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DO MORE DECENTRALIZED LOCAL GOVERNMENTS DO BETTER? AN EVALUATION OF THE 2001 DECENTRALIZATION REFORM IN COLOMBIA

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Do more decentralized local governments do better? An evaluation of the 2001 decentralization reform in Colombia

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Abstract

In this paper I evaluate the impact of the 2001 decentralization reform in Colombia. I use data from Colombia's municipalities. I look at the effect of the 2001 reform on enrolment in pre-college schools. While all municipalities received earmarked national transfers, with the reform some of them now have more responsibilities to provide education (deeper decentralization) than others. Particularly important, the reform entitles the more decentralized municipalities to sign subsidy contracts with private schools. Departments (the regional governments) are entitled to sign this type of contract for the less decentralized municipalities. Since the rule for municipalities to receive more responsibilities follows an exogenous population threshold, I can implement Regression Discontinuity Design. Enrolment is measured through two variables: the number of students enroled in public schools and the number of subsidized students enroled in private schools. Results suggest that more decentralized municipalities subsidize more students in private schools. The difference is significant at all the levels of pre-college school for the period 2004 - 2006. In 2005, the difference accounts for 20% of enrolment in private schools and 3% of population of school age. Besides, there are no significant differences among municipalities regarding enrolment in public schools.

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1 Introduction

Decentralization has been at the core of the debate on government organization during the last decades. Nowadays, fiscal decentralization is an objective in both developed and developing countries that is promoted by international organizations such as the World Bank.

The economic theory has identified several reasons that explain why decentralized governments may do better. The usual argument is that local governments have better information on local preferences (Persson and Tabellini, 2000). Besides, local governments may be more productive for several reasons. Among these, it has been argued that local governments are more accountable to citizens and (Seabright, 1996) that this increased accountability implies improved accomplishment of their tasks. Decentralization may also foster the initiative of local politicians provided that they have political career concerns (Aghion and Tirole (1997), Myerson (2006) and Enikolopov and Zhuravskaya (2007)). However, local governments may be more likely to be captured by interest groups (Bardhan, 2002).

The benefits of decentralization have been measured empirically in both developed and developing countries. For instance, Faguet (2004) points out that the decentralization in Bolivia has improved responsiveness of government to local needs (matching preferences). Barankay and Lockwood (2007) show that fiscal decentralization has improved educational attainment in Swiss cantons (productive efficiency).

The aim of this paper is to assess whether the 2001 decentralization reform in Colombia has increased enrolment in the more decentralized municipalities. The 2001 reform is a complex reform of the financing and the provision of public services, mainly, education and health.

With respect to education, the reform had two main characteristics: first, it established a process to certify certain municipalities. The certification process consists of two parts: the devolution of the teachers' payroll and the reorganization of schools. The certified municipalities are more decentralized since they receive more responsibilities in the provision of public education. The reform devolved the management of personnel and other resources (buildings, material, etc.) to those municipalities. The non-certified municipalities are less decentralized since they only received the management of other resources different from personnel. Second, the reform allowed the more decentralized municipalities to sign contracts with private schools, as an additional strategy to increase enrolment. Departments (the regional governments) were entitled to sign this type of contracts for the less decentralized municipalities.

How might the reform affect enrolment in pre-college school? First, it provides subnational governments (departments and municipalities) with strong incentives to increase enrolment, since the national transfer received by these governments depends on the number of pupils enroled in public schools and subsidized in private schools. Thus it is very likely that the reform has increased enrolment. Second, the reform established two parallel

organizations for the provision of education: In one system, municipalities are more decentralized (the certified ones) and in the other system, municipalities are less decentralized (the non-certified ones). These organizations may differ in their efficiency at increasing enrolment.

I will not measure the general effect of the reform on enrolment. Rather, I look for differences among more and less decentralized municipalities regarding the strategies they use to increase enrolment: either enrol children in public schools or sign subsidy contracts to enrol them in private schools.

I identify the effect of decentralization on enrolment exploiting the fact that the law established an exogenous rule to certify municipalities, that is, to decentralize municipalities: all municipalities with more than 100 thousand inhabitants in 2001 and all departments must undertake the certification process, that is, must receive and manage the teachers' payroll and reorganize public schools. This exogenous rule allows me to estimate causal effects with a Regression Discontinuity Design approach. The approach allows for variables that may affect enrolment to be very different on average among certified and non-certified municipalities. But it presumes that those variables are not very different in a small neighborhood around the cutoff defining the treatment. Then, assuming that all observable and non-observable variables that may affect enrolment are smoothly distributed around the threshold, any discontinuity in enrolment may be credibly attributed to the reform. Identification relies on continuity checks of relevant variables.

The main result of this paper suggests that more decentralized municipalities (i.e. the certified municipalities) subsidize more students in private schools than do less decentralized municipalities. The differences are particularly significant in primary and lower secondary levels all along the period of study. The difference represents around 20% of enrolment in private schools and 3% of the school-age population. The result is robust to differences in education prices (tuition fees), the size of population of school age, variables of public finance (income and spending of municipalities), political economy, poverty and violence.

In addition, the paper shows that, although enrolment in public schools has increased after the reform, there are no significant differences among more decentralized and less decentralized municipalities. The more decentralized municipalities seem to have enroled more pupils in upper secondary in 2002, but the difference does not pass all the robustness checks.

I treat the reform as a black-box and do not identify the mechanism that causes the effect goes. One plausible explanation, besides those in the literature mentioned above, is the following: Local governments benefit from subsidy contracts with private schools. These benefits may be varied in nature: They may take the form of political rents (stay in office, career promotions, etc.); economic rents (more subsidized students means more national transfer); and informational rents that allows municipalities to better control private schools' actions, etc. The less decentralized municipalities share these benefits with their departments, since they are not allowed to sign subsidy contracts. This is not the case for the more decentralized municipalities, who thus obtain more benefits from contracting

with private schools.

This paper is also important because it sheds some light on policies that are effective in developing countries. Contracting with private schools may be an important strategy to improve enrolment rates in developing countries. Recent literature has provided evidence on this issue, for instance, Angrist, Bettinger, Bloom, King, and Kremer (2002) and Angrist, Bettinger, and Kremer (2006) have shown that the PACES program, a voucher program implemented in mid-nineties in Colombia, increased enrolment and academic achievement of pupils.

The rest of the paper is organized as follows. Section 2 provides context on public education in Colombia and describes the reform in detail. Section 3 discusses the empirical framework and presents the identification strategy and descriptive statistics. Section 4 presents results; Section 5 discusses these results and Section 6 concludes.

2 Colombia and its Reform

Pre-college education in Colombia consists of 12 mandatory years divided into three levels: 1 mandatory year of pre-primary, 5 years of primary and 6 years of secondary (divided into 4 years of lower secondary and 2 years of upper secondary). Education is one of the most important components of the public sector in Colombia. In 2001, 36% of central government tax revenues were allocated to public education, teachers constitute the largest group of public employees (26% of total public employees in 1999) and the public expenditures on education increased to 3.8% GDP on average in the 1990s. Besides, 7.2 million students attended public schools (75% of all students), and were taught by 290 thousand teachers (68% of all teachers) in 52 thousand schools (75% of total schools).

2.1 The situation prior the 2001 reform

The three levels of government (i.e. nation, departments and municipalities) have intervened in the provision of public education. The responsibilities assigned to each level have changed through several reforms over the last 50 years. Two different processes can be distinguished. From 1960 to 1985 there was a centralization process in which the nation was in charge of most administrative functions of the sector. The aim of this process was to provide both more economic rationality to and equity among teachers' pay. During the 1950s, there was a highly decentralized system in which remuneration of teachers depended basically on the level government hiring them, regardless of their education level or workload. As a result, teachers' contracts were very instable and unequal. *Nationalization* provided more labor stability to teachers but made the system less sensitive to local needs and preferences.

Decentralization has been in process since 1986. On political grounds, citizens began to elect mayors of municipalities, who previously were appointed by the President of the

Republic. Under the Political Constitution adopted in 1991, citizens also began to elect department governors. On economic grounds, the main rules on decentralization of education are included in Law 60 of 1993, which establishes the responsibilities of each government tier in the provision of education and the rules and formulae to distribute national revenues to the lower governments. This law was revoked by Law 715 of 2001.

The main arguments for the reform given by specialists and congressional representatives can be summarized in three points: first, overlapping responsibilities at various levels of government decreases accountability. Having separated responsibilities would give citizens a clearer idea of incumbent politicians' performance while in office. Second, there is a high risk of public deficits. In particular, national transfer formulae were based on the current income of the central government. This income experienced huge fluctuations between 1995 and 2001. In good times (1995 - 1996), teachers' pay increased a lot, which increased the risk of default by local governments in bad times (1997 - 2000). The central government had to cover these deficits with additional resources. Finally, a large percentage of school-age children were not in school. Deepening decentralization may help to enrol this population by better meeting local needs.

2.2 The 2001 Reform

The reform has three main components. First, it establishes two parallel organizations for the provision of education, one more decentralized than the other. To become more decentralized, municipalities must carry out a certification process. Second, the reform proposes an exogenous rule for municipalities to qualify for the certification, that is, to have the more decentralized provision of education. Third, it allows certified entities to sign subsidy contracts with private schools. I will explain these components in the rest of the section.

First, the reform establishes two parallel ways to organize the provision of education, one more decentralized than the other. In the more decentralized organization, municipalities deal with the management of both personnel and non-personnel inputs. In the less decentralized organization, municipalities manage the non-personnel inputs and departments manage the personnel. The mechanism for making national transfers establishes a per-pupil budget for each type of input, so that more decentralized municipalities receive both budgets for each enroled pupil and the less decentralized municipalities only receive the budget corresponding to the non-personnel input.

Second, all the departments must carry out the certification process. Besides, the reform established an exogenous rule for municipal certification, which says that municipalities with more than 100 thousand inhabitants in 2001 must be certified. Those municipalities with less than 100 thousand inhabitants in 2001 must not follow the certification process (but may do so afterwards). Therefore, after the reform, the smallest municipalities have a less decentralized organization and the largest municipalities have a more decentralized organization.

This rule is completely exogenous since municipalities must attain the official 2001 population size from the National Statistics Office to find out whether they need to undertake certification. This allows me to consider the reform as a quasi-experiment to analyze the effect of decentralization on enrolment.

Municipal certification consists of a reorganization of both personnel (teachers, principals, administrative personnel) and schools, with the aim of devolution of the *optimal* personnel payrolls from the departments to to the certified municipalities. The reorganization of personnel is based on the minimum pupils-per-teacher ratios and the organization of the labor time of teachers established by law. The reorganization of schools has the aim of consolidating individual schools into larger institutions providing preschool, primary and secondary education under the administration of a single principal. Forty (40) municipalities were certified in 2003. Four districts were certified automatically under law as were the departments. Two municipalities (Pasto and Armenia) had already been certified in 1997 under the Law 60[1].

Third, certified entities (departments and municipalities) may contract with private schools to increase enrolment. The private schools interested in signing subsidy contracts must previously inscribe themselves into a list of potential private providers, before the respective certified government. The aim of this inscription is to make the contracting process clearer and to guarantee a minimum level of education quality. However, being on the list does not mean signing a subsidy contract.

Subsidy contracts last one year (the school year) and establish a per-pupil price and a number of pupils. Mayors and governors must choose a school or schools from the private schools on the list. Although mayors and governors are free to negotiate prices, the contracted price must not exceed the per-pupil budget transferred by the nation. Indeed, since governments have all bargaining power, the actual contracted price has been a part of the per-pupil transfer.

To sum up, the reform introduced strong incentives for municipalities to increase enrolment either by enroling more pupils in public schools or by subsidizing pupils in private schools. It also established two parallel organizations of provision of education, one more decentralized than the other; and an exogenous rule that assigns each municipality to one of the two organizations. This allows me to use the reform as a quasi-experiment to study the effect of decentralization on the number of pupils enroled in pre-college school.

3 Empirical Strategy

The literature of quasi-experiments allows analysis of the effect of an exogenous change or *treatment* when the control group is not random. The paper's goal is to estimate the effect of the 2001 education reform on enrolment. The challenge of analyzing causality of

[1]All the departments, except for the poorest department, Chocó, were also certified under the previous law. Chocó was certified automatically with the new law in 2001.

a reform like this is to find the appropriate control group so that the effect of the reform can be identified.

I will use a Regression Discontinuity (RD) design to exploit the rule requiring certification of municipalities over a certain size[2]. This rule is completely exogenous since it establishes that all municipalities with 100 thousand inhabitants or more in 2001 must be certified, i.e. must be in charge of all tasks related to the provision of education. This rule provides a well-defined cut-off point that produces sharp discontinuities, i.e., treatment is a discontinuous function of the population size in 2001. The treatment group will be the more decentralized municipalities (i.e. the certified municipalities) and the control group will be the less decentralized municipalities (i.e. the non-certified municipalities).

