Online Appendix for the paper "The Impact of Intergovernmental Transfers on Education Outcomes and Poverty Reduction"

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1 Impacts on spending shares

Figure 2 documents the impacts of additional FPM funding on total spending per capita as well as on the main local expenditure categories: education, housing and urban infrastructure, and transportation. There is clear evidence of a jump of about 20% at the cutoff in all of these variables, although the jumps in expenditure categories are somewhat sensitive to the width of the neighborhood examined. The regression lines also slope downward almost without exception, which is further evidence favoring the validity of the design. The spending category graphs are considerably noisier than the total spending graph because the sample size is smaller (due to missing values) and because the expenditure categories are only available for the years 1982 and 1983, whereas total spending is reported over the entire period 1982 to 1985. Nevertheless, the jumps in the expenditure categories are also statistically significant as shown in Table 2. This evidence thus suggests that local spending on education, housing and urban infrastructure, and transportation all increased by about 20% per capita, leaving local spending shares essentially unchanged.[1]

2 Impacts on direct public service measures

The public service indicators we consider are dictated by data availability. They are measured in 1991, the earliest posttreatment year for which comprehensive data on municipalities are available. The indicators are supposed to capture improvements in the main spending areas of education as well as housing and urban infrastructure. Unfortunately we do not have any indicators on local transportation services or infrastructure.

In the area of education, we use the primary school teacher-student ratio in municipal elementary schools and the number of schools run by the municipal government. It is easy to see how extra spending over the period 1982-1985 might affect the number of schools six years later in 1991. Effects on teacher-student ratios in 1991 might arise if the extra spending on education was in fact smoothed over subsequent years or if additional teachers could not easily be dismissed once the funding differential stopped. Public service measures in the area of housing and urban infrastructure are the percentages of individuals in the municipality with access to water, sewer,

[1] To be precise, the null hypothesis of a proportional, 20 percent per capita increase cannot be rejected in any of the specifications.

electricity and living in substandard housing.

Table 3 shows effects on the primary school teacher-student ratio. Estimates are reasonably close across samples and suggest that the teacher-student ratio increased by about .01, or one teacher per hundred students. This compares to an average teacher-student ratio in the marginal comparison group of about .05. The implied average class-size reduction at the primary school level amounts to about 3 students per teacher. In contrast, results on municipal elementary schools (not shown) display no clear patterns and are imprecisely estimated, suggesting that transfers financed mostly more labor input as opposed to school infrastructure.

Housing and urban infrastructure measures do not indicate much evidence of public service improvements. Although the estimates go almost all in the right direction (positive for access to electricity, water and sewer; negative for inadequate housing) they are very variable and only rarely statistically significant. Rather than showing separate tables with mostly insignificant results, we present the school and infrastructure estimates below when we test the joint significance of all the outcome variables. Figure 3 shows the results for the teacher-student ratio, elementary schools, and water and electricity access graphically (the graphs for sewer and inadequate housing look very similar to the electricity graph). Direct evidence on public service improvements is thus mixed at best: while there is evidence that student-teacher ratios in local primary school systems fell, there is little evidence that housing and urban development spending affected housing conditions.

3 Further robustness checks

This section provides further robustness checks regarding functional form of both the running variable (population) and of pretreatment covariates, as well estimates using the change in average schooling and literacy outcomes over time, rather than the 1991 levels. The corresponding difference estimates are also presented for cohorts that had largely completed their education when the extra funding started in 1982 and for whom one would expect smaller or no impacts. A final robustness check on education outcomes uses only the subsample of individuals who were born in the municipality and never moved away. All the previously discussed results turn out to be robust to these additional tests. To conclude this section, we test and reject the joint null hypotheses of no discontinuities in any outcome variable, suggesting that at least some of the impacts above are

real. This section starts out with robustness checks for schooling (3.1), followed by literacy (3.2), and poverty (3.3), and concludes with the joint test (3.4).

3.1 Schooling

Table 5.1 presents pooled estimates across cutoffs c_1 and c_2, as well as c_1, c_2 and c_3 for the older cohorts of 19- to 28-year-olds in 1991 and for the three previously used bandwidths ($p = 2\%$, 3% and 4%). For each bandwidth, Table 5.1 has 3 columns, corresponding to the following specifications: first, linear population polynomial with pretreatment covariates as in Table 5 of the paper but now including average years of schooling of the 8- to 17-year-olds in 1980 (19- to 28-year-olds in 1991) based on the 1980 census microdata as an additional control; second, quadratic population polynomial without covariates; and third, linear population polynomial with a quadratic specification of the pretreatment covariates. The corresponding results for the younger cohort of 9- to 18-year-olds in 1991 are presented in Table 6.1.

All estimates in Table 5.1 are positive and most of them fall in the 0.2 to 0.3 range, the same result encountered in Table 5 of the paper for the specifications with covariates. And as before, these estimates become statistically significant (at 5%) even within a relatively small neighborhood of +/- 3% around the cutoffs. Table 5.1 also gives results of three hypothesis tests, one for each of the three specifications discussed above. The first is a t-test of the hypothesis that the coefficient on the pretreatment outcome is equal to one, as imposed in the first-difference specification further discussed below. This null hypothesis is never rejected across bandwidths and cutoffs (the lowest p-value 0.15). The second test investigates the joint hypotheses that the coefficients on the quadratic population terms on either side of the cutoff are zero, that is, whether linearity of the population polynomial can be rejected. As expected, there is no statistical evidence against linearity close to the cutoff ($p = 2\%$ and 3%), although for the $p = 4\%$ bandwidth linearity is clearly rejected. The third is an F-test for the joint hypotheses that the coefficients on the quadratics in covariates are all zero. It turns out that the statistical evidence against including covariates linearly is weak across bandwidths and cutoffs.

Estimates of the schooling gains for the 9- to 18-year-old cohort in 1991 based on the same specifications as above are presented in Table 6.1. The only difference with the above specifications

is that pretreatment average schooling for this cohort (0- to 7-year-olds in 1980) is not included since the census only collects schooling information for those aged 5 or above. As in Table 6, the discontinuity estimates fluctuate around 0.15 years per capita, again statistically significant even in the narrow samples around the cutoffs. Again there is no statistical evidence against linearity of the population polynomial close to the cutoff ($p = 2\%$ and 3%) and only weak statistical evidence against including covariates linearly.

Table 5.2 presents estimates where the dependent variable is the change in average years of schooling between 1991 and 1980 of the older cohorts (19- to 28-year-olds in 1991). This approach imposes a coefficient of one on initial schooling of this cohort, rather than allowing the coefficient to be estimated as in Table 5.1 above. For each bandwidth, Table 5.2 has 3 columns, corresponding to the following specifications: first, linear population polynomial without covariates; second, quadratic population polynomial without covariates; and third, linear population polynomial with covariates. Again, all estimates in Table 5.2 are positive, most of them fall in the 0.2 to 0.3 range and they become statistically significant even within a relatively small neighborhood of +/- 3% around the cutoffs.

