralization Variables				
Own Resources/	0.105***	0.484***	0.570***	0.471***
Total Education Expenditures	[5.76]	[4.46]	[3.90]	[3.67]
Municipal Independence+	0.035***	0.068***		
	[4.12]	[5.15]		
Statutory Transfers (Poverty)/	-0.112***	-0.004	0.016	-0.018
Total Education Expenditures	[7.55]	[0.11]	[0.35]	[0.44]
Statutory Transfers (No. of students)/	-0.153***	-0.080***	-0.082**	-0.104***
Total Education Expenditures	[6.69]	[2.67]	[2.06]	[3.01]
Resource Availability Variables				
Municipal Expenditure Growth	0.153***	0.144***	0.133***	0.143***
	[18.15]	[15.00]	[10.35]	[14.14]
Per Capita Expenditure on	-0.107***	-0.115***	-0.121***	-0.119***
Public Education (Ln)	[17.52]	[15.64]	[14.70]	[16.15]
Student/Teacher Ratio (lagged)	-0.001***	-0.002***	-0.001**	-0.002***
	[3.09]	[3.05]	[2.49]	[2.92]
Political Variables				
Electoral Turnout	0.018**	0.012	0.017	0.015
	[2.06]	[1.28]	[1.42]	[1.55]
Mayor's Electoral Support	0.044***	0.042***	0.047***	0.044***
	[4.41]	[4.16]	[3.81]	[4.08]
Electoral year	0.001	-0.002	0.001	-0.001
	[0.32]	[0.87]	[0.41]	[0.54]
University Graduates as a Share of	0.020*	0.005	-0.014	0.005
Municipal Personnel	[1.78]	[0.40]	[0.96]	[0.36]
Socioeconomic and Regional Variables				
Population (Ln)	-0.019***	-0.016***	-0.030***	-0.023***
	[10.47]	[8.75]	[7.34]	[8.36]
Gini Coefficient	-0.018**	-0.033***	-0.039***	-0.032***
	[2.06]	[3.42]	[2.83]	[2.86]
Unsatisfied Basic Needs	0.040***	0.043***	0.034***	0.046***
	[5.91]	[6.06]	[3.79]	[6.31]
Displaced Population, Receiving	-0.078	-0.067	0.039	-0.062
Municipalities	[0.49]	[0.41]	[0.21]	[0.37]
Displaced Population, Expelling	-0.208***	-0.198***	-0.223***	-0.183***
Municipalities	[3.08]	[2.98]	[2.80]	[2.70]
Unemployment Rate (Departmental)	-0.008	-0.006	0.016	-0.001
	[0.45]	[0.37]	[0.56]	[0.05]
1999 Year Dummy	0.053***	0.053***	0.055***	0.054***
	[13.38]	[13.15]	[10.49]	[12.41]
Public-School Gross Enrollment Rate	-0.045***	-0.046***	-0.050***	-0.046***
(lagged) (% of School-Age Population)	[11.65]	[11.59]	[9.33]	[10.97]
Private Enrollment Rate (% of School-A	0.415***	0.303***	0.239***	0.280***
Pop. in Private Schools) (Ln, lagged)	[6.99]	[4.85]	[2.77]	[3.90]

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Andean Regional Dummy	-0.105***	-0.035	-0.005	-0.012
	[3.14]	[0.85]	[0.59]	[1.55]
Caribbean Regional Dummy	-0.126***	-0.06	-0.032***	-0.036***
	[3.74]	[1.47]	[3.53]	[4.83]
Eastern Regional Dummy	-0.082**	-0.024		
	[2.42]	[0.60]		
Pacific Regional Dummy	-0.092***	-0.02	0.021**	0.006
	[2.74]	[0.49]	[1.99]	[0.74]
Amazonia Regional Dummy	-0.043	0.031	0.072***	0.056***
	[1.25]	[0.71]	[3.80]	[4.06]
Constant	1.807***	1.809***	1.975***	1.900***
	[17.03]	[15.64]	[14.86]	[16.71]
Observations	10292	10292	6548	9205
Sargan statistic		1.082	0.399	1.436
Chi-square p-value		0.29822	0.52773	0.23086