The RD strategy acknowledges that the control and treatment groups might be different on average. However, assuming that other characteristics of municipalities (observable and non-observable) are continuous at the cutoff, any discrete difference in enrolment between certified and non-certified municipalities can be attributed to the reform. Therefore, I do not identify a general effect of the reform on enrolment. I instead try to identify the effect on enrolment of having a more decentralized system.

Notice that the identifying assumption of continuity of other variables related to enrolment is crucial. To illustrate the point, consider for instance that at the same moment of the introduction of the reform there is an exogenous shock on prices of private education, say tuition fees. Moreover, consider that the size of the shock varies discretely between certified and non-certified municipalities. In this case, any difference in enrolment could not be identified as an effect of the reform.

Some other caveats about the approach are in order. Although department and municipal governments have been subject to the same formal rules, their autonomy with respect to the national government is far from homogeneous. Historically, Bogota and Antioquia have been more autonomous than the other regions. They have had better organized education offices than other departments or cities. Therefore, municipalities in Antioquia, both certified and non-certified, have likely operated in more decentralized systems than other regions. Moreover, Antioquia implemented an scheme of subsidies to private schools since the second half of the 1990s[3].

Law and decrees that implemented the reform established deadlines for the process of certification. It is not surprising that some municipalities were certified without having completed payroll reorganization. At the department level it is important to mention the case of Chocó. This department is the least developed in the country. Unlike the other departments, Chocó was not certified under the previous regime. Nevertheless, it was certified automatically in 2001 without having received the personnel payroll from the nation. The lack of technical capacity in Chocó rendered certification of its capital, Quibdó, impossible even though it had to be done by law. This caveat implies that in

[2]See Shadish, Cook, and Campbell (2002) for an overview and Hahn, Todd, and Van der Klaauw (2001) for a non-parametric presentation.

[3]This was a special program financed with a World Bank credit.

practice the reform was not carried out as planned. Both delayed implementation and automatic certification might reduce the effect on enrolment. The size of this downward bias is difficult to measure.

3.1 Identification

Let O_m be an outcome variable of enrolment for municipality m and C_m be the dummy variable defining the treatment. It is a discontinuous function of population size in 2001, $C_m = \mathbb{1}(S_m \geq 100000)$. I will estimate the following equation:

$$O_m = \alpha_0 + f(S_m - S_m^c, C_m) + \theta C_m + \varepsilon_m \tag{1}$$

where $S_m^c = 100000$. The polynomial $f(S_m - S_m^c, C_m)$ should reproduce how the dependent variable is distributed across the assignment variable (the population in 2001). Theoretically it can be of any order but often it is of lower order. So, if $f(S_m - S_m^c, C_m)$ is well specified then θ identifies the effect of the reform. Reported results are based on the following specific form of f,

$$f(S_m - S_m^c, C_m) = \alpha_1(S_m - S_m^c) + \alpha_2(S_m - S_m^c)^2 \tag{2}$$

$$+\beta_1((S_m - S_m^c) * C_m) + \beta_2((S_m - S_m^c)^2 * C_m).$$

Equation (2) allows for interactions between the assignment and the treatment variables when $\beta_1 = \beta_2 \neq 0$.

I will use two measures of enrolment as an outcome variable. The first part of the analysis focuses on $O_m = \Delta Y_m = Y_{post} - Y_{pre}$, where Y_{post} is the number of students in municipality m in a post-reform year and Y_{pre} is the number of students in municipality m in a pre-reform year. I perform this exercise for students enroled in public schools. Notice that, if identifying assumptions hold, the effect of treatment is identified by

$$E[\Delta Y_m | C_m = 1, S_m - S_m^c = 0] - E[\Delta Y_m | C_m = 0, S_m - S_m^c = 0] = \widehat{\theta}.$$

Afterwards, I conduct the same exercise using the number of students subsidized in private schools. Since there are no subsidies before the reform, the outcome variable becomes $O_m = Ys_{m,post}$. If the identifying assumptions hold, the effect of treatment is identified by

$$E[Ys_{m,post} | C_m = 1, S_m - S_m^c = 0] - E[Ys_{m,post} | C_m = 0, S_m - S_m^c = 0] = \widehat{\theta}.$$

Although the law was approved in 2001, it was implemented in 2003. The main part of the results shown below take 2001 as the pre-reform year in order to account for the reform effects in 2002. Indeed, knowing that in the future, transfers will be based on per-pupil budgets, municipal governments could try to increase enrolment before the law was implemented.

To check the assumption that, in absence of treatment, the dependent variable should be continuous at the cutoff, I take the increase of enrolment between two pre-reform years,

2000 and 2001, as the dependent variable. Estimations of Equation (1) using this dependent variable should show no discontinuity. To check the continuity assumption that other observable variables must be continuous at the cutoff, several variables were included, one by one, as controls in the estimations of enrolment. Among the controls I have tuition fees; population of school age; municipal taxes per capita; investment in human capital (teacher training), buildings, materials; measures of poverty, political elections, conflict, etc.

I run parametric estimations for each year and calculate robust standard errors. I also pool the annual samples. Errors are clustered at the municipal level in order to control for correlations across time in the same municipality. Pooling allows me to obtain estimates with more precision at the cost of losing the variability of the coefficient θ. It also allows me to check whether the results are robust to independent errors (see Lee and Card (2006)).

Colombia has more than one thousand municipalities. Only 40 of them were certified with the reform. To check whether the estimated polynomial is driven by municipalities beyond the cutoff point, I estimate the regressions with interactions as in Equation 1. The rest of the municipalities are non-certified. Two of the 40 municipalities certified in 2003 are very large with respect to the others (outliers). In the estimations, I use two samples. A full sample with around 1021 non-certified municipalities and 38 certified municipalities. A sample defined with a window of ± 80000 inhabitants above and below the cutoff, with around 340 non-certified municipalities and 18 certified municipalities. Quibdó (the capital of Chocó), the 6 municipalities certified before 2003[4] and the two outliers[5] are excluded from all estimations.

3.2 Data and descriptive evidence

Data on enrolment comes from DANE (the national statistics office) and the Ministry of Education. Every year both private and public schools report information on different variables including enrolment. This information is used by the Ministry of Education to calculate enrolment rates by sector (public and private) at the municipal level. Data on municipal finance comes from a questionnaire gathered annually by the National Department of Planning. Data on tuition fees come from the questionnaire responded to by secondary senior students for a national test administered every year.

Although a before-after analysis is not a causal analysis, it gives us an idea of how enrolment has changed after the reform. Figure 1 shows the number of students in pre-college education (total and different levels), attending either public or private schools in the last eleven years. There is a slightly increasing trend in total number of students after the reform. This is the net effect of a trend increase in enrolment in secondary (upper and lower) and a trend decrease in primary. Besides, trends in gross enrolment rates in Figure 2 seem to increase after the reform. It reflects an increase in the trend of gross enrolment in secondary and pre-primary that outweighs a decrease in gross enrolment rate

[4]Bogotá, Barranquilla, Santa Marta, Cartagena, Pasto and Armenia

[5]Cali and Medellín.

in primary. The decrease in the growth trend of primary enrolment is reflected in the Net Enrolment Rate (NER) – Primary school NER have not risen after the reform (see Table 1). This reduction in the growth trend of primary enrolment may be due to governments have concentrated efforts in increasing enrolment in secondary. Since there is a large fraction of children and youth out of secondary school, it might be easier to enrol pupils in secondary than in primary. Indeed, in 2001, school-age children out secondary school amounted to almost 50% of school-age children, while school-age children out primary school amounted to 13% (see Table 1).

Table 2 shows some characteristics of certified and non-certified municipalities. In 1993, 45% of households in non-certified municipalities and 31% of households in certified municipalities were poor, on average. Regarding variables on conflict, we see that the conflict intensity has decreased between 2000 and 2005. Both types of municipalities receive a similar number of displaced people per thousand inhabitants. However, displaced people are more often expelled from non-certified municipalities. Regarding taxes on industry and commerce, certified municipalities collect 31 thousand pesos per capita (15 dollars) while non-certified municipalities collect 23 thousand pesos (11 dollars), on average.

The reform affects the municipal spending per capita, transfers to municipalities per capita and the proportion of municipal income made up of transfers. Before the reform 45% of municipal income in certified municipalities was transfers. After the reform it amounted to 63%. Similarly, transfers to certified municipalities were about 85 thousand pesos per capita in 2000 and rose to about 246 thousand pesos per capita in 2005. On the other hand, transfers have represented around 60% of municipal income in non-certified municipalities, and transfers have been around 135 thousand pesos per capita, both before and after the reform. In Figure 3, we have transfers per capita just before and after the reform was implemented. Population in 2001 has been normalized around the cutoff of 100 thousand inhabitants. In 2002, transfers per capita for the municipalities around the cutoff amounted to 110 thousand pesos. At the cutoff, there is no visible difference between certified and non-certified municipalities in that year. In contrast, in 2003, non-certified municipalities received a similar amount as in 2002, while certified municipalities received a bit more of the double of the transfers received by non-certified municipalities (around 260 thousand pesos).

The number of pupils enrolled in public and private schools as a fraction of school-age children appears in Tables 3 and 4, respectively. Pre-college enrolment in public schools from non-certified municipalities is 73.44% of school-age children in 2001, on average. It increases to 81.69% in 2005. In certified municipalities, this fraction is about 67.84% in 2001, on average, and rises up to 75.75% in 2005. Notice that the number of pupils enrolled in primary is larger than the number of school-age children. In both types of municipalities, around 60% of these students are undertaking primary studies, 25% are following lower secondary courses, 8% are in upper secondary and 7% in pre-primary. Pre-college enrolment in private schools from non-certified municipalities represents 7.19% of school age children in 2001, on average. It decreases to 6.96% in 2005. In certified

municipalities, enrolment in private schools also decreases from 17.75% to 17.31% of school age students in the same period.

Finally, the number of subsidized pupils in private schools as a fraction of school-age children appears in tables 5 and 6. On the one hand, non-certified municipalities subsidized 1.29% of school-age children in 2003, on average. This fraction remains relatively stable until 2005. Most of the subsidized students are attending either primary or lower secondary school, which is reflected in the fraction of school-age children (1.32% for primary and 1.67% for lower secondary in 2003). On the other hand, certified municipalities subsidized 1.73% of school-age children in 2003, on average. This fraction rises to 3.42% in 2005. As in non-certified municipalities, most subsidized students are in primary or lower secondary school. But, the number of subsidized pupils in pre-primary school represents the largest fraction of school-age children (4.75%) in 2005. As was mentioned previously, the department of Antioquia had developed a subsidy program before the 2001 reform. Notice that the largest fraction of school-age children subsidized in private schools in the non-certified municipalities is larger than anyone in the certified municipalities. Table 6 shows fractions calculated excluding the municipalities in Antioquia. The maximum fractions subsidized in private schools of non-certified municipalities decreases a lot. This suggests that non-certified municipalities in Antioquia subsidize a large number of students, which may be a consequence of the subsidy scheme implemented in Antioquia before the reform.

3.3 Effects on enrolment

Since the 2001 reform establishes a subsidy scheme that regional and local governments can use to enrol pupils in private schools, decentralization may have affected enrolment in both public and private schools. Throughout this section, we will assume the identifying assumptions hold. In the next section, we will verify those assumptions.

Let me first consider the effect in public schools. The dependent variable is the increase in the number of pupils between a post-reform year and 2001. I look for differences between more and less decentralized municipalities, i.e. certified and non-certified municipalities, respectively.

The results show that there is almost no enrolment effect in public schools (See Tables 7 and 8). I estimate Equation (1) for each post-reform year (2002 - 2006), each level of schooling (pre-primary, primary, lower secondary, upper secondary) and all pre-college education. Table 7 reports the estimations of coefficient θ of equation (1). The quadratic form of this equation reproduces relatively well the distribution of enrolment across population size (see Figure 4). There are few significant effects. In 2002, the certified municipalities enroled 212 more students in upper secondary than did the non-certified municipalities. This number is the mean treatment effect over all municipalities evaluated at the treatment cutoff. This difference represents around 6.5% of the 16-17 year-old population and 12% of upper-secondary students in public schools in 2002 for the municipalities nearest to the cutoff on both sides. Since the law approved in 2001 was implemented starting in 2003,

the difference may be interpreted as the more decentralized municipalities' anticipation of the reform's implementation. Indeed, since 2001 all municipalities knew that from 2003 onwards a national transfer will be assigned according to the number of pupils. Both types of municipalities had incentives to enrol more students in 2002 because of the national transfer to be paid at the beginning of 2003 was based on 2002 enrolment. The results show that more decentralized municipalities were more successful in increasing the number of pupils in upper secondary than the less decentralized municipalities.