In contrast, the corresponding estimates based on changes in average schooling for those 25 years and older in 1980—typically considered to have completed most of their schooling—are close to zero in magnitude (sometimes negative) and very far from statistical significance as shown in Table 5.3. These estimates are for the exact same cohorts for which Table 3 in the paper shows a positive schooling differential before the extra funding had started. While it is reassuring that these older cohorts did not experience any schooling gains, strictly speaking this is not a falsification test. Although one would expect smaller effects on education outcomes for cohorts that were beyond regular elementary schooling age, the effect need not be zero since older cohorts might have attended adult literacy programs that were promoted by the military government and offered through the local administration, such as the MOBRAL (Movimento Brasileiro de Alfabetização). In fact the difference in average years of schooling of these cohorts in the comparison group is about 0.32, on average (Table 5.3). This would be consistent with roughly one out of three individuals among those 25 years and older getting an extra year of schooling over the eleven-year-period from 1980 to 1991.

As a final robustness check, we also estimate the impact on schooling for the 19- to 28-year-olds in 1991 on a restricted sample of individuals who were born in a given municipality and never moved away. The results are shown in Table 5.4 and are again quantitatively close to those from the unrestricted sample. This provides suggestive evidence that the schooling gains stem at least partly from existing residents, rather than being driven by inmigration of more highly educated individuals in response to public service improvements. The results are only suggestive, however, because there could be selective attrition among nonmigrants across treatment and comparison communities. In particular, more educated individuals might be more likely to stay in the municipality in response to public service improvements.

3.2 Literacy

Table 7.1 presents robustness checks for literacy outcomes of the 19- to 28-year-olds in 1991 using the same specifications as in Tables 5.1 and 6.1 above. As in Table 7 in the paper, the estimates in Table 7.1 suggest a literacy gain of about four percentage points throughout, significant even in the +/- 2% window around the cutoffs. The hypothesis that the coefficient on the pretreatment outcome is equal to one is soundly rejected across bandwidths and cutoffs (p-values of 0.00), although this turns out not to matter at all for the estimate of interest. Again as expected, there is no statistical evidence against linearity of the population polynomial close to the cutoff ($p = 2\%$ and 3%) although for the p=4% bandwidth linearity is again rejected. There is also only weak statistical evidence across bandwidths and cutoffs against including covariates linearly.

Estimates of the literacy gains for the 9- to 18-year-old cohort in 1991 are presented in Table 7.2. Table 7.3 presents robustness checks. Estimated impacts are mostly around two to three percentage points, again statistically significant even in the discontinuity samples. As in Table 7.1, Table 7.3 shows no statistical evidence against linearity of the population polynomial close to the cutoff and strong evidence against including covariates linearly across bandwidths and cutoffs.

Table 7.4 presents estimates where the dependent variable is the difference in literacy rates between 1991 and 1980 of the older cohorts (19- to 28-year-olds in 1991). Compared to the estimates of about four percentage points in Tables 7 and 7.1, those in Table 7.4 suggest a slightly lower literacy gain of about three percentage points, again statistically significant even within a

relatively small neighborhood of +/- 3% around the cutoffs.

Table 7.5 presents the final robustness check for the literacy gains of the 19- to 28-year-olds in 1991 based on the subsample of individuals who were born in a given municipality and never moved away. The results are again quantitatively close to those from the unrestricted sample.

3.3 Poverty

Table 8.1 presents robustness checks for the poverty rate using the same specifications as in Table 5.1 above. As in Table 8 in the paper, the estimates in Table 8.1 suggest a poverty reduction of about four to five percentage points, significant even in the +/- 2% window around the cutoffs. There is no statistical evidence against linearity of the population polynomial for any bandwidth. In contrast, there is strong statistical evidence across bandwidths and cutoffs against including covariates linearly. Again, this turns out not to matter much since estimates with linear vs. quadratic covariates are always very similar.

3.4 Testing joint significance

The analysis so far has examined impacts of additional financing on several intermediary and final outcomes, some of which were statistically significant, while others were not. Since examining a sufficient number of variables would always yield some jumps that are statistically different from zero simply by chance, it is important to test the joint hypotheses of zero discontinuities in all outcome variables. Table 10 presents local linear estimates from the pooled specification across the first 3 cutoffs and the results of F-statistics, testing the joint null hypotheses of no discontinuities in any outcome variable. The tests clearly reject these joint hypotheses, suggesting that at least some of the effects are real.

4 Heterogeneous effects

In this section we show that additional resources had stronger effects on schooling and literacy in the north of Brazil, which is generally less developed than the south (see Table 1 in the paper for the definitions of north and south). We also find stronger effects on schooling in rural compared to urban municipalities, which would be consistent with the larger role municipal governments play

in the provision of elementary education in rural areas. Poverty reduction was somewhat more pronounced in the south of the country and evenly spread across rural and urban municipalities.

Table 11 shows impacts of additional FPM transfers on total public spending per capita and on the primary school teacher-student ratio in northern and southern states of Brazil. Spending increased by about 20% in both parts of the country and effects on primary school teacher-student ratios tend to be positive and statistically significant, especially in the south. Although all estimates tend to be larger in the south they are not statistically different from each other. None of the other public service indicators are statistically significant in either region (results not shown).

Table 12 shows that the average schooling and literacy gains reported above are for the most part accounted for by gains in the northern part of the country. The estimates with covariates put the schooling gains in the north at about 0.3 years. Literacy gains are also larger in the north than in the south. These regional differences in literacy and schooling gains are not statistically significant.[2] The poverty reduction, in contrast, is larger in the south, and the differential impact is statistically significant.

Tables 13 and 14 examine whether the notion that extra funds have stronger effects in less developed areas holds true not just between the northern and southern parts of Brazil but also across rural and urban areas as distinguished by the median percentage of urban residents in 1980. Table 13 shows that spending increased by about 20% in both urban and rural municipalities. The effect on primary school teacher-student ratios tends to be positive and statistically significant in rural areas, with no real difference in urban areas although the differential effect is not statistically significant.[3] Again, none of the other public service indicators are statistically significant in either region (results not shown).

The results in Table 14 suggest that almost the entire schooling gains come from rural municipalities (an additional 0.5 year of schooling per capita). Effects in urban communities are smaller, statistically insignificant but not statistically different from the effects in rural communities.[4] The literacy gains are more evenly spread although they too are concentrated among rural municipali-

[2]The coefficients and standard errors on the interaction of the treatment indicator with the region indicator (1 for south) in the pooled sample for schooling and literacy are, respectively: -0.172 (0.208) and - 0.033 (0.024).