Panel regressions with robust standard errors; t-statistics in parentheses
Model 2, 3 & 4 instrument for own resources using lagged per capita taxes (Ln)
*, **, *** = coefficients significant at the 10%, 5% and 1% levels
+ No municipalities below 50,000 inhabitants have been certified "independent" yet.

Figure 10: Decentralization's Effect on Public School Enrollment in Colombia

Both measures of strong decentralization are positive and significant at the 1% level in all the models. This implies strong evidence that public school enrollment rises as the share of own resources in total education expenditures rises, and when municipalities are more independent. Interestingly, the effect appears to be larger in the smallest municipalities. By contrast, ζ_3 and ζ_4 are negative and significant at the 1% level in four of the models, and at the 5% level in a fifth. This implies that where central transfers form a large part of total expenditures, and hence municipalities face strong incentives set by the center, public enrollment falls, although the evidence is less strong than for the previous finding. We interpret this as evidence that decentralization of education has led to improved educational outcomes in Colombia, in the sense of more students attending school. By contrast, in those places where central control persists, outcomes appear to have worsened.

Supply-side measures of resources availability are all strongly significant. They show that enrollment increases as expenditure grows, and falls with the student-teacher

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ratio, as one would expect. Curiously, the per capita expenditure term is also negative, and the evidence for this is quite strong. This implies that raising student numbers are not a simple question of increasing the education budget, but rather based on other factors, such as how and where funds are invested. These findings are robust to different specifications/instrumentation.

Amongst our political controls, electoral support for the mayor is positive and strongly significant in all four models, implying a larger effect on enrollment in places where the mayor has strong political backing. Electoral turnout is significant at the 5% level only in the OLS model. And there is essentially no evidence that the quality of local government's human resources matters.

Amongst socioeconomic and geographic controls, results of interest include the first three coefficients, implying that districts that are smaller, relatively more equal, and with a higher level of unsatisfied basic needs saw greater increases in enrollment. These results hold, or even increase, amongst smaller municipalities. Public enrollment also rises with the share of students attending private schools, indicating complementarity between the public and private education systems. This contradicts the impression of substitution between public and private enrollment implied in figure 7. Decentralization appears not to improve public schooling at the expense of private schools, but rather to promote the idea of education more generally. Other control variables capturing the impact of Colombia's armed violence, the 1999 recession, level effects, and a district's region are also significant.

6. CONCLUSIONS

The evidence from Bolivia and Colombia is consistent with some of the central claims in favor of decentralization. In both countries decentralization appears to have shifted public investment patterns in important ways, switching resources out of infrastructure and industry, and into primary social services such as education and water & sanitation. The evidence for Bolivia suggests that public investment in education became more responsive to real local needs, rising disproportionately in areas with the worst education indicators. As an implicit targeting strategy this is efficient, and probably served to improve educational outcomes, especially in rural areas. Unfortunately, data constraints do not allow us to test that theory.

But we can for the case of Colombia, and the results are strong: decentralization improved enrollment rates in public schools. In districts where educational finance and policy making were under greater local control, enrollment increased. In districts where educational finance was still based on centrally-controlled criteria, enrollment fell. Further evidence suggests that this was not the simple result of increasing financing *levels*, but due instead to the *quality* of investment that municipalities achieved – to how and where funds were spent. Of course, enrollment is only a proximate educational outcome; deeper outcomes of interest include literacy, numeracy and standardized test results. Current data limitations prevent us from using such variables here. Based on the results above, however, we would expect to see improving literacy rates as a result of decentralizing education in the medium to long term.