In addition, non-certified municipalities seem to have a larger increase in the number of pupils in pre-primary in 2005 (774 students) and in primary in 2006 (1672 students). However, these differences disappear once controls for department fixed effects are introduced (see Table 8). These fixed effects account for institutional differences among departments that cannot be attributed to the reform.

The difference in upper secondary mentioned above does not disappear with the department fixed effects (see the fourth line in Table 8). I further check the robustness of this result with different specifications of the model. These specifications differ from each other in the polynomial of the assignment variable. Both the quadratic and the linear polynomials with and without interactions between the assignment and the treatment variables are estimated. The first panel in Table 9 shows the results for upper secondary in 2002. The coefficients of the quadratic polynomial with interactions seems to be non significant (Model 1). Besides, the difference in upper secondary in 2002 is not robust to different specifications. Neither are the differences found in the number of pupils enroled in pre-primary and primary levels that are mentioned above (see Panels 1 and 2 in Table 9). Although the RDD methodology only provides evidence at the treatment cutoff, comparing how data is distributed at each side of the cutoff along all the sample also helps to see why there are no differences in public school enrolment. Figure 4 shows that observed data have no important differences in the dependent variable's support.

In conclusion, if there is any difference in the number of pupils enroled in public schools between more and less decentralized municipalities, the difference is temporary (lasts one year– 2002) and is present only in the number of pupils enroled in the upper secondary school.

Let me now look at the effect of decentralization on subsidized enrolment in private schools. Since there is no subsidized enrolment before the reform implementation[6], the dependent variable is not the increase but the number of pupils subsidized in private schools in each year after implementation (2003 - 2006). Once again, I look for differences between more and less decentralized municipalities, i.e. certified and non-certified municipalities, respectively. Under the identifying assumptions, estimates of θ estimate the mean treatment effect evaluated at the treatment cutoff, which is the treatment effect of interest.

I estimate the six specifications already shown in Table 9 for each level of school in

[6]As stated in the second section, the municipalities from the department of Antioquia subsidized some pupils in private schools before 2003. All the municipalities from Antioquia are excluded from regressions.

the study, for each year. To illustrate this, Table 10 shows the estimates of the polynomials' coefficients and the Certification Dummy's coefficient for 2005. Each panel of the Table shows the results for each level of education. The coefficient of the Certification Dummy, θ, estimates the difference in the number of subsidized pupils among both types of municipalities. All the estimates of θ are statistically significant and robust to different specifications. This result provides evidence that more decentralized municipalities have subsidized more pupils in private schools than less decentralized municipalities have done.

The estimates of θ of Model 4 of Table 10 for all school levels and years are summarized in Table 11. It shows that the treatment has an effect on the number of pupils subsidized in private schools for all school levels in the period 2004 - 2006. The largest differences were in 2005. In that year, the more decentralized municipalities subsidized 833 students more than did the less decentralized municipalities. At the cutoff, it represents around 20% of the number of pupils in private schools and 3% of the population of school age. These students are distributed in pre-primary (97 students), primary (430 students), lower secondary (253 students) and upper secondary (53 students). In pre-primary, the difference represents around 22% of pupils enroled at that level in private schools and 4% of the 6-year-old population. In primary, the difference represents around 30% of pupils at that level in private schools and 3.4% of the 7-6-year-old population. In lower secondary, the difference amounts to about 20% of pupils at that level in private schools and 2.8% of the 12-15-year-old population. Finally, in upper secondary the difference goes up to 7.5% of pupils in upper-secondary private schools and 1.3% of the 16-17-year-old population. The estimates with linear interactions and the observed data for 2005 are depicted in Figure 5.

Since the mean treatment effect is estimated at the treatment cutoff, the estimates may be biased by the observations far from the cutoff in both directions, that is, by data from the smallest and the largest municipalities included in the sample. To check for any bias of this type, I restrict the sample to the municipalities in the window of $\pm$ 80 thousand inhabitants around the treatment cutoff. The estimates of the treatment effect are summarized in (Table 12). It shows that the treatment effects are still significant for all the school levels in 2005 and 2006.

In conclusion, there is evidence showing that more decentralized municipalities subsidized more pupils studying in private schools than did less decentralized municipalities. The difference in subsidized pupils is significant for all school levels affected by the reform and, at least, for 2005 and 2006.

3.4 Continuity checks and Robustness

Let me first have a look at how results are affected by using different samples. In particular, I want to compare the results obtained with and without the municipalities of Antioquia, the department that implemented subsidy contracts before the reform. The comparison appears in Table 13. It presents the difference between certified and non-certified municipalities in the number of subsidized pupils in private schools for 2005 by school level.

Columns (1) and (2) show the results fitting the model using the full sample with and without the municipalities in Antioquia, respectively. Columns (3)-(4) show the results using the small sample with and without the municipalities in Antioquia, respectively. First, notice that all estimates of θ are statistically significant for the four samples. Second, remark that, as expected, including the municipalities in Antioquia bias downwards the effect of decentralization. This is true for the full and the small samples and for all school levels except for pre-primary, which is bias upwards.

Findings in the previous section are valid if the identifying assumptions hold. In the first place, in absence of treatment, the number of pupils in public and private schools must be continuous at the treatment cut-off. If so, any discontinuity in presence of treatment can be attributed to the treatment itself. Table 14 reports the estimates of θ using the increase in the number of pupils between 2000 and 2001 as the dependent variable. The estimates correspond to the specifications of Models 1 - 5 of Table 9. A significant estimate of θ would reveal the existence of discontinuities at the treatment cutoff before the treatment occurs. Any discontinuity would threaten the identification of the treatment effect. Table 14 shows that there are no discontinuities at the treatment cutoff for all levels of education and specifications for both public and private schools. This provides evidence that supports the claim that the discontinuities found in the previous section are caused by the decentralization reform.

Moreover, Urquiola and Verhoogen (2006) show that the RD design should be applied with caution in settings where parents have significant school choice and schools are free to set prices. In this case, there may be discontinuities that are not caused by the treatment. The authors illustrate the issue using data from Chile, a country in which there is a widely spread voucher system. Although I do not use data at the level of households, it is worth saying that Colombian households do not have such a school choice because there is no a substantial voucher system[7] and big cities, the places in which school choice is more likely, are excluded from all regressions. Besides, prices of private schools are regulated since the early nineties, so that competition on prices is limited. However, nothing of this prevents discontinuities in prices across municipalities. To check discontinuities in prices I use data on tuition fees reported by senior secondary students each year as a proxy of tuition fees of all pre-college schools. Table 15 reports estimates of θ using tuition fees as the dependent variable. It shows no discontinuities in tuition fees in either public or private schools for all years in the period of study. The absence of discontinuities in the pre-treatment years means the continuity assumption holds for tuition fees. The absence of discontinuities in the post-treatment provides evidence that supports the idea that the reform's effect on the increase of pupils do not pass through tuition fees.

Another crucial variable to check is the structure of population. Discontinuities in the population of school age at the cutoff may cause discontinuities in the number of pupils.

[7]The largest voucher program in Colombia, the PACES program, assigned 125000 vouchers in mid-nineties. It amounts to less than 2% of the overall enrolment. See Angrist et al. (2002) and Angrist et al. (2006) for an evaluation of the PACES program.

If they exist, it may be the case that the difference in the number of pupils across types are explained not because more decentralized municipalities do better but because they have more population of school age. To check for these discontinuities I estimate the same models as before using the number of inhabitants of school age corresponding to each school level as the dependent variable. Estimates of θ with the specification of Model 4 of Table 9 for all years are summarized in Table 16. They show no difference between more decentralized and less decentralized municipalities at the cutoff regarding their population of school age (See Figure 6).

In general, I should check whether all other observable and non-observable characteristics of municipalities affecting enrolment are continuous at the treatment cutoff. Of course, continuity of most of non-observable variables will remain as assumption. But, all observable variables must be checked. There are two alternatives to check continuity: either one estimates Equation (1) using those variables as dependent variables or one adds those variables, one by one, to the regressions of the previous section.

New regressions of the number of subsidized pupils controlling for the observable variables were done. Table 17 shows the results for 2005[8]. Column (1) reports again the treatment effect from Model 4 in the last panel of Table 10– the baseline estimation. Column (2) shows the treatment effect once one controls for department fixed effects. Although the treatment effect decreases a little bit, it is significant. The other columns control by some measure of poverty. Column (3) shows that the proportion of poor population does not affect the number of subsidized pupils. Columns (4)-(6) show the effect of the number of people targeted for welfare programs. In Colombia, there is an index implemented to target poor people for welfare programs. This index, the SISBEN index, defines some levels of welfare, that I call WELFARE (level 1 to level 3). Column (4) shows that the number of subsidized pupils decreases with the population in WELFARE-1 (the poorest people) and Column (6) shows that it increases with the population in WELFARE-3 (not so poor).

The second panel of Table 17 shows the treatment effects controlling by municipal budget variables, like tax income per capita, transfers per capita, municipal education spending per capita and transfer dependence (Transfers/Total income). It also reports the effect of tuition fees. Education spending per capita (Column (3)) and transfers per capita (Column (4)) have a positive effect on the number of subsidized pupils. The effect is small and significant at the 90% level of confidence.

The third panel of Table 17 shows the treatment effect controlled with other municipal variables. The effect of municipal bankruptcy appears in column (1). Columns (2)-(6) show the effect of other spending variables. Indeed, Drazen and Eslava (2007) find that politicians may use some expenditures to target voters in pre-electoral periods. In particular, they find, using Colombian data, that politicians may increase current spending (bureaucracy) and some investment expenditures like recreation, housing and health in order to attract voters. None of these variables are significant.

[8]These exercises were also performed for the other years. The results are similar.

The fourth panel of Table 17 shows the treatment effect controlled by other variables of education investment by municipalities, including (lagged) proportion of investment in new infrastructure, maintenance of infrastructure, material and equipment, training of teachers, non-earmarked transfers per capita spent on education and own resources spent on education. None of these variables are significant.

The fifth panel of Table 17 shows conflict variables like forcibly displaced population (expelled and received people), killings in attacks or combats by illegal armies and number of attacks and combats by different illegal armies. The guerrilla attacks have a significant negative influence on subsidized enrolment, as do the attacks of illegal armies combined. All the other variables have no effect.

The last panel of the same Table shows political variables. Indeed, part of the effects of decentralization may arise from political grounds. The Same-Party dummy is a dummy equal to one if the department governor and the municipal mayor belong to the same party. I also include a dummy for the main political parties in Colombia (the Liberal and the Conservative), the percentage of winning votes in elections and the voter turnout. All these variables have no effect on the number of subsidized pupils.

In conclusion, the treatment effect is robust to many different kinds of observable variables.

As observed in Figures 4 and 5 there is very large variation in the certified municipalities. This is so because of the small number of certified municipalities. I have dealt with the lopsided sample introducing interactions between the assignment and the treatment variables. To gain additional precision in the estimation of θ, I pool the sample for the period 2003-2006 . The cost of doing so is that I lose the yearly variability of the coefficient. The estimates provide the average number of subsidized pupils in the period 2003 - 2006. Table 18 shows the results for each specification. The average difference in subsidized enrolment among certified and non-certified municipalities amounts to 541 students. All schooling levels have significant differences. The pooled sample is also useful to check for robustness to specification error. Following Lee and Card (2006), the literature usually deals with this problem by clustering errors by each observation of population (municipalities), as I have done. The authors show that clustering is useful when the specification error is identical. However, when the specification error is independent we need to inflate standard error even more to account for different errors. Following the procedure in Lee and Card (2006), I estimate the robust confidence intervals. With identical specification error the confidence intervals come from the standard error of running the regression with the micro data clustered by municipalities. The inflated variance with independent specification error comes from estimations on the collapsed data at the cell level. Notice that the confidence interval with 95% level of significance for independent standard error is wider than the interval for identical standard error. The treatment effect survives for all levels and the total except for upper secondary.

4 Discussion

The reform established two ways for regional and local governments to increase enrolment: either enrol more students in public schools or subsidize pupils through contracts with private schools. Why is it that the more decentralized municipalities subsidize more pupils in private schools than less decentralized municipalities? Why isn't there a difference between the two types of municipalities in the increase in pupils enroled in public schools?

Let me discuss the first question. Once the reform is launched, the easiest way for governments to increase enrolment is to put more children in public schools. In Colombia there is no cap on the number of pupils per teacher. So, the governments, subject to the technological constraints (i.e. the size of classrooms), can establish any cap level they wish. However, at some point in time, the seats in the public schools will be completely full. At that point the governments must decide: either they contract private schools or they build new public schools. How might decentralization affect this decision?

Contracting with private schools increases the number of children and youth attending school. This provides benefits to the local governments, which may take the form of political or economic rents. Indeed, increasing enrolment may improve the chances for the incumbent political party to stay in power or for an incumbent politician to be promoted to more important positions. There may also be economic rents. There is anecdotal evidence that contracts with private schools are signed at a lower price than the transfer per pupil received by the certified government, so the government may save money by contracting with private schools.