[3]The coefficient and standard error on the interaction term of the treatment indicator with the urban indicator (1 for urban) are -.007 and (.007).

[4]The coefficient and standard error on the interaction term are -.335 and (.221).

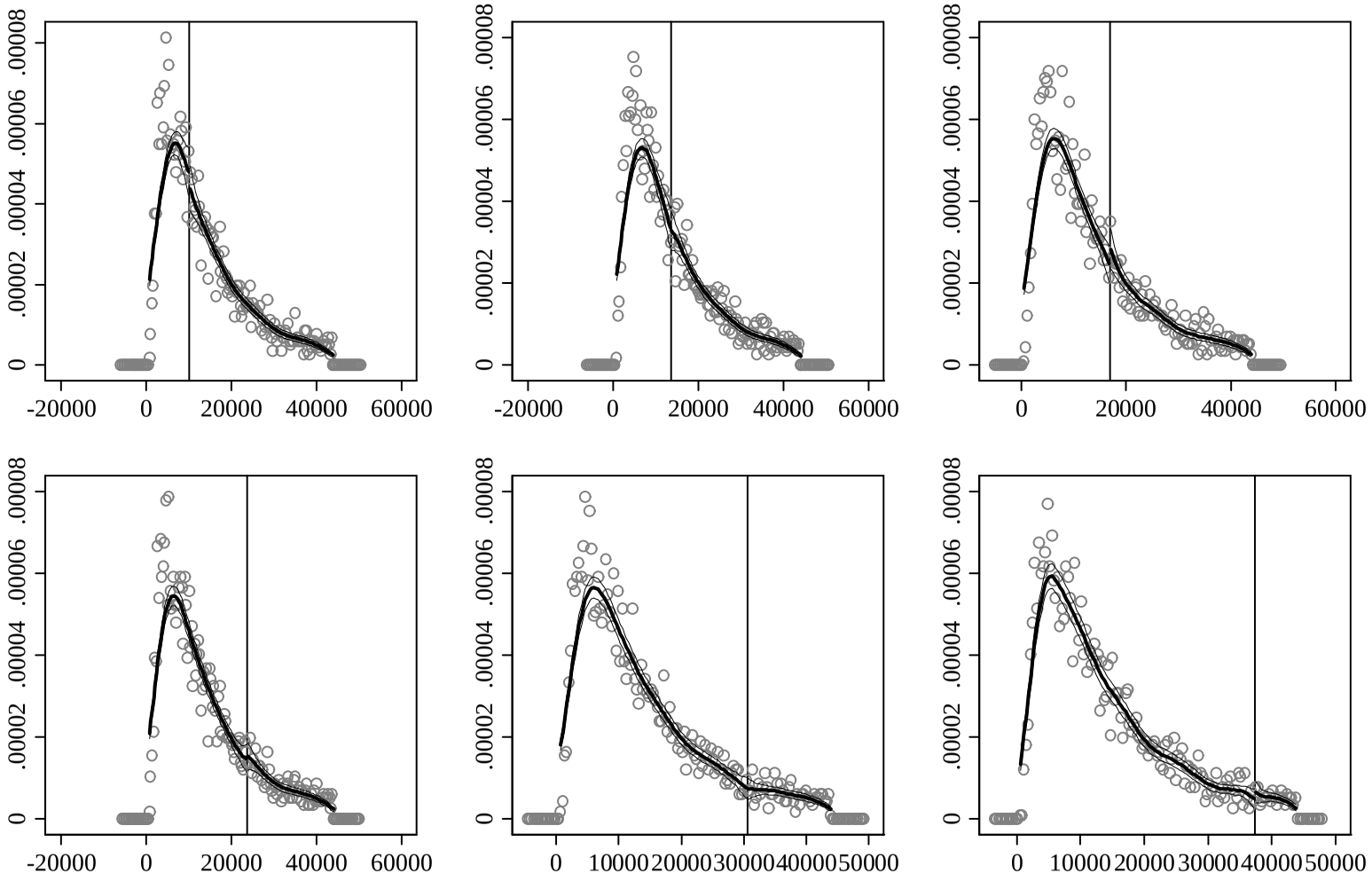
ties and somewhat smaller in urban municipalities although the difference is again not statistically significant.[5] The poverty reduction is evenly spread across urban and rural communities. Overall, the point estimates suggest that additional public spending had stronger effects on schooling and literacy in less developed parts of Brazil, while poverty reduction was more pronounced in the south of the country and evenly spread across rural and urban municipalities.[6]

An alternative explanation for these effects is that poor communities had stronger preferences for education than richer communities and hence spent a higher proportion of extra funds on education. A direct test of this alternative view is to examine the share of education expenditure in total spending subsequent to the increase in funding in poor vs. rich areas. Unfortunately, however, existing expenditure data do not allow such a disaggregation between 1984 and 1989. When we test for differential effects on education expenditure shares using data from 1982 and 1983, we find no significant effects (results not shown), suggesting that stronger preferences for education in poor communities are not the driving force behind the higher schooling and literacy gains found in less developed parts of Brazil.

[5] The coefficient and standard error on the interaction term are -.005 and (.026).