It is striking that in both countries, the major policy changes identified were driven by the behavior of the smallest, poorest, most rural municipalities. To understand this properly, we must place it in the context of what came before. In Bolivia, central

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government traditionally ignored small, rural districts, whereas in Colombia the center invested much more equitably prior to reform. In both countries, decentralization empowered the smallest, poorest districts disproportionately, and their collective response altered national investment patterns. But decentralization in Bolivia included a huge fiscal equalization shock, which led to much larger changes in the uses and spatial distribution of national investment than for Colombia.

This underlines an important point that is often ignored: decentralization is not a program, but rather a *process* that relocates power and resources from officials at the center to others at the periphery. Its effects depend very much on the character of central decision-making – on how the center used its power and resources – before reform began. Even the most transparent, well-meaning local administrations might find it difficult to improve upon the performance of a central government that was effective and well-informed.

But performance did improve, at least in education. In Bolivia public investment became more responsive to local needs, and in Colombia more children went to school. These substantive, localized improvements are at least in part due to the new incentives reform put in place. Before decentralization, central officials stationed beyond national and regional capitals had little reason to concern themselves with local demands. Career success was determined by ministerial fiat unrelated to local outcomes in distant districts. Throughout most of each country, ordinary citizens' ordinary concerns were given little attention. Decentralization changed this by creating local authorities beholden to local voters. Nationwide, it put real power over public resources in the hands of ordinary citizens. And it changed the way both countries are run.

Appendix

First-stage regressions of Own Resources/Total Education Expenditures

Independent Variable	1	2	3
	Instrumenting for Own Resources		
	IV	IV	IV
	Full Sample	Sample: < 20,000 Inhabitants	Sample: < 50,000 Inhabitants
Instrumental Variables			
lagged 1 per capita taxes (Ln)	0.006***	0.007***	0.006***
	[3.79]	[3.19]	[3.35]
lagged 2 per capita taxes (Ln)	0.009***	0.007***	0.008***
	[5.00]	[3.25]	[4.21]
Decentralization Variables			
Municipal Independence+	-0.089***		
	[17.60]		
Statutory Transfers (Poverty)/	-0.278***	-0.312***	-0.295***
Total Education Expenditures	[32.49]	[28.69]	[32.84]
Statutory Transfers (No. of students)/	-0.192***	-0.217***	-0.206***
Total Education Expenditures	[12.30]	[10.18]	[12.31]
Resource Availability Variables			
Municipal Expenditure Growth	0.020***	0.010**	0.012***
	[5.54]	[2.15]	[3.32]
Per Capita Expenditure on	0.022***	0.035***	0.025***
Public Education (Ln)	[3.13]	[4.18]	[3.73]
Student/Teacher Ratio (lagged)	0.001***	0.001***	0.001***
	[3.95]	[3.26]	[3.80]
Political Variables			
Electoral Turnout	0.021***	0.019***	0.019***
	[4.15]	[2.95]	[3.59]
Mayor's Electoral Support	0.008*	0.011**	0.010**
	[1.69]	[2.07]	[2.07]
Electoral year	0.007***	0.009***	0.009***
	[4.90]	[4.81]	[5.78]
University Graduates as a Share of	0.040***	0.015*	0.026***
Municipal Personnel	[6.21]	[1.82]	[3.82]
Socioeconomic and Regional Variables			
Population (Ln)	-0.007***	-0.017***	-0.013***
	[6.13]	[8.59]	[9.95]
Gini Coefficient	0.010*	0.022***	0.023***
	[1.71]	[2.97]	[3.88]
Unsatisfied Basic Needs	0.031***	0.036***	0.037***
	[7.44]	[6.87]	[8.64]
Displaced Population, Receiving	-0.052	0.039	-0.034
Municipalities	[0.72]	[0.48]	[0.47]
Displaced Population, Expelling	-0.023	-0.019	-0.021
Municipalities	[1.13]	[0.76]	[1.08]
Unemployment Rate (Departmental)	-0.004	-0.017*	-0.014**
	[0.60]	[1.77]	[2.18]
1999 Year Dummy	-0.001	0.001	0.0003
	[0.30]	[0.35]	[0.17]