One important point here is that the certified municipalities can deal directly with private schools, while the others must do so through the department. The less decentralized municipalities have to negotiate the subsidy contracts with departments, which means that they split the benefits of contracting private schools among them. That is, under the less decentralized organization, governments have fewer incentives to contract with private schools.

It also seems that the municipal governments have important information on the number of children out of school within their jurisdiction that the department governments do not have, nor do they have enough incentives to obtain it. Note that the less decentralized organization also undermines the political incentives of department governments. The less decentralized municipalities are the smallest ones and the votes from these municipalities surely play a minor role in the election of governors.

In addition, recall that the number of children and youth out of school is quite large. They belong to poor households and probably have less ability than children already in school. Since citizens not only care about enrolment but also about quality of education, the more decentralized municipalities may be more accountable on this issue. enroling all the children out of school in public schools may deteriorate their average quality. Therefore, it is more beneficial for local governments to enrol them in private schools for at least two reasons. First, because it reduces quality deterioration in public schools. Second, because

private schools are both more accountable to parents and less likely to be controlled by interest groups like teachers' unions.

Of course, there may also be alternative explanations. For instance, are the departments more likely to be captured by groups that dislike private providers? The national teachers' union is likely the only group able to do so. I would say that this union is more able to control the lower levels of government, as departments have more negotiation power with the union than the municipalities. However, it is likely that the union provides more votes in department elections than the very small municipalities. An investigation comparing the smallest and the largest non-certified municipalities would provide insights on this issue[9].

Let me now discuss the second question. In a context in which there are no differences in taxes and national transfers are earmarked, it seems that differences in the level of public school enrolment across more and less decentralized municipalities have to do with differences in credit constraints to finance the construction of new schools. More and less decentralized municipalities have no differences regarding the portion of expenditures spent on new infrastructure nor the portion of own resources spent in education. It seems as well, that the problem not only has to do with constraints on the supply side but also with constraints on the demand side. The econometric exercises show that subsidized enrolment decreases with extreme poverty. This can be explained because the poorest households may require additional programs (food-for-school, transport subsidies, etc.) to afford to send their children to school. Why municipalities and departments do not have this type of programs is a question that deserves to be answered.

5 Concluding remarks

The 2001 reform substantially modified how public social services (education, health, etc.) are provided in Colombia. Regarding education, it introduced several changes, ranging from the transfer mechanism to school organization. The reform introduced differences across municipalities in the organization of education provision. Particularly important, the reform established an exogenous rule that divided municipalities in two groups. One group has a more decentralized organization of education provision than the other.

Results suggest that more decentralized municipalities have significantly more subsidized students in private schools. The difference amounts to 20% of enrolment in private schools and 3% of the school-age population. This fraction represents almost one fifth of children and youth that were out school in 2001. Besides, political election variables and expenditures related to political pandering have no effect on subsidized enrolment.

In addition, tuition fees of private schools and the size of the school-age population have no discrete variations at the threshold defining the treatment, therefore differences

[9]Seabright (1996) makes a theoretical analysis of how groups that are not decisive in the elections of governments of local jurisdictions can become decisive in the elections of governments of regional or national jurisdictions.

in subsidized enrolment cannot be attributed to differences in these variables. Additional controls show that subsidized enrolment decreases with extreme poverty and increases with milder poverty. This result is important for policy issues because it suggests that the students in private schools financed by subsidies do not belong to the poorest households. The poorest households may require additional resources (e.g. transport to school) or cash incentives to send children to school. Finally, subsidized enrolment decreases with variables measuring the internal conflict and increases with transfers per capita.

Additional results show that although enrolment in public schools has increased after the reform, decentralization has had no effect on this variable. In a context in which there are no differences in taxes and national transfers are earmarked, it seems that differences in the level of public school enrolment across more and less decentralized municipalities have to do with differences in credit constraints to finance the construction of new schools. The econometric exercises show that there is no difference between more and less decentralized municipalities regarding the portion of expenditures spent on new infrastructure. A complete analysis on this issue requires both an additional piece of theory and empirical exercises. This is left for future research.

References

Aghion, P. and J. Tirole (1997). Formal and real authority in organizations. *The Journal of Political Economy 105*, 1–29.

Angrist, J., E. Bettinger, E. Bloom, E. King, and M. Kremer (2002). Vouchers for private schooling in colombia: Evidence from a randomized natural experiment. *American Economic Review 92*(5), 1535–1558.

Angrist, J., E. Bettinger, and M. Kremer (2006). Long-term educational consequences of secondary school vouchers: Evidence from administrative records in colombia. *American Economic Review 96*(3), 847–862.

Barankay, I. and B. Lockwood (2007). Decentralization and the productive efficiency of government: Evidence from swiss cantons. *Journal of Public Economics 91*, 1197–1218.

Bardhan, P. (2002). Decentralization of governance and development. *Journal of Economic Perspectives 16*, 185–205.

Drazen, A. and M. Eslava (2007). Electoral manipulation via voter-friendly spending: theory and evidence. Working Paper.

Enikolopov, R. and E. Zhuravskaya (2007). Decentralization and political institutions. *Journal of Public Economics 91*, 2261–2290.

Faguet, J.-P. (2004). Does decentralization increase government responsiveness to local needs?: Evidence from bolivia. *Journal of Public Economics 88*(3-4), 867–893.

Hahn, J., P. Todd, and W. Van der Klaauw (2001). Identification and estimation of treatment effects with a regression-discontinuity design. *Econometrica 69*(1), 201–09.

Lee, D. S. and D. Card (2006). Regression discontinuity inference with specification error. Working Paper 322, National Bureau of Economic Research.

Myerson, R. (2006). Federalism and incentives for success of democracy. *Quarterly Journal of Political Science 1*, 3 – 23.

Persson, T. and G. Tabellini (2000). *Political Economics: Explaining Economic Policy*. MIT press.

Seabright, P. (1996). Accountability and decentralisation in government: an incomplete contracts model. *European Economic Review 40*(1), 61–89.

Shadish, W., T. Cook, and D. Campbell (2002). *Experimental and Quasi-Experimental Designs*. Houghton Mifflin.

Urquiola, M. and E. Verhoogen (2006). Class size and sorting in market equilibrium: Theory and evidence. Working Paper.

Appendix

Table 1: Net Enrolment Rate

School Level	2001	2002	2003	2004	2005
Pre-Primary	52.1	54.6	60.7	56.9	58.8
Primary	87.1	87.2	86.4	86.2	86.5
Secondary	52.1	53.0	54.4	57.6	59.5
Total	79.5	80.4	81.2	83.3	84.3

Table 2: Means for Certified and Non-Certified Municipalities, 2000 and 2005

	2000			2005		
	Certified Mun.	Non-Certified Mun.	Total	Certified Mun.	Non-Certified Mun.	Total
Population in 2001	135018	37755	42604	135018	37755	42604
Proportion of Poor in 1993 (%)	31.17	45.26	38.21	31.17	45.26	38.21
Forcibly Displacement:						
Expelled Population	2.8	15.1	14.5	1.9	7.7	7.4
Received Population	8.9	8.2	8.2	3.3	4.4	4.3
Industry-Commerce Tax per capita	30.96	23.19	27.29	32.20	23.35	27.77
Education Spending per capita	26.53	32.90	29.59	161.65	27.78	93.87
Transfers per capita	85.02	133.01	107.72	246.77	136.34	191.56
Transfer Dependence (%)	45	62	53	63	57	60

Note.– The population in 2001 for certified municipalities is calculated taking the information of municipalities with population between 100 thousand inhabitants and 180 thousand inhabitants. The population in 2001 for non-certified municipalities is calculated taking the information of municipalities with population between 20 thousand inhabitants and 100 thousand inhabitants. The proportion of poor corresponds to data of 1993. Expelled Population and Received Population are measured as the number of persons per 1000 inhabitants. Industry-Commerce Tax per capita, Education Spending per capita and Transfers per capita are measured in thousand pesos per inhabitant (constant prices of 2004). Education Spending per capita is the money spent by the municipal government in education. Transfers per capita and Transfer dependence include both National and Department transfers.

Table 3: Fraction of School-Age Children Enrolled in Public schools for Certified and Non-Certified Municipalities (%)

		Non-Certified Municipalities				Certified Municipalities			
Year	School Level	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
2001	Pre-primary	52.4	23.85	3.78	135.35	55.93	10.51	38.73	73.89
	Primary	107.42	28.82	25.37	241.75	89.93	22.96	60.73	150.13
	Lower Secondary	52.17	20.13	7.72	103.01	57.07	13.25	34.85	84.57
	Upper Secondary	33.7	17.12	0	109.24	36.92	11.16	20.42	69.96
	Total	73.44	18.24	14.91	139.95	67.84	14.61	44.15	100.57
2005	Pre-primary	79.05	39.46	7.46	330.95	74.35	27.91	43.01	154.82
	Primary	106.33	29.94	25.42	196.54	92.08	25.72	62.13	154.56
	Lower Secondary	66.45	23.96	9.22	155.81	67.38	11.56	49.7	86.52
	Upper Secondary	44.72	20.31	2.99	104.7	49.4	11.67	33.13	79.26
	Total	81.69	21.99	17.65	150.23	75.75	15.4	52.57	109.7

Note.– Statistics for non-certified municipalities are calculated with data of the 343 municipalities whose population was between 20 thousand inhabitants and 100 thousand inhabitants in 2001. Statistics for certified municipalities are calculated with data of the 18 municipalities whose population was between 100 thousand inhabitants and 180 thousand inhabitants.

Table 4: Fraction of School-Age Children Enrolled in Private schools for Certified and Non-Certified Municipalities (%)

		Non-Certified Municipalities				Certified Municipalities			
Year	School Level	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
2001	Pre-primary	6.53	9.98	0	82.23	19.77	12.77	2.9	52.86
	Primary	7.93	10.9	0	80.05	19.33	11.25	3.71	48.49
	Lower Secondary	6.91	11.47	0	101.86	16.4	12.3	2.93	49.47
	Upper Secondary	6.10	10.83	0	103.36	15.17	10.86	3.25	44.58
	Total	7.19	10.32	0	80.14	17.75	11.12	4.44	48.54
2005	Pre-primary	7.2	11.77	0	86.59	21.8	13.6	1.01	45.76
	Primary	7.01	11.87	0	83.84	17.42	10.76	1.12	42.3
	Lower Secondary	7.07	11.59	0	76.59	16.39	13.89	2.66	57.56
	Upper Secondary	6.35	14.2	0	191.43	16.44	13.04	2.31	53.4
	Total	6.96	11.21	0	78.92	17.31	11.83	2.57	49.3

Note.– Statistics for non-certified municipalities are calculated with data of the 343 municipalities whose population was between 20 thousand inhabitants and 100 thousand inhabitants in 2001. Statistics for certified municipalities are calculated with data of the 18 municipalities whose population was between 100 thousand inhabitants and 180 thousand inhabitants.

Table 5: Fraction of School-Age Children Subsidized in Private Schools, 2003 - 2005 (%)

		Non-Certified Municipalities				Certified Municipalities			
Year	School Level	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
2003	Pre-primary	0.67	3.01	0	27.67	1.85	3.54	0	11.64
	Primary	1.32	5.75	0	50.83	1.84	4.01	0	14.9
	Lower Secondary	1.67	4.56	0	31.73	1.81	3.67	0	13.87
	Upper Secondary	0.62	2.21	0	23.08	1.17	2.48	0	8.66
	Total	1.29	3.98	0	31.73	1.73	3.46	0	13.22
2004	Pre-primary	1.01	5.26	0	53.52	3.16	6	0	24.87
	Primary	1.31	5.27	0	43.02	1.99	2.63	0	9.09
	Lower Secondary	1.43	3.7	0	30.53	1.89	2.56	0	8.91
	Upper Secondary	0.52	1.76	0	18.28	1.03	2.46	0	8.65
	Total	1.22	3.6	0	26.16	1.92	2.24	0	6.8
2005	Pre-primary	0.78	3.35	0	34.18	4.75	6.23	0	22.55
	Primary	1.38	5.79	0	47.96	3.93	4.89	0	15.64
	Lower Secondary	1.68	4.13	0	28.34	3.19	3.97	0	14.47
	Upper Secondary	0.56	1.83	0	20.62	1.71	2.71	0	9.41
	Total	1.33	3.84	0	29.78	3.42	3.86	0	13.95

Note.– Statistics for non-certified municipalities are calculated with data of the 343 municipalities whose population was between 20 thousand inhabitants and 100 thousand inhabitants in 2001. Statistics for certified municipalities are calculated with data of the 18 municipalities whose population was between 100 thousand inhabitants and 180 thousand inhabitants.