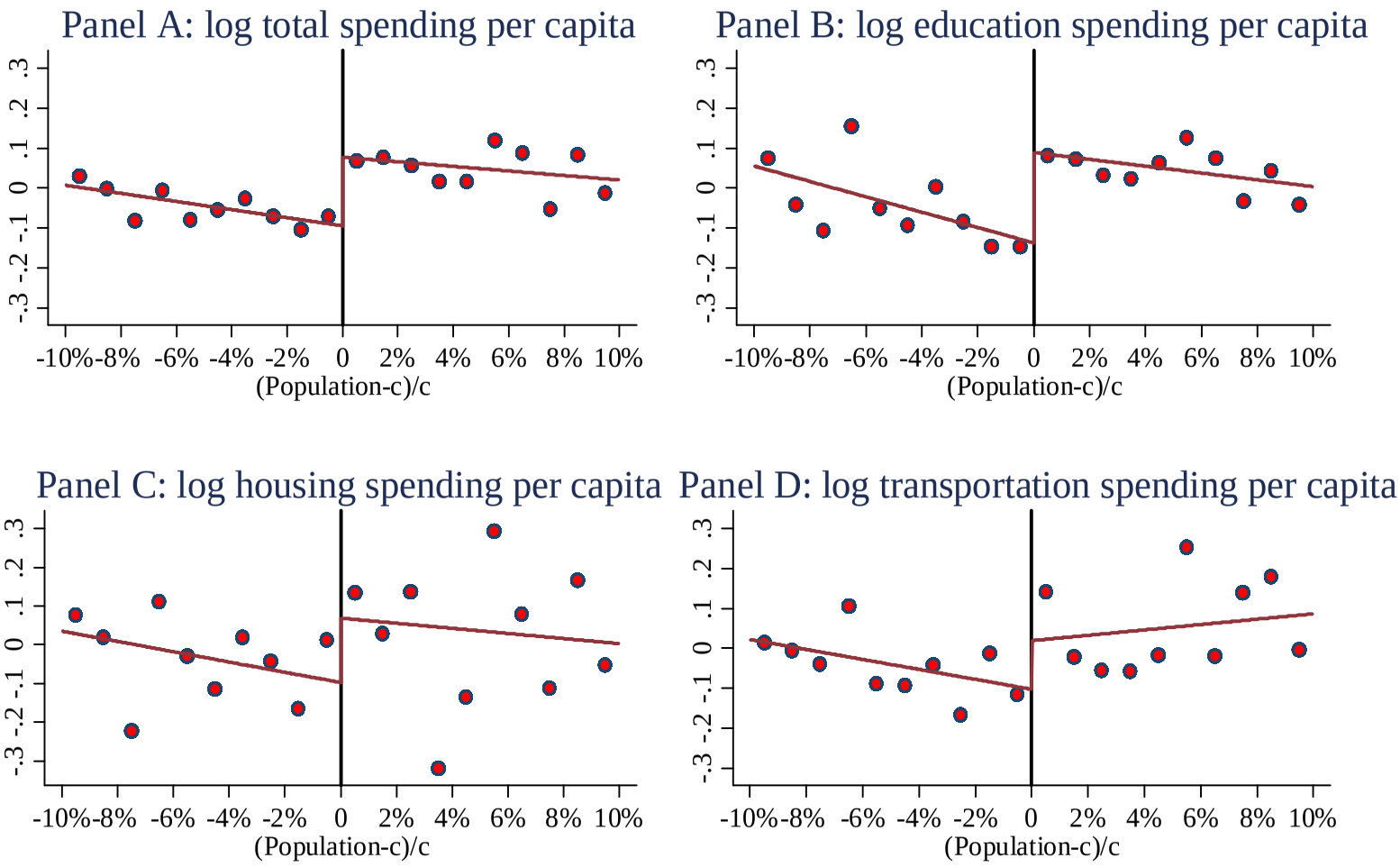
[6] We also break the sample into high vs. low education and low vs. high initial poverty counties and find quantitatively similar results.

Figure 1: McCrary density plots and discontinuity tests for cutoffs 1 through 6



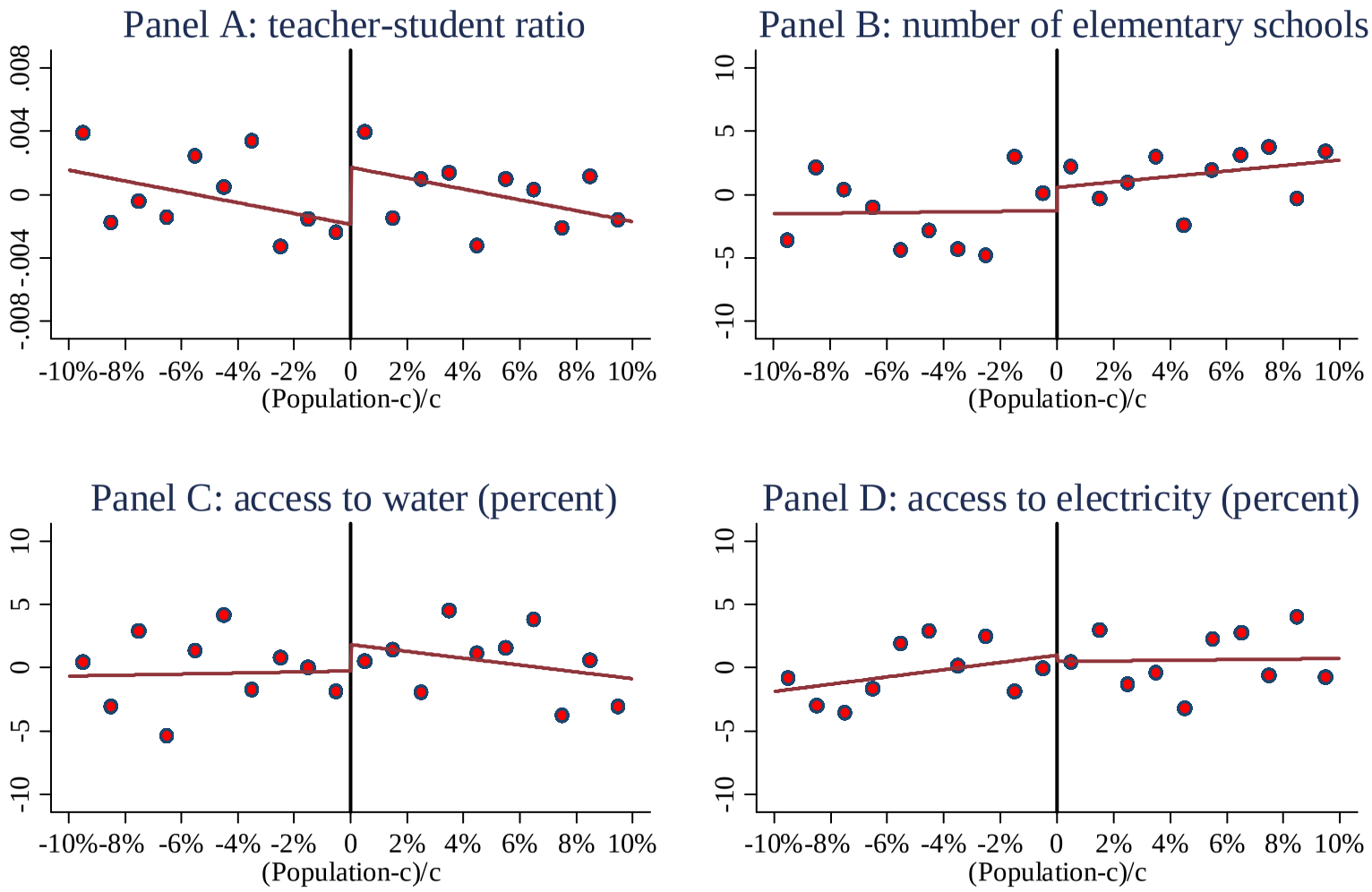
Notes: These density plots are for 1982 official municipality population based on the 1980 census. The estimates (standard errors) of the McCrary (2008) test are, for the first to sixth cutoffs respectively, -0.072 (0.095), 0.011 (0.111), 0.180 (0.136), 0.054 (0.174), -0.011 (0.269), 0.350 (0.357).