Public-School Gross Enrollment Rate	-0.004**	-0.009***	-0.005***
(lagged) (% of School-Age Population)	[2.06]	[3.62]	[2.60]
Private Enrollment Rate (% of School-A	0.186***	0.027	0.144***
Pop. in Private Schools) (Ln, lagged)	[5.29]	[0.75]	[3.64]
Andean Regional Dummy	-0.178***	0.016***	-0.029***
	[6.01]	[3.57]	[6.97]
Caribbean Regional Dummy	-0.157***	0.039***	-0.010**
	[5.26]	[6.10]	[2.14]
Eastern Regional Dummy	-0.149***	0.052***	
	[4.98]	[8.41]	
Pacific Regional Dummy	-0.176***	0.018***	-0.030***
	[5.92]	[3.72]	[6.86]
Amazonia Regional Dummy	-0.196***		-0.044***
	[6.58]		[8.52]
Constant	0.076	0.113	0.078
	[1.11]	[1.44]	[1.29]
Observations	10294	6550	9207
R-squared	0.27	0.3	0.28

Panel regressions with robust standard errors; t-statistics in parentheses

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

+ No municipalities below 50,000 inhabitants are yet certified "independent".

NOTES

[1] Ellis and Bahiigwa (2003), p.1010.

[2] At the time MNR strategists gleefully predicted such a result. They proved wrong.

[3] "Injertos Tramposos en 'Participación Popular'", *Hoy*, January 19, 1994; "La Declaratoria de Guerra del Primer Mandatario", *La Razon*, January 27, 1994; and "Arrogancia Insultante", *Presencia*, February 27, 1994 are only three of the many articles which appeared in the Bolivian press documenting popular reaction to the "Damned Law". These are documented in Unidad de Comunicación (1995).

[4] Sánchez (2000) shows that central transfers grew from 2% of GDP in 1990 to almost 7% in 1997.

[5] Colombia's public accounts classify such items as teachers' and health workers' salaries as investments, and not running costs.

[6] The *Frente Nacional* (1957-74) quelled *La Violencia* by sharing out the fruits of power equally between Liberals and Conservatives, and restricting electoral competition to those two parties.

[7] In the sense that more data on more local characteristics are collected in Colombia than any other country in the region bar Brazil.

[8] Meaning we do not combine information from different sources into a single variable.

[9] A hodgepodge, including feasibility studies, technical assistance and emergency relief, that is difficult to categorize.

[10] This point is developed further below.

[11] The last year for which comprehensive data are available.

[12] We believe it is preferable to push the analysis as far as each country's data will allow, as opposed to limiting the Colombian analysis for the sake of symmetry.

[13] Thus α^*_m takes the value 0 for all municipalities and all years before 1994, and is identical to α_m for all years from 1994 onwards.

[14] In any event, a lack of time-series data for **Z** and **S** would leave us no other choice even with a different methodology.

[15] There are, for example, 18 variables concerning the types of capacity-building programs that municipalities received after 1994, and 11 more on programs they may have requested.

[16] See for example Wolman in Bennet (1990).

[17] The proportion of the local population above a predetermined level of unsatisfied basic needs.

[18] Note that LHS data is not censored/truncated. Observed "zeros" are real zeros, and not failures of measurement or excluded negative values. Hence a 2SLS panel estimation is appropriate. As a check, we also estimated the IV model with a Tobit first stage. The findings did not change.

[19] The small number of municipalities with significant unspent sums implies that the money was spent elsewhere, not left in the bank.

[20] Our results for urban development – typically big, expensive construction projects – where private sector lobbying is strongly positive, support this interpretation.

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