Table 6: Fraction of School-Age Children Subsidized in Private Schools excluding Antioquia(%)

		Non-Certified Municipalities				Certified Municipalities			
Year	School Level	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
2003	Pre-primary	0.09	0.56	0	4.45	1.4	3.23	0	11.64
	Primary	0.1	0.58	0	4.38	1.54	3.9	0	14.9
	Lower Secondary	0.23	1.22	0	11.12	1.68	3.84	0	13.87
	Upper Secondary	0.13	0.88	0	9.15	1.06	2.55	0	8.66
	Total	0.15	0.76	0	6.81	1.49	3.58	0	13.22
2004	Pre-primary	0.4	3.4	0	53.52	2.01	2.71	0	6.36
	Primary	0.31	1.46	0	15.98	1.65	2.04	0	5.48
	Lower Secondary	0.64	1.97	0	12.41	1.67	2.47	0	8.91
	Upper Secondary	0.28	1.05	0	10.93	0.58	1.66	0	6.67
	Total	0.42	1.26	0	9.70	1.52	1.95	0	6.8
2005	Pre-primary	0.28	1.59	0	17.65	4.45	6.31	0	22.55
	Primary	0.24	1.46	0	16.78	3.73	4.81	0	15.64
	Lower Secondary	0.58	1.97	0	18.59	3.16	4.18	0	14.47
	Upper Secondary	0.2	0.85	0	7.28	1.62	2.78	0	9.41
	Total	0.35	1.25	0	12.21	3.27	4.02	0	13.95

Note.– Municipalities in Antioquia are excluded. Statistics for non-certified municipalities are calculated with data of the 296 municipalities whose population was between 20 thousand inhabitants and 100 thousand inhabitants in 2001. Statistics for certified municipalities are calculated with data of the 16 municipalities whose population was between 100 thousand inhabitants and 180 thousand inhabitants.

Table 7: Difference between Certified and Non-Certified Municipalities in the Increase of Pupils in Public Schools

School Level	2002	2003	2004	2005	2006
Pre-primary	-109.023	-76.590	19.085	-773.753	-749.201
	(120.631)	(319.882)	(312.283)	(442.816)*	(501.842)
Primary	-261.948	-419.572	39.518	-871.942	-1671.956
	(397.362)	(918.906)	(1102.779)	(1103.677)	(995.589)*
Lower Secondary	469.015	-53.220	532.000	475.174	417.533
	(317.181)	(488.411)	(534.198)	(691.066)	(643.807)
Upper Secondary	211.967	138.477	166.175	241.353	-76.674
	(110.358)*	(157.117)	(218.227)	(262.423)	(191.354)
Total	310.010	-410.904	756.778	-929.167	-2080.298
	(656.444)	(1566.482)	(1841.266)	(2013.452)	(1980.567)

Note.– Estimates of the certification dummy's coefficient (θ). Robust standard errors are in parentheses. All estimates are calculated using the quadratic polynomial with interactions (Equation (1) in the text). The dependent variable is the difference between the year of the study and 2001 of the number of pupils. Municipalities in Antioquia are excluded from estimations.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 8: Difference between Certified and Non-Certified Municipalities in the Increase of Pupils in Public Schools (with Department Fixed Effects)

School Level	2002	2003	2004	2005	2006
Pre-primary	-72.276	107.927	226.282	-439.943	-390.957
	(113.707)	(278.088)	(272.859)	(348.016)	(368.240)
Primary	-108.748	-93.733	491.126	-315.274	-957.898
	(364.301)	(991.381)	(1147.510)	(1152.775)	(896.237)
Lower Secondary	402.734	-68.886	590.216	511.221	497.411
	(274.839)	(460.804)	(467.079)	(689.114)	(611.923)
Upper Secondary	200.649	125.245	122.920	257.157	-85.873
	(102.591)*	(148.347)	(218.209)	(244.806)	(171.491)
Total	422.359	70.552	1430.543	13.160	-937.318
	(609.987)	(1521.140)	(1745.298)	(1951.855)	(1718.622)

Note.– Estimates of the certification dummy's coefficient (θ). Robust standard errors are in parentheses. All estimates are calculated using the quadratic polynomial with interactions (Equation (1) in the text). All models include a dummy variable for each department. The dependent variable is the difference between the year of the study and 2001 in the number of pupils. Municipalities in Antioquia are excluded from estimations.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 9: Difference between Certified and Non-Certified Municipalities in the Increase of Pupils in Public Schools (Robustness to different specifications)

Upper Secondary 2002	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.004	.002	.004	.0006	.001	.001
	(.003)	(.003)	(.003)	(.001)	(.0006)**	(.0006)*
$(\text{Population})^2$	2.36e-08	8.65e-09	3.16e-08	-6.14e-09		
	(2.69e-08)	(2.56e-08)	(2.56e-08)	(9.60e-09)		
Certification Dummy	211.967	8.463	67.385	49.492	88.456	14.052
	(110.358)*	(131.757)	(86.165)	(94.637)	(82.348)	(74.490)
Population*Certification	-.016		-.008		-.003	
	(.006)***		(.005)		(.002)	
$(\text{Population})^2$*Certification	1.19e-07	-3.84e-08				
	(7.83e-08)	(6.33e-08)				
Constant	153.513	121.787	168.348	92.563	110.106	99.321
	(80.982)*	(77.987)	(78.259)**	(44.829)**	(43.731)**	(41.979)**
N	361	361	361	361	361	361
r^2	.092	.07	.084	.068	.075	.066

Table 9 Continued...

Pre-Primary 2005	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.006 (.006)	.010 (.006)	.003 (.007)	.007 (.005)	.005 (.001)***	.005 (.001)***
(Population)^2	1.36e-08 (5.54e-08)	4.69e-08 (5.99e-08)	-1.40e-08 (6.17e-08)	2.51e-08 (4.86e-08)		
Certification Dummy	-773.753 (442.816)*	-320.139 (291.807)	-278.277 (346.589)	-259.736 (347.671)	-287.627 (326.593)	-114.800 (231.897)
Population*Certification	.037 (.036)		.009 (.013)		.006 (.010)	
(Population)^2*Certification	-4.06e-07 (4.62e-07)	-5.65e-08 (2.03e-07)				
Constant	550.29 (151.41)***	621.01 (156.96)***	499.45 (158.41)***	577.99 (118.36)***	525.30 (79.18)***	550.35 (84.48)***
N	361	361	361	361	361	361
r^2	.141	.128	.129	.127	.129	.123
Primary 2006	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.030 (.017)*	.033 (.017)**	.024 (.018)	.015 (.010)	.012 (.004)***	.012 (.004)***
(Population)^2	1.83e-07 (1.63e-07)	2.17e-07 (1.62e-07)	1.26e-07 (1.68e-07)	2.76e-08 (9.62e-08)		
Certification Dummy	-1671.956 (995.589)*	-1210.921 (774.649)	-638.520 (792.142)	-684.964 (805.412)	-554.849 (741.531)	-525.823 (580.491)
Population*Certification	.037 (.076)		-.021 (.033)		.001 (.018)	
(Population)^2	-8.47e-07 (9.57e-07)	-4.92e-07 (4.51e-07)				
Constant	1244.24 (432.29)***	1316.12 (424.03)***	1138.21 (438.07)***	941.49 (291.48)***	906.94 (254.43)***	911.15 (250.55)***
N	361	361	361	361	361	361
r^2	.067	.065	.061	.06	.059	.059

Note.– Estimates of the certification dummy's coefficient (θ) and the polynomial's coefficients. Robust standard errors are in parentheses. The dependent variable is the difference between the year of the study and 2001 in the number of pupils in the corresponding school level. Population is the number of inhabitants of municipalities in 2001. Municipalities in Antioquia are excluded from estimations.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 10: Difference between Certified and Non-Certified Municipalities in the Number of Subsidized Pupils in Private Schools, 2005 (Robustness to different specifications)

Pre-Primary	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	-.00003	.0003	.00004	.00008	.00006	
	(.00008)	(.0003)	(.00009)	(.00003)**	(.0001)	
(Population)^2	-8.00e-10	2.15e-09	1.18e-10			
	(7.12e-10)	(2.58e-09)	(5.38e-10)			
Certification Dummy	131.780	118.661	97.343	97.121	96.744	107.633
	(71.773)*	(62.829)*	(43.341)**	(47.413)**	(44.985)**	(27.909)***
Population*Certification	-.0007	-.001		-.00003		
	(.001)	(.001)		(.0003)		
(Population)^2*Certification	3.17e-09					
	(2.84e-09)					
Constant	4.353	14.503	3.752	7.111	5.643	1.021
	(2.703)*	(9.338)	(5.891)	(2.756)***	(11.560)	(.313)***
N	926	926	926	926	926	926
r^2	.345	.343	.329	.328	.328	.326
Primary	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.00003	-.0002	.00004	.0003	-.0002	
	(.0003)	(.001)	(.0003)	(.00009)***	(.0005)	
(Population)^2	-1.74e-09	-3.72e-09	-2.01e-09			
	(2.41e-09)	(8.09e-09)	(1.32e-09)			
Certification Dummy	384.255	393.053	411.080	430.392	421.215	385.288
	(224.640)*	(195.082)**	(129.858)***	(140.581)***	(134.838)***	(98.638)***
Population*Certification	.0007	.0009		-.0008		
	(.004)	(.004)		(.0009)		
(Population)^2*Certification	-2.12e-09					
	(9.02e-09)					
Constant	18.093	11.287	20.378	24.101	-11.655	3.597
	(11.908)	(29.054)	(20.703)	(8.328)***	(39.400)	(.982)***
N	926	926	926	926	926	926
r^2	.353	.353	.352	.349	.34	.338
Lower Secondary	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.001	.0001	.00007	.0003	-.00009	
	(.0008)*	(.0006)	(.0002)	(.0001)**	(.0003)	
(Population)^2	7.54e-09	-9.43e-10	-1.46e-09			
	(5.30e-09)	(4.46e-09)	(7.77e-10)*			
Certification Dummy	205.621	243.404	237.957	252.869	245.341	227.293
	(124.701)*	(109.474)**	(83.986)***	(90.185)***	(87.518)***	(60.308)***
Population*Certification	-.001	-.0003		-.0007		
	(.002)	(.002)		(.0005)		
(Population)^2*Certification	-9.12e-09					
	(7.12e-09)					
Constant	61.207	31.976	29.229	35.224	5.892	13.553
	(26.322)**	(19.670)*	(13.784)**	(11.493)***	(21.237)	(1.538)***
N	926	926	926	926	926	926
r^2	.246	.244	.243	.243	.231	.23

Table 10 Continued...

Upper Secondary	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.0002	-.0002	.00009	.00006	.00009	
	(.0002)	(.0002)	(.0001)	(.00003)*	(.0002)	
(Population)^2	1.14e-09	-1.75e-09	-3.58e-11			
	(1.15e-09)	(1.84e-09)	(5.50e-10)			
Certification Dummy	22.651	35.532	53.599	53.139	53.780	71.158
	(44.904)	(38.669)	(26.543)**	(30.100)*	(28.038)*	(25.803)***
Population*Certification	.0006	.0009		.00006		
	(.0009)	(.001)		(.0003)		
(Population)^2*Certification	-3.11e-09					
	(2.27e-09)					
Constant	10.990	1.024	10.136	7.067	9.565	2.188
	(5.847)*	(7.027)	(5.398)*	(2.808)**	(12.413)	(.334)***
N	926	926	926	926	926	926
r^2	.215	.213	.199	.199	.199	.192
Total	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.001	.0001	.0002	.0007	-.0001	
	(.001)	(.002)	(.0006)	(.0002)***	(.0008)	
(Population)^2	6.14e-09	-4.27e-09	-3.38e-09			
	(7.20e-09)	(1.46e-08)	(2.29e-09)			
Certification Dummy	744.307	790.650	799.980	833.522	817.080	791.372
	(393.14)*	(343.34)**	(243.16)***	(262.16)***	(252.49)***	(176.074)***
Population*Certification	-.0006	.0004		-.002		
	(.006)	(.008)		(.001)		
(Population)^2*Certification	-1.12e-08					
	(1.72e-08)					
Constant	94.644	58.790	63.495	73.503	9.445	20.359
	(35.790)***	(54.043)	(36.250)*	(19.376)***	(64.172)	(2.391)***
N	926	926	926	926	926	926
r^2	.393	.392	.392	.391	.383	.383

Note.– Estimates of the certification dummy's coefficient (θ) and the polynomial's coefficients. Robust standard errors are in parentheses. The dependent variable is the number of subsidized pupils enroled in the corresponding school level. Population is the number of inhabitants of municipalities in 2001. Municipalities in Antioquia are excluded from estimations.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 11: Difference between Certified and Non-Certified Municipalities in the Number of Subsidized Pupils in Private Schools, 2003 - 2006