Figure 2: Impacts on total spending and main spending categories



Notes: Total spending is summed over the period 1982-1985. The spending categories are summed over the period 1982-1983. All variables are scaled by 1982 official municipality population. Each dot represents the sample average of the (partialled out) dependent variable in a given bin. The bin-width is 1 percentage point of the respective threshold, c=10'188,13'584,16'980.

Figure 3: Impacts on direct public service measures



Notes: Each dot represents the sample average of the (partialled out) dependent variable in a given bin. The bin-width is 1 percentage point of the respective threshold, c=10'188,13'584,16'980.

Table 1: Discontinuity tests for pretreatment covariates (quadratic specifications)

Polynomial specification:	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic
Neighborhood (percent):	2	3	4	5	6
Opposition party (0/1)	0.192	0.132	0.084	0.064	0.043
	(0.153)	(0.126)	(0.112)	(0.103)	(0.094)
Average years of schooling	0.218	0.044	0.075	0.144	0.260*
(25 years and older)	(0.267)	(0.201)	(0.178)	(0.157)	(0.144)
Urban residents (percent)	0.826	0.151	-0.092	2.021	3.105
	(6.857)	(5.166)	(4.625)	(4.226)	(3.729)
Net enrollment rate (percent)	0.962	1.833	2.013	4.090	5.984**
(7- to 14-year-olds)	(5.919)	(4.419)	(3.782)	(3.241)	(2.960)
Literacy rate (percent)	0.355	0.266	0.261	1.550	3.000
(15 years and older)	(4.723)	(3.578)	(3.055)	(2.650)	(2.451)
Poverty headcount ratio (percent)	2.645	6.206	2.126	-0.615	-2.485
(national poverty line)	(5.913)	(4.406)	(3.759)	(3.348)	(3.038)
Income per capita (percent)	3.357	-7.493	-2.040	2.319	6.718
(percent of minimum salary)	(12.216)	(9.598)	(7.771)	(6.919)	(6.296)
Infant mortality	-4.782	-3.318	-2.549	-7.464	-7.070
(per 1000 life births)	(8.076)	(5.911)	(5.602)	(4.851)	(4.569)
Log current transfers 1981	0.099	0.116	0.093	0.103	0.157**
(per capita)	(0.146)	(0.110)	(0.092)	(0.085)	(0.079)
Log capital transfers 1981	0.291	0.124	0.102	0.083	0.087
(per capita)	(0.274)	(0.200)	(0.168)	(0.153)	(0.142)
Log total revenue 1981	0.149	0.132	0.064	0.127	0.183**
(per capita)	(0.127)	(0.106)	(0.089)	(0.080)	(0.074)
Log own revenue 1981	0.258	0.173	0.222	0.449	0.514
(per capita)	(0.689)	(0.515)	(0.432)	(0.364)	(0.340)
Municipalities	202	297	391	479	570
F-statistic	0.86	0.85	0.43	0.75	1.16
[p-value]	[0.59]	[0.60]	[0.95]	[0.71]	[0.31]

Notes: Table entries are OLS estimates (standard errors) of discontinuities in pretreatment covariates using the pooled specification across the first three cutoffs described in Section IV, equation (2) in the main text. F-statistic tests the joint null hypotheses of no discontinuities in any pre-treatment covariate. Clustered (at the municipality level) standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. All specifications allow for differential slopes by segment and on each side of the cutoff. Opposition party is an indicator for whether the county was run by a PDS mayor from 1982-1988 (0) or a mayor from an opposition party (PMDB, PDT, PT or PTB) (1). (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 2: Impacts on spending categories

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Various[1]
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Panel A: log education spending per capita (1982-1983)							
Pooled cutoffs 1-3							
I[X > 0]	0.479***	0.392**	0.334***	0.261**	0.348***	0.291***	0.247***
	(0.154)	(0.170)	(0.115)	(0.120)	(0.095)	(0.096)	(0.078)
Observations	140	137	205	202	273	269	832
R-squared	0.51	0.59	0.49	0.58	0.47	0.55	0.46
Pooled cutoffs 1-2							
I[X > 0]	0.536**	0.551**	0.367**	0.308*	0.312***	0.277**	0.289***
	(0.205)	(0.222)	(0.147)	(0.157)	(0.116)	(0.119)	(0.094)
Observations	94	93	141	140	185	183	578
R-squared	0.59	0.68	0.59	0.66	0.55	0.62	0.48
Panel B: log housing and urban infrastructure spending per capita (1982-1983)							
Pooled cutoffs 1-3							
I[X > 0]	0.254	0.134	0.239	0.108	0.378**	0.313*	0.239*
	(0.281)	(0.295)	(0.225)	(0.215)	(0.192)	(0.184)	(0.141)
Observations	136	133	198	195	263	259	810
R-squared	0.39	0.56	0.27	0.47	0.28	0.47	0.43
Pooled cutoffs 1-2							
I[X > 0]	0.565*	0.269	0.409	0.193	0.482**	0.408*	0.345**
	(0.299)	(0.287)	(0.257)	(0.241)	(0.222)	(0.213)	(0.165)
Observations	92	91	136	135	180	178	564
R-squared	0.42	0.65	0.30	0.51	0.28	0.48	0.40
Panel C: log transportation spending per capita (1982-1983)							
Pooled cutoffs 1-3							
I[X > 0]	0.287	0.239	0.228	0.215	0.293**	0.254*	0.164*
	(0.189)	(0.208)	(0.145)	(0.157)	(0.136)	(0.133)	(0.085)
Observations	139	136	202	199	267	263	810
R-squared	0.84	0.87	0.83	0.84	0.78	0.79	0.74
Pooled cutoffs 1-2							
I[X > 0]	0.244	0.263	0.181	0.213	0.157	0.168	0.180*
	(0.241)	(0.292)	(0.183)	(0.209)	(0.160)	(0.164)	(0.096)
Observations	93	92	139	138	181	179	565
R-squared	0.87	0.89	0.86	0.87	0.82	0.84	0.76

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

[1]Moving down the table from the top of Panel A to the bottom of panel C, the specifications are quadratic, quadratic, quadratic, quadratic, linear, and linear, respectively.

Table 3: Impact on teacher-student ratio

Dependent variable: primary school teacher-student ratio in 1991; comparison mean: 0.054

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Quartic
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Pooled cutoffs 1-3							
I[X > 0]	0.012**	0.010**	0.008**	0.007*	0.008**	0.005*	0.012***
	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
Observations	175	172	263	260	345	341	1125
R-squared	0.45	0.53	0.44	0.52	0.42	0.50	0.47
Pooled cutoffs 1-2							
I[X > 0]	0.011**	0.012**	0.008*	0.010**	0.006	0.006	0.007
	(0.005)	(0.006)	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)
Observations	114	113	180	179	236	234	769
R-squared	0.44	0.56	0.45	0.53	0.40	0.48	0.46
1st cutoff							
I[pop > 10188]	0.007	0.012	0.013	0.014*	0.009	0.011*	0.016**
	(0.013)	(0.013)	(0.009)	(0.008)	(0.008)	(0.006)	(0.008)
Observations	56	55	91	90	124	122	420
R-squared	0.37	0.71	0.35	0.56	0.36	0.51	0.46
2nd cutoff							
I[pop > 13584]	0.015	0.019	0.004	0.011	0.002	0.002	0.001
	(0.010)	(0.012)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)
Observations	58	58	89	89	112	112	349
R-squared	0.57	0.65	0.60	0.67	0.55	0.62	0.50
3rd cutoff							
I[pop > 16980]	0.019*	0.011	0.013*	0.007	0.013**	0.009	0.024***
	(0.010)	(0.012)	(0.008)	(0.008)	(0.007)	(0.006)	(0.008)
Observations	61	59	83	80	109	107	356
R-squared	0.72	0.77	0.66	0.75	0.58	0.66	0.52

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects. The pooled specifications include segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 5.1: Robustness checks for impact on schooling, 19- to 28-year-olds in 1991

Dependent variable: average years of schooling, 19- to 28-year-olds in 1991; comparison mean: 4.26

Neighborhood (percent):	2	2	2	3	3	3	4	4	4
Population polynomial:	Linear	Quadratic	Linear	Linear	Quadratic	Linear	Linear	Quadratic	Linear
Pretreatment covariates:	Linear	None	Quadratic	Linear	None	Quadratic	Linear	None	Quadratic
Pooled cutoffs 1-3									
I[X > 0]	0.126	0.140	0.147	0.200*	0.152	0.254**	0.179*	0.386	0.248**
	(0.135)	(0.398)	(0.160)	(0.104)	(0.302)	(0.115)	(0.093)	(0.268)	(0.100)
F-test for H_0: γ_{Yt-1}=1	0.30			0.44			0.63		
[p-value]	[0.58]			[0.51]			[0.43]		
F-test for H_0: linearity		1.65			1.56			3.86	
[p-value]		[0.14]			[0.16]			[0.00]	
F-test for H_0: linearity			0.69			1.28			2.43
[p-value]			[0.68]			[0.26]			[0.02]
Pooled cutoffs 1-2									
I[X > 0]	0.085	0.184	0.150	0.199	0.222	0.276**	0.169	0.421	0.270**
	(0.162)	(0.531)	(0.184)	(0.128)	(0.382)	(0.137)	(0.118)	(0.331)	(0.126)
F-test for H_0: γ_{Yt-1}=1	1.97			1.52			2.05		
[p-value]	[0.16]			[0.22]			[0.15]		
F-test for H_0: linearity		1.76			1.39			3.84	
[p-value]		[0.14]			[0.23]			[0.00]	
F-test for H_0: linearity			0.50			0.79			1.15
[p-value]			[0.83]			[0.60]			[0.34]

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. Columns 1, 4 and 7 also include average years of schooling of the 8- to 17-years-old cohort in 1980 (19- to 28-year-olds in 1991). All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 6.1: Robustness checks for impact on schooling, 9- to 18-year-olds in 1991

Dependent variable: average years of schooling, 9- to 18-year-olds in 1991; comparison mean: 2.61

Neighborhood (percent):	2	2	2	3	3	3	4	4	4
Population polynomial:	Linear	Quadratic	Linear	Linear	Quadratic	Linear	Linear	Quadratic	Linear
Pretreatment covariates:	Linear	None	Quadratic	Linear	None	Quadratic	Linear	None	Quadratic
Pooled cutoffs 1-3									
I[X > 0]	0.155	0.117	0.133	0.166**	0.086	0.131*	0.136**	0.192	0.117*
	(0.095)	(0.237)	(0.099)	(0.071)	(0.177)	(0.074)	(0.062)	(0.158)	(0.062)
F-test for H_0: linearity		1.60			0.95			2.55	
[p-value]		[0.15]			[0.46]			[0.02]	
F-test for H_0: linearity			0.42			1.36			2.18
[p-value]			[0.88]			[0.22]			[0.04]
Pooled cutoffs 1-2									
I[X > 0]	0.171	0.192	0.191	0.205**	0.124	0.209**	0.164**	0.222	0.170**
	(0.121)	(0.327)	(0.122)	(0.089)	(0.232)	(0.089)	(0.080)	(0.202)	(0.080)
F-test for H_0: linearity		1.92			0.69			2.30	
[p-value]		[0.11]			[0.59]			[0.06]	
F-test for H_0: linearity			0.62			1.15			2.26
[p-value]			[0.73]			[0.33]			[0.03]

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 5.2: Impact on change in schooling, 19- to 28-year-olds in 1991

Dependent variable: difference in average years of schooling between 1991 and 1980, 19- to 28-year-olds in 1991; comparison mean: 2.45

Neighborhood (percent):	2	2	2	3	3	3	4	4	4
Population polynomial:	Linear	Quadratic	Linear	Linear	Quadratic	Linear	Linear	Quadratic	Linear
Pretreatment covariates:	N	N	Y	N	N	Y	N	N	Y
Pooled cutoffs 1-3									
I[X > 0]	0.186	0.028	0.116	0.301**	0.079	0.191*	0.279***	0.271*	0.170*
	(0.159)	(0.238)	(0.134)	(0.123)	(0.181)	(0.104)	(0.109)	(0.163)	(0.094)
Observations	202	202	199	297	297	294	391	391	387
R-squared	0.39	0.42	0.55	0.34	0.36	0.52	0.32	0.35	0.50
F-test for H_0: linearity		2.27			2.40			3.35	
[p-value]		[0.04]			[0.03]			[0.00]	
Pooled cutoffs 1-2									
I[X > 0]	0.217	0.125	0.053	0.283**	0.092	0.179	0.232*	0.284	0.144
	(0.189)	(0.285)	(0.159)	(0.143)	(0.213)	(0.128)	(0.132)	(0.198)	(0.118)
Observations	133	133	132	203	203	202	263	263	261
R-squared	0.45	0.47	0.60	0.39	0.42	0.54	0.33	0.36	0.48
F-test for H_0: linearity		1.44			2.68			3.64	
[p-value]		[0.23]			[0.03]			[0.00]	

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. The pooled specifications include segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 5.3: Impact on change in schooling, above 24 year-olds in 1980

Dependent variable: difference in average years of schooling between 1991 and 1980, above 24 year-olds in 1980; comparison mean: 0.32