School Level	2003	2004	2005	2006
Pre-primary	17.285	36.592	97.121	100.793
	(14.556)	(22.753)*	(47.413)**	(57.883)*
Primary	92.795	184.516	430.392	358.856
	(64.651)	(78.308)**	(140.581)***	(150.958)**
Lower Secondary	67.102	159.391	252.869	231.059
	(62.045)	(74.196)**	(90.185)***	(96.451)**
Upper Secondary	16.766	33.008	53.139	65.805
	(23.699)	(24.088)	(30.100)*	(26.467)**
Total	193.948	413.507	833.522	756.513
	(160.827)	(176.640)**	(262.165)***	(272.388)***

Note.– Estimates of the certification dummy's coefficient (θ) of Model 4 in Table 10 for each school level. Robust standard errors are in parentheses. The dependent variable is the number of subsidized pupils enroled in the corresponding school level. Municipalities in Antioquia are excluded from estimations.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 12: Difference between Certified and Non-Certified Municipalities in the Number of Subsidized Pupils in Private Schools (Small Sample)

School Level	2003	2004	2005	2006
Pre-primary	13.310	29.774	106.543	96.867
	(15.167)	(24.137)	(51.362)**	(63.296)
Primary	67.012	120.033	406.53	339.11
	(68.197)	(94.579)	(152.20)***	(156.95)**
Lower Secondary	65.844	92.156	228.431	208.547
	(68.029)	(87.852)	(93.112)**	(100.531)**
Upper Secondary	21.668	14.695	50.810	56.598
	(24.540)	(25.138)	(28.929)*	(28.094)**
Total	167.833	256.658	792.321	701.125
	(174.719)	(209.230)	(277.56)***	(282.32)**

Note.– Estimation sample includes all municipalities with population between 20 thousand inhabitants and 180000 thousand inhabitants in 2001 except for those municipalities in Antioquia in the interval. Estimates of the certification dummy's coefficient (θ) of Model 4 in Table 10 for each school level. Robust standard errors are in parentheses. The dependent variable is the number of subsidized pupils enroled in the corresponding school level.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 13: Difference between Certified and Non-Certified Municipalities in the Number of Subsidized Pupils in Private Schools, 2005 (Different Samples)

School Level	(1)	(2)	(3)	(4)
Pre-primary	111.399	97.121	125.084	106.543
	(47.050)**	(47.413)**	(50.537)**	(51.362)**
Primary	410.881	430.392	393.400	406.537
	(158.888)***	(140.581)***	(179.579)**	(152.205)***
Lower Secondary	198.805	252.869	181.158	228.431
	(84.352)**	(90.185)***	(89.271)**	(93.112)**
Upper Secondary	47.897	53.139	45.004	50.810
	(29.013)*	(30.100)*	(27.338)*	(28.929)*
Total	768.983	833.522	744.646	792.321
	(261.062)***	(262.165)***	(287.435)***	(277.561)***
N	1044	926	355	310

Note.– Estimates of the certification dummy's coefficient (θ) of Model 4 in Table 10 for each school level. Robust standard errors are in parentheses. The dependent variable is the number of subsidized pupils enroled in the corresponding school level. Results in Column (1) are obtained with the full sample. Results in Column (2) are obtained with the full sample excluding the municipalities in Antioquia. Results in Column (3) are obtained with the sample of all municipalities with population between 20 thousand inhabitants and 180000 thousand inhabitants in 2001. Results in Column (4) are obtained excluding those municipalities in Antioquia from the sample of Column (3).

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 14: Difference between Certified and Non-Certified Municipalities in the Increase of Pupils between 2000 and 2001

		Model 1	Model 2	Model 3	Model 4	Model 5
Public Schools	Pre-primary	105.711	93.515	79.909	78.167	74.263
		(78.306)	(79.582)	(71.284)	(65.188)	(68.850)
	Primary	304.311	298.008	254.467	220.267	21.068
		(362.763)	(378.430)	(325.798)	(300.444)	(320.314)
	Lower Secondary	79.394	-.451	30.856	129.253	92.561
		(228.458)	(239.056)	(206.020)	(185.537)	(202.370)
	Upper Secondary	-82.509	-128.847	-96.690	-26.826	-25.684
		(85.456)	(87.832)	(69.840)	(63.137)	(78.325)
	Total	406.907	262.225	268.541	400.861	162.208
		(639.074)	(664.315)	(586.200)	(544.130)	(588.307)
Private Schools	Pre-primary	2.892	4.105	-12.561	-10.445	-17.624
		(73.808)	(58.076)	(58.272)	(57.402)	(55.220)
	Primary	-379.555	-30.568	-41.568	-21.980	-75.441
		(374.223)	(373.850)	(255.067)	(264.862)	(231.500)
	Lower Secundary	48.808	-112.838	-209.858	-206.349	-205.376
		(247.953)	(161.965)	(186.723)	(184.161)	(182.404)
	Upper Secondary	89.469	-43.512	-126.811	-123.494	-130.284
		(134.792)	(79.179)	(90.621)	(87.882)	(88.738)
	Total	-238.386	-182.814	-390.798	-362.267	-428.724
		(642.812)	(501.783)	(431.280)	(431.200)	(409.988)

Note.– Estimates of the certification dummy's coefficient (θ) of Models 1 - 5 in Table 10. Robust standard errors are in parentheses. The dependent variable is the difference between 2001 and 2000 in the number of pupils enroled in the corresponding school level.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 15: Tuition Fees Difference between Certified and Non-Certified Municipalities

	2000	2001	2002	2003	2004	2005	2006
Public Schools	-0.07472	0.117173	0.222518	0.337281	-0.25331	0.103325	0.210001
	(0.286374)	(0.30916)	(0.300375)	(0.357833)	(0.35281)	(0.3008)	(0.2901)
Private Schools	0.069669	0.026087	-0.11612	-0.32477	0.935683	0.415024	-0.04963
	(0.691119)	(0.817843)	(0.801712)	(0.826128)	(1.028172)	(1.08488)	(1.104675)

Note.– Estimates of the certification dummy's coefficient (θ) using the quadratic polynomial with interactions (Equation (1) in the text). Robust standard errors are in parentheses. The dependent variable is the average tuition fees paid by senior students in the municipality.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 16: Difference between Certified and Non-Certified Municipalities in the number of inhabitants of school age

Age	2000	2001	2002	2003	2004	2005
6 years	-93.643	-111.384	-119.744	-127.576	-136.076	-136.923
	(150.180)	(164.377)	(172.627)	(181.877)	(191.780)	(196.998)
7-11 years	-52.662	-67.323	-112.068	-169.751	-224.649	-311.407
	(547.474)	(561.923)	(613.925)	(673.385)	(740.657)	(825.982)
12-15 years	383.115	370.507	336.057	302.574	273.009	241.603
	(302.155)	(316.782)	(330.585)	(351.670)	(378.522)	(419.446)
16-17 years	73.074	70.049	64.924	59.037	54.808	49.775
	(147.314)	(145.030)	(144.190)	(145.669)	(149.149)	(154.212)
6-17 years	309.473	261.929	169.190	63.675	-32.719	-156.991
	(1021.400)	(1070.724)	(1143.833)	(1234.431)	(1340.891)	(1474.480)

Note.– Estimates of the certification dummy's coefficient (θ) using the quadratic polynomial with interactions (Equation (1) in the text). Robust standard errors are in parentheses. The dependent variable is the number of inhabitants of school age. Each age range correspond to each school level in the study, as follows: 6 year olds (pupils in pre-primary), 7-11 year olds (pupils in primary), 12-15 year olds (pupils in lower secondary), 16-17 year olds (pupils in upper secondary) and 6-17 year olds (pupils in pre-college school).

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 17: Controls on the Subsidized-Pupils Difference between Certified and Non-Certified Municipalities for Pre-College School, 2005

Poverty Variables	(1)	(2)	(3)	(4)	(5)	(6)
Certification Dummy	833.52	804.95	804.66	810.32	819.21	818.43
	(262.16)***	(248.86)***	(248.66)***	(241.62)***	(248.83)***	(240.26)***
Proportion of Poor (%)			-.181			
			(.315)			
Welfare - Level 1				-.005		
				(.002)**		
Welfare - Level 2					.004	
					(.004)	
Welfare - Level 3						.015
						(.006)**
Department Dummies	NO	YES	YES	YES	YES	YES
N	926	926	926	926	926	926
r^2	.391	.459	.459	.485	.464	.492

Table 17 Continued...

Municipal Budget	(1)	(2)	(3)	(4)	(5)	(6)
Certification Dummy	802.35 (248.65)***	802.38 (248.69)***	792.32 (249.77)***	802.25 (248.68)***	807.29 (249.68)***	794.39 (232.77)***
Tax Income per capita	.0007 (.0009)					
Industry-Commerce Tax per capita		.001 (.001)				
Education Spending per capita			.001 (.0006)*			
Transfers per capita				.00002 (1.00e-05)*		
Transfer Dependence					-.192 (.228)	
Tuition fee						-5.659 (9.307)
Department Dummies	YES	YES	YES	YES	YES	YES
N	911	911	909	911	916	282
r^2	.461	.461	.474	.461	.461	.498
Other Municipal Variables	(1)	(2)	(3)	(4)	(5)	(6)
Certification Dummy	805.16 (250.32)***	792.67 (249.84)***	802.33 (248.65)***	790.53 (248.03)***	792.35 (250.03)***	790.37 (250.03)***
Bankrupt Dummy	-30.618 (38.036)					
Investment per capita		.00003 (.00003)				
Current Spending per capita			.0002 (.0001)			
Health Spending				-.059 (.297)		
Recreation Spending					.298 (1.986)	
Housing Spending						-1.566 (1.347)
Department Dummies	YES	YES	YES	YES	YES	YES
N	924	909	911	914	914	914
r^2	.462	.474	.461	.473	.473	.473
Education Spending	(1)	(2)	(3)	(4)	(5)	(6)
Certification Dummy	797.00 (250.03)***	791.25 (250.30)***	789.42 (249.79)***	792.37 (250.05)***	792.85 (249.81)***	792.83 (249.87)***
New Infrastructure (-1)	.249 (.173)					
Maintenance (-1)		-.267 (.225)				
Materials (-1)			.448 (.409)			
Teachers Training (-1)				-.141 (.782)		
Non-Earmarked Transfers per capita					.008 (.006)	
Own resources per capita						.021 (.020)
Dept. Dummy	YES	YES	YES	YES	YES	YES
N	913	913	913	913	909	909
r^2	.474	.474	.474	.473	.474	.474

Table 17 Continued...

Conflict	(1)	(2)	(3)	(4)	(5)	(6)
Certification Dummy	805.46 (248.76)***	805.40 (248.75)***	801.77 (247.54)***	801.00 (244.57)***	802.85 (249.14)***	798.82 (243.72)***
Expelled Population	.008 (.071)					
Received Population		-.082 (.090)				
Killings			-1.600 (1.396)			
Guerrilla Attacks				-8.182 (4.113)**		
Paramilitary Attacks					-5.247 (7.181)	
Illegal Armies Attacks						-8.362 (3.873)**
Department Dummies	YES	YES	YES	YES	YES	YES
N	921	921	926	926	926	926
r^2	.46	.46	.461	.468	.459	.47

Elections	(1)	(2)	(3)	(4)	(5)
Certification Dummy	718.85 (235.90)***	722.53 (235.23)***	722.02 (235.19)***	720.64 (235.30)***	725.72 (234.85)***
Same-Party Dummy	21.739 (20.918)				
Liberal-Party Dummy		7.406 (12.889)			
Conservative-Party Dummy			-2.212 (6.479)		
Winning Percentage				.236 (.419)	
Voter Turnout					-.585 (.460)
Department Dummies	YES	YES	YES	YES	YES
N	776	776	776	776	776
r^2	.44	.439	.439	.439	.439

Note.– Estimates of Model 4 in Table 10. Robust standard errors are in parentheses. The dependent variable is the number of subsidized pupils enroled in private schools in the pre-college level. The proportion of poor corresponds to data of 1993. Welfare (levels 1-3) is measured as the number of targeted persons in each level per 1000 inhabitants in 2004. Tax income per capita, Tax on Industry and Commerce per capita, Education Spending per capita, Transfers per capita, Investment per capita and Current Spending per capita are variables of the municipal budget. All of them are measured in thousand pesos per inhabitant (constant prices of 2004). Education Spending per capita is the money spent by the municipal government in education. Transfers per capita and Transfer dependence includes both National and Department transfers. Tuition fees in the average tuition fee paid by senior students. The bankrupt dummy takes value 1 if the municipality is under the bankrupt law. Health, recreation and housing spending are the proportions that the municipality spends on these expenditures. New infrastructure, maintenance of infrastructure, material and equipment and teachers training are the (lagged) proportions of investment spent on these expenditures. Non-earmarked transfers per capita and own resources per capita correspond to those spent on education. They are also measured in thousand pesos per inhabitant (constant prices of 2004). Expelled Population and Received Population measure forcibly displaces population and measured as the number of persons per 1000 inhabitants. Killings is the number of killings than can be attributed to the illegal armies. Guerrilla attacks is the number of attacks and combats in which the guerrilla has participated. Paramilitary attacks is the number of attacks and combats in which the paramilitary has participated. Illegal armies attacks is the sum of the guerrilla and paramilitary attacks. Same-party dummy takes value one if the mayor and the corresponding governor belong to the same party. Winning percentage is the percentage of votes obtained by the winner. Voter turnout is the percentage of eligible voters who cast a ballot in an election.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 18: Difference between Certified and Non-Certified Municipalities in the Number of Subsidized Pupils in Private Schools using the pooled sample (2003 - 2006)