Neighborhood (percent):	2	2	2	3	3	3	4	4	4
Population polynomial:	Linear	Quadratic	Linear	Linear	Quadratic	Linear	Linear	Quadratic	Linear
Pretreatment covariates:	N	N	Y	N	N	Y	N	N	Y
Pooled cutoffs 1-3									
I[X > 0]	0.059	0.030	0.058	0.072	0.060	0.067	0.035	0.086	0.029
	(0.082)	(0.114)	(0.081)	(0.064)	(0.085)	(0.068)	(0.060)	(0.078)	(0.060)
Observations	202	202	199	297	297	294	391	391	387
R-squared	0.18	0.19	0.21	0.12	0.14	0.16	0.10	0.11	0.13
F-test for H_0: linearity		0.60			1.05			1.13	
[p-value]		[0.73]			[0.39]			[0.34]	
Pooled cutoffs 1-2									
I[X > 0]	0.074	0.062	0.052	0.032	0.085	0.035	-0.010	0.095	-0.003
	(0.101)	(0.118)	(0.106)	(0.078)	(0.096)	(0.090)	(0.075)	(0.091)	(0.080
Observations	133	133	132	203	203	202	263	263	261
R-squared	0.27	0.27	0.29	0.22	0.23	0.28	0.16	0.18	0.18
F-test for H_0: linearity		0.41			0.30			1.23	
[p-value]		[0.80]			[0.88]			[0.30]	

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 5.4: Schooling gains for native nonmigrants, 19- to 28-year-olds in 1991

Dependent variable: average years of schooling, 19- to 28-year-olds in 1991, native non-migrants

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Quartic
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Pooled cutoffs 1-3							
I[X > 0]	0.413	0.336**	0.663***	0.424***	0.592***	0.331***	0.375***
	(0.283)	(0.168)	(0.226)	(0.139)	(0.190)	(0.120)	(0.164)
Observations	202	199	297	294	391	387	1271
R-squared	0.72	0.88	0.70	0.87	0.68	0.86	0.86
Pooled cutoffs 1-2							
I[X > 0]	0.486	0.324	0.652**	0.454**	0.565**	0.363**	0.373*
	(0.361)	(0.215)	(0.284)	(0.181)	(0.243)	(0.159)	(0.216)
Observations	133	132	203	202	263	261	874
R-squared	0.73	0.88	0.71	0.87	0.68	0.86	0.85
1st cutoff							
I[pop > 10188]	0.221	0.767	0.499	0.588*	0.489	0.491**	0.557
	(0.543)	(0.475)	(0.380)	(0.351)	(0.358)	(0.278)	(0.362)
Observations	68	67	103	103	137	135	479
R-squared	0.80	0.91	0.77	0.88	0.74	0.88	0.86
2nd cutoff							
I[pop > 13584]	0.382	0.401	0.531	0.471*	0.563	0.333	0.179
	(0.610)	(0.298)	(0.460)	(0.259)	(0.367)	(0.219)	(0.245)
Observations	65	65	100	100	126	126	395
R-squared	0.74	0.94	0.73	0.90	0.70	0.88	0.86
3rd cutoff							
I[pop > 16980]	0.184	0.584*	0.483	0.390	0.611	0.234	0.484*
	(0.529)	(0.339)	(0.416)	(0.249)	(0.384)	(0.220)	(0.263)
Observations	69	67	94	92	128	126	397
R-squared	0.78	0.94	0.75	0.93	0.70	0.89	0.89

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects. The pooled specifications include segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 7.1: Robustness checks for impact on literacy, 19- to 28-year-olds in 1991

Dependent variable: literacy rate, 19- to 28-year-olds in 1991, comparison mean: 0.76

Neighborhood (percent):	2	2	2	3	3	3	4	4	4
Population polynomial:	Linear	Quadratic	Linear	Linear	Quadratic	Linear	Linear	Quadratic	Linear
Pretreatment covariates:	Linear	None	Quadratic	Linear	None	Quadratic	Linear	None	Quadratic
Pooled cutoffs 1-3									
I[X > 0]	0.043***	0.033	0.042***	0.044***	0.038	0.044***	0.036**	0.056**	0.036***
	(0.016)	(0.037)	(0.016)	(0.012)	(0.028)	(0.012)	(0.011)	(0.025)	(0.010)
F-test for H_0: γ_{Yt-1}=1	35.5			56.9			80.5		
[p-value]	[0.00]			[0.00]			[0.00]		
F-test for H_0: linearity		1.35			0.90			2.66	
[p-value]		[0.24]			[0.50]			[0.02]	
F-test for H_0: linearity			3.39			4.07			7.26
[p-value]			[0.00]			[0.00]			[0.00]
Pooled cutoffs 1-2									
I[X > 0]	0.034*	0.022	0.042**	0.039***	0.028	0.045***	0.027**	0.038	0.033***
	(0.018)	(0.045)	(0.019)	(0.014)	(0.035)	(0.015)	(0.013)	(0.031)	(0.013)
F-test for H_0: γ_{Yt-1}=1	21.6			57.7			50.1		
[p-value]	[0.00]			[0.00]			[0.00]		
F-test for H_0: linearity		1.44			0.39			2.62	
[p-value]		[0.22]			[0.82]			[0.04]	
F-test for H_0: linearity			1.03			2.17			5.80
[p-value]			[0.41]			[0.04]			[0.00]

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. Columns 1, 4 and 7 also include the literacy rate of the 8- to 17-years-old cohort in 1980 (19- to 28-year-olds in 1991). All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 7.2: Impact on literacy, 9- to 18-year-olds in 1991

Dependent variable: literacy rate, 9- to 18-year-olds in 1991; comparison mean: 0.73

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Quartic
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Pooled cutoffs 1-3							
I[X > 0]	0.037	0.028	0.043**	0.027*	0.046***	0.024**	0.032**
	(0.028)	(0.019)	(0.020)	(0.014)	(0.017)	(0.012)	(0.016)
Observations	202	199	297	294	386	387	1271
R-squared	0.82	0.93	0.83	0.91	0.82	0.91	0.90
Pooled cutoffs 1-2							
I[X > 0]	0.049	0.036	0.039	0.037**	0.036*	0.027*	0.044**
	(0.037)	(0.023)	(0.024)	(0.017)	(0.022)	(0.015)	(0.019)
Observations	133	132	203	202	263	261	874
R-squared	0.82	0.93	0.84	0.92	0.82	0.91	0.90
1st cutoff							
I[pop > 10188]	0.045	0.056	0.056	0.071**	0.049	0.055**	0.071**
	(0.058)	(0.049)	(0.040)	(0.032)	(0.039)	(0.025)	(0.031)
Observations	68	67	103	102	137	135	479
R-squared	0.85	0.94	0.84	0.92	0.81	0.91	0.90
2nd cutoff							
I[pop > 13584]	0.041	0.037	0.024	0.020	0.032	0.006	0.022
	(0.045)	(0.037)	(0.031)	(0.020)	(0.026)	(0.018)	(0.023)
Observations	65	65	100	100	126	126	395
R-squared	0.84	0.94	0.88	0.95	0.87	0.94	0.90
3rd cutoff							
I[pop > 16980]	-0.006	0.011	0.029	0.010	0.058*	0.015	0.013
	(0.050)	(0.045)	(0.040)	(0.034)	(0.034)	(0.026)	(0.030)
Observations	69	67	94	92	128	126	397
R-squared	0.87	0.94	0.85	0.93	0.84	0.93	0.92