Pre-primary	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.00008	.0002	.0001	.0001	.00008	
	(.0001)	(.0002)	(.00006)*	(.00004)***	(.00009)	
(Population)^2	-5.32e-10	7.55e-10	-1.49e-10			
	(1.08e-09)	(1.47e-09)	(3.13e-10)			
Certification Dummy	75.270	69.868	60.326	62.195	61.291	77.030
	(43.427)*	(38.655)*	(27.730)**	(29.938)**	(28.893)**	(17.886)***
Population*Certification	-.0003	-.0005		-.0001		
	(.0006)	(.0008)		(.0002)		
(Population)^2*Certification	1.37e-09					
	(1.89e-09)					
Constant	11.415	15.663	10.816	13.170	8.368	1.767
	(5.090)**	(5.957)***	(4.527)**	(3.395)***	(7.130)	(.364)***
N	3213	3213	3213	3213	3213	3213
r^2	.191	.19	.187	.188	.186	.182
Primary	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.0006	.0004	.0003	.0005	.00009	
	(.0006)	(.0006)	(.0002)	(.0001)***	(.0003)	
(Population)^2	7.58e-10	-1.32e-09	-1.70e-09			
	(4.42e-09)	(4.94e-09)	(9.49e-10)*			
Certification Dummy	242.267	251.003	246.996	264.441	257.989	275.934
	(137.694)*	(120.838)**	(86.261)***	(93.005)***	(90.384)***	(63.656)***
Population*Certification	-.0004	-.0002		-.0008		
	(.002)	(.003)		(.0006)		
(Population)^2*Certification	-2.22e-09					
	(6.88e-09)					
Constant	50.490	43.622	41.586	47.987	13.704	6.177
	(22.088)**	(19.455)**	(15.015)***	(10.142)***	(25.840)	(.972)***
N	3213	3213	3213	3213	3213	3213
r^2	.251	.251	.251	.25	.24	.239
Lower Secondary	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.0007	.0004	.0002	.0004	-.00003	
	(.0007)	(.0004)	(.0001)	(.0001)***	(.0002)	
(Population)^2	2.46e-09	-1.35e-10	-1.68e-09			
	(4.75e-09)	(3.19e-09)	(5.67e-10)***			
Certification Dummy	161.643	172.551	156.226	173.918	167.089	161.009
	(103.154)*	(91.949)*	(69.899)**	(74.564)**	(73.203)**	(45.478)***
Population*Certification	-.001	-.0008		-.0008		
	(.002)	(.002)		(.0003)**		
(Population)^2*Certification	-2.77e-09					
	(5.84e-09)					
Constant	55.918	47.342	39.049	47.786	11.496	14.047
	(22.036)**	(15.408)***	(12.052)***	(10.894)***	(15.949)	(1.431)***
N	3213	3213	3213	3213	3213	3213
r^2	.142	.142	.141	.142	.124	.124

Table 18 Continued...

Upper Secondary	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.00006 (.00009)	-.00005 (.0001)	.00007 (.00005)	.00008 (.00002)***	.00004 (.00008)	
(Population)^2	-1.58e-10 (7.26e-10)	-1.08e-09 (1.17e-09)	-2.61e-10 (2.44e-10)			
Certification Dummy	26.421 (34.347)	30.298 (30.675)	38.954 (22.190)*	41.290 (24.108)*	40.640 (23.329)*	48.531 (15.973)***
Population*Certification	.0003 (.0005)	.0004 (.0006)		-.00008 (.0001)		
(Population)^2*Certification	-9.85e-10 (1.44e-09)					
Constant	8.680 (3.156)***	5.631 (4.373)	10.028 (3.507)***	9.201 (2.094)***	5.751 (6.444)	2.442 (.287)***
N	3213	3213	3213	3213	3213	3213
r^2	.15	.15	.145	.142	.14	.138
Total	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	.001 (.001)	.0009 (.001)	.0006 (.0004)*	.001 (.0003)***	.0002 (.0006)	
(Population)^2	2.53e-09 (9.61e-09)	-1.78e-09 (9.33e-09)	-3.79e-09 (1.66e-09)**			
Certification Dummy	505.601 (274.859)*	523.720 (243.437)**	502.503 (179.307)***	541.843 (192.267)***	527.010 (187.701)***	562.503 (121.094)***
Population*Certification	-.001 (.004)	-.001 (.005)		-.002 (.001)*		
(Population)^2*Certification	-4.60e-09 (1.38e-08)					
Constant	126.503 (46.767)***	112.257 (38.642)***	101.479 (29.213)***	118.144 (22.474)***	39.320 (45.143)	24.432 (2.449)***
N	3213	3213	3213	3213	3213	3213
r^2	.261	.261	.261	.261	.247	.247

Note.– Estimates of the certification dummy's coefficient (θ) and polynomial's coefficients of Models 1-6 in Table 10 for each school level pooling the sample. Clustered standard errors are in parentheses. The dependent variable is the number of subsidized pupils enroled in the corresponding school level in each year of the study.

* Denotes significance at 10%, two tailed tests.
** Denotes significance at 5%, two tailed tests.
*** Denotes significance at 1%, two tailed tests.

Table 19: Robust Confidence Intervals

	School Level	Level of Significance	Confidence	Interval
Identical Specification Error	Pre-primary	95	3.440048	120.9493
	Primary	95	81.91736	446.9644
	Lower Secondary	95	27.58499	320.2517
	Upper Secondary	95	-6.023275	88.60228
	Total	95	164.5166	919.1702
Independent Specification Error	Pre-primary	90	3.5693225	120.82
		95	-7.4451348	131.83445
		99	-29.474049	153.86337
	Primary	90	67.549263	461.33253
		95	30.557502	498.32429
		99	-43.426021	572.30781
	Lower Secondary	90	10.247198	337.58948
		95	-20.503137	368.33982
		99	-82.003808	429.84049
	Upper Secondary	90	-11.083187	93.662193
		95	-20.922904	103.50191
		99	-40.60234	123.18135
	Total	90	138.38983	945.29697
		95	62.589459	1021.0973
		99	-89.011277	1172.6981

Note.– The confidence intervals are calculated following the procedure that appears in Lee and Card (2006).

Figure 1: Overall Enrolment (Number of Pupils)

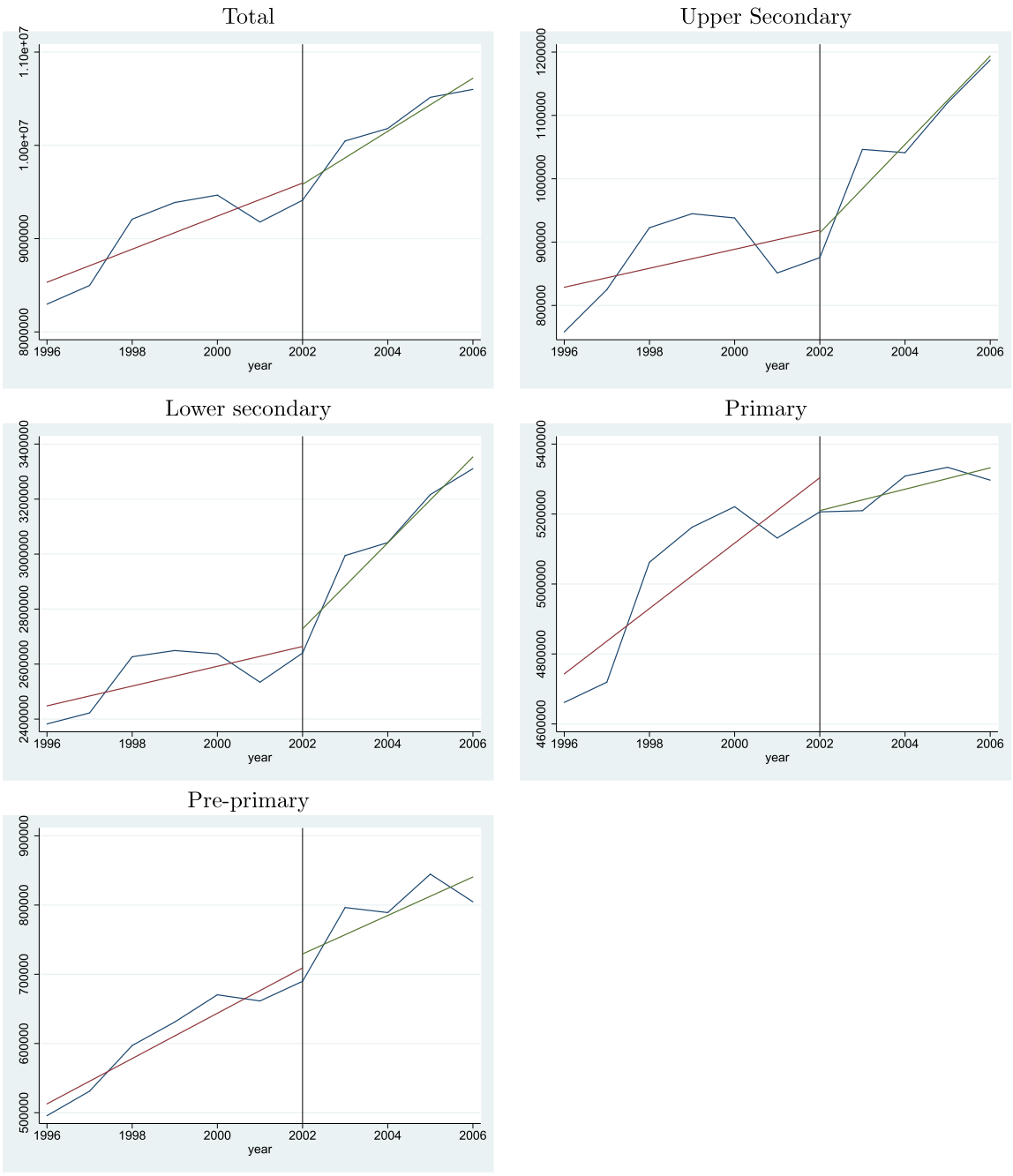


Figure 2: Gross Enrolment Rate (%)

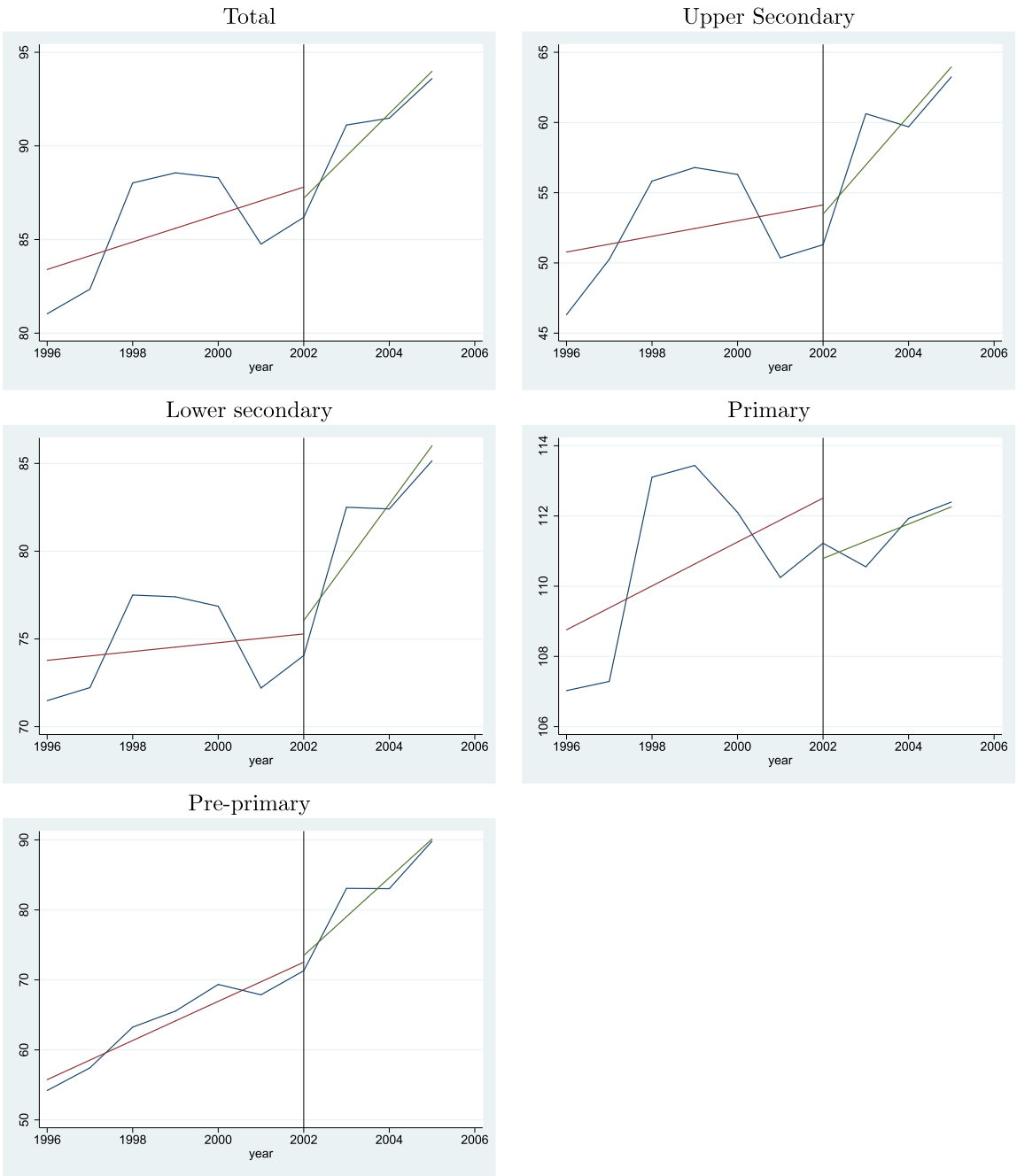
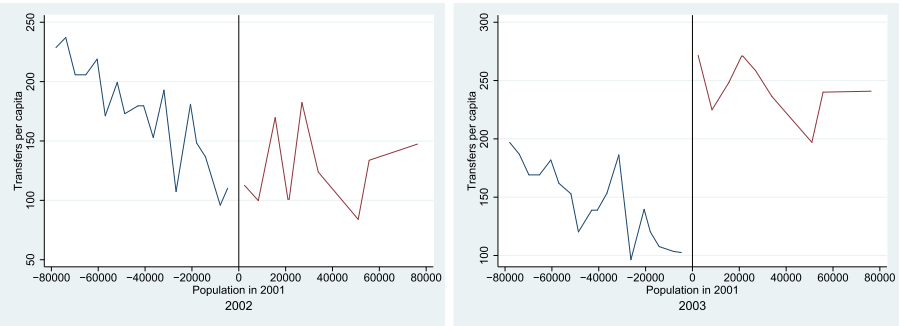


Figure 3: Transfers to municipalities per capita



Note.– Transfers per capita are measured in thousand pesos per inhabitant (constant prices of 2004). It includes both National and Department transfers to municipalities.

Figure 4: Increase of the Number of Pupils in Public Schools Compared to 2001

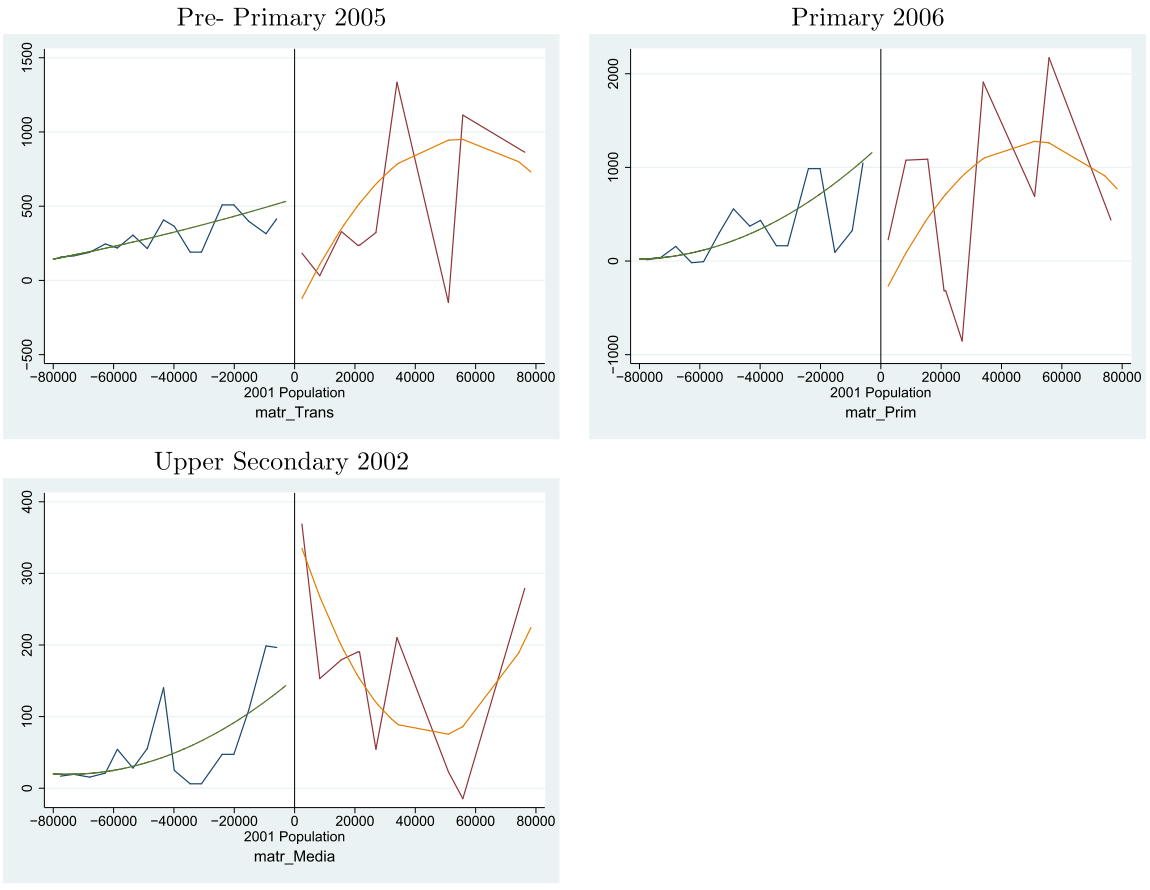
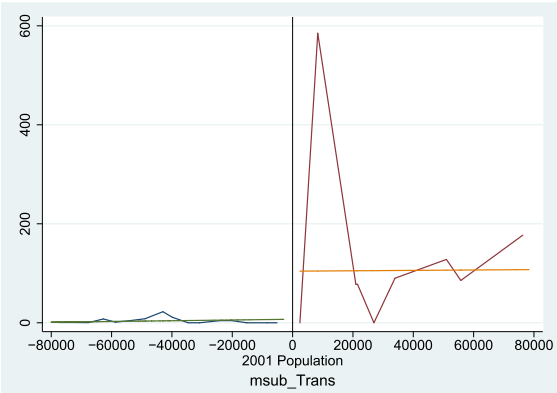
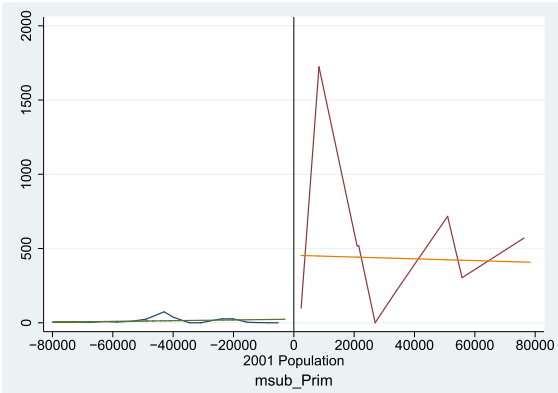


Figure 5: Number of Subsidized Pupils in Private Schools by school level, 2005

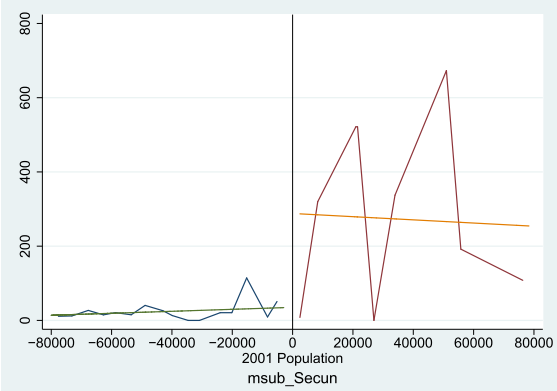
Pre-primary



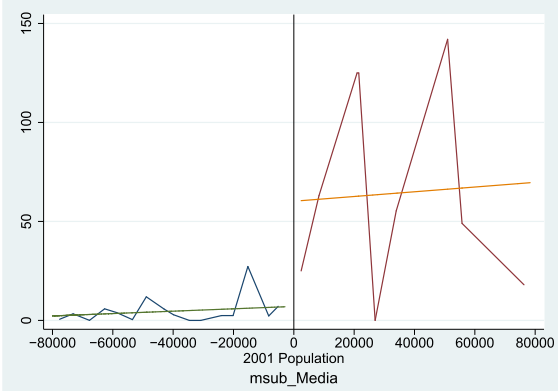
Primary



Lower Secondary



Upper Secondary



Total

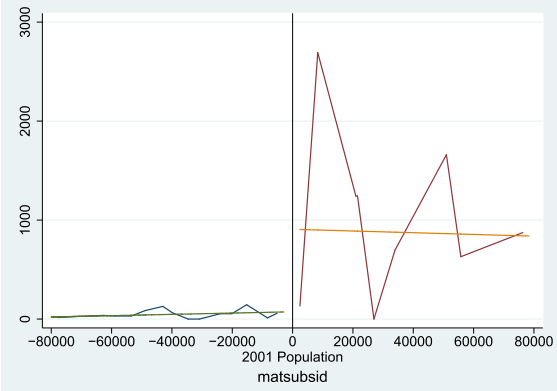
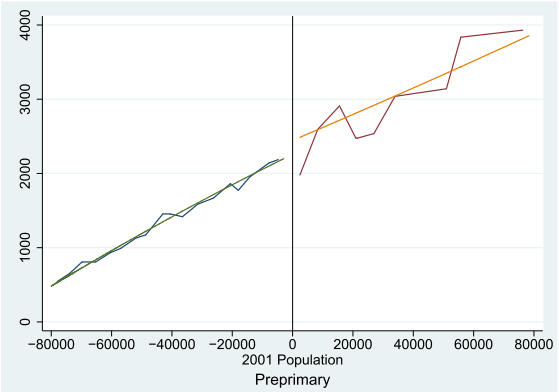
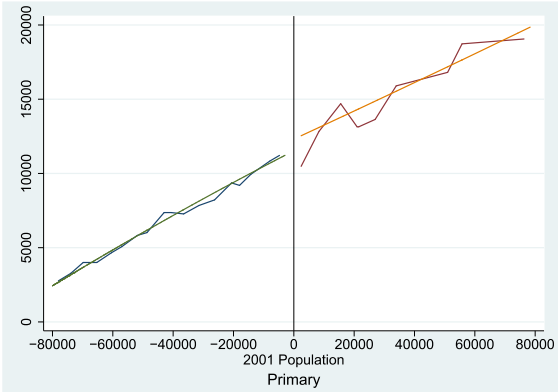


Figure 6: Population of School Age in 2005

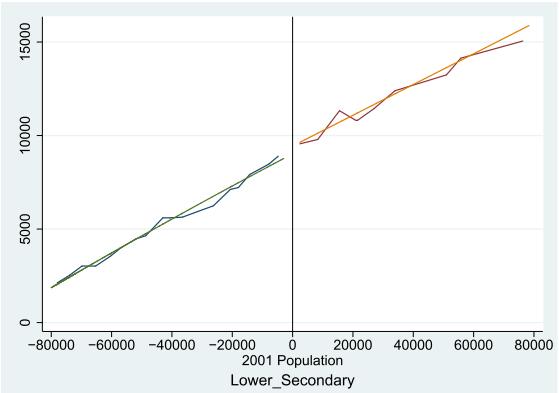
6 year olds (pre-primary)



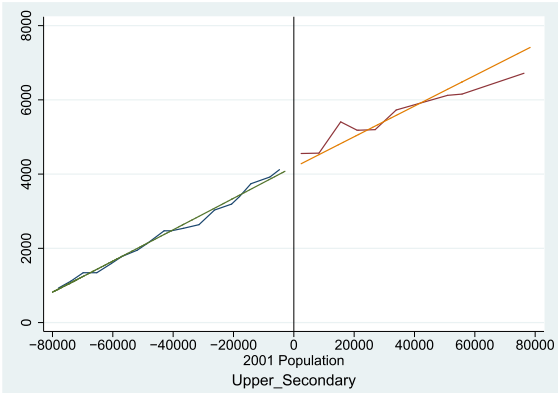
7-11 year olds (primary)



12-15 year olds (lower secondary)



16-17 year olds (upper secondary)



6-17 year olds (pre-college)