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects. The pooled specifications include segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 7.3: Robustness checks for impact on literacy, 9- to 18-year-olds in 1991

Dependent variable: literacy rate, 9- to 18-year-olds in 1991; comparison mean: 0.73

Neighborhood (percent):	2	2	2	3	3	3	4	4	4
Population polynomial:	Linear	Quadratic	Linear	Linear	Quadratic	Linear	Linear	Quadratic	Linear
Pretreatment covariates:	Linear	None	Quadratic	Linear	None	Quadratic	Linear	None	Quadratic
Pooled cutoffs 1-3									
I[X > 0]	0.028	0.018	0.019	0.027*	0.016	0.021	0.024**	0.028	0.019
	(0.019)	(0.036)	(0.019)	(0.014)	(0.029)	(0.014)	(0.012)	(0.027)	(0.012)
F-test for H_0: linearity		1.68			0.91			2.01	
[p-value]		[0.13]			[0.50]			[0.06]	
F-test for H_0: linearity			4.38			5.69			9.74
[p-value]			[0.00]			[0.00]			[0.00]
Pooled cutoffs 1-2									
I[X > 0]	0.036	0.024	0.037	0.037**	0.021	0.039**	0.027*	0.030	0.026*
	(0.023)	(0.046)	(0.025)	(0.017)	(0.036)	(0.018)	(0.015)	(0.033)	(0.014)
F-test for H_0: linearity		2.03			0.81			1.43	
[p-value]		[0.10]			[0.52]			[0.22]	
F-test for H_0: linearity			1.09			2.71			7.09
[p-value]			[0.37]			[0.01]			[0.00]

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 7.4: Impact on change in literacy, 19- to 28-year-olds in 1991

Dependent variable: difference in literacy rates between 1991 and 1980, 19- to 28-year-olds in 1991; comparison mean: 0.14

Neighborhood (percent):	2	2	2	3	3	3	4	4	4
Population polynomial:	Linear	Quadratic	Linear	Linear	Quadratic	Linear	Linear	Quadratic	Linear
Pretreatment covariates:	N	N	Y	N	N	Y	N	N	Y
Pooled cutoffs 1-3									
I[X > 0]	0.031	0.028	0.035*	0.031**	0.023	0.035***	0.015	0.041*	0.025**
	(0.022)	(0.035)	(0.019)	(0.016)	(0.027)	(0.014)	(0.014)	(0.022)	(0.013)
Observations	202	202	199	297	297	294	391	391	387
R-squared	0.62	0.63	0.70	0.63	0.63	0.70	0.57	0.58	0.67
F-test for H_0: linearity		0.77			0.46			0.91	
[p-value]		[0.60]			[0.83]			[0.49]	
Pooled cutoffs 1-2									
I[X > 0]	0.023	0.035	0.019	0.024	0.010	0.024	0.009	0.030	0.012
	(0.025)	(0.040)	(0.023)	(0.019)	(0.033)	(0.018)	(0.018)	(0.028)	(0.017)
Observations	133	133	132	203	203	202	263	263	261
R-squared	0.70	0.70	0.79	0.68	0.69	0.76	0.58	0.58	0.71
F-test for H_0: linearity		0.40			0.49			0.95	
[p-value]		[0.81]			[0.74]			[0.44]	

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 7.5: Literacy gains for native nonmigrants, 19- to 28-year-olds in 1991

Dependent variable: literacy rate, 19- to 28-year-olds in 1991, native nonmigrants

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Quartic
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Pooled cutoffs 1-3							
I[X > 0]	0.065**	0.055***	0.076***	0.061***	0.062***	0.044***	0.055***
	(0.028)	(0.017)	(0.022)	(0.015)	(0.018)	(0.012)	(0.016)
Observations	202	199	297	294	391	387	1271
R-squared	0.77	0.91	0.77	0.89	0.78	0.89	0.88
Pooled cutoffs 1-2							
I[X > 0]	0.058	0.047**	0.058**	0.060***	0.044**	0.036**	0.050**
	(0.037)	(0.020)	(0.026)	(0.017)	(0.022)	(0.015)	(0.020)
Observations	133	132	203	202	263	261	874
R-squared	0.77	0.93	0.79	0.90	0.79	0.89	0.88
1st cutoff							
I[pop > 10188]	0.060	0.085**	0.058	0.087***	0.038	0.045*	0.070**
	(0.061)	(0.036)	(0.042)	(0.027)	(0.040)	(0.026)	(0.030)
Observations	68	67	103	102	137	135	479
R-squared	0.81	0.95	0.82	0.94	0.81	0.92	0.89
2nd cutoff							
I[pop > 13584]	0.035	0.023	0.048	0.046*	0.049*	0.029	0.029
	(0.044)	(0.025)	(0.038)	(0.027)	(0.028)	(0.020)	(0.025)
Observations	65	65	100	100	126	126	395
R-squared	0.82	0.95	0.81	0.89	0.82	0.89	0.88
3rd cutoff							
I[pop > 16980]	0.062	0.055*	0.081**	0.057*	0.080**	0.038*	0.065**
	(0.046)	(0.033)	(0.038)	(0.029)	(0.033)	(0.023)	(0.029)
Observations	69	67	94	92	128	126	397
R-squared	0.86	0.94	0.84	0.93	0.82	0.93	0.90

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects. The pooled specifications include segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 8.1: Robustness checks for impact on the poverty rate in 1991

Dependent variable: poverty rate in 1991; comparison mean: 0.64

Neighborhood (percent):	2	2	2	3	3	3	4	4	4
Population polynomial:	Linear	Quadratic	Linear	Linear	Quadratic	Linear	Linear	Quadratic	Linear
Pretreatment covariates:	Linear	None	Quadratic	Linear	None	Quadratic	Linear	None	Quadratic
Pooled cutoffs 1-3									
I[X > 0]	-0.064***	-0.068	-0.056***	-0.051***	-0.031	-0.048***	-0.037***	-0.052	-0.034***
	(0.022)	(0.068)	(0.020)	(0.017)	(0.048)	(0.016)	(0.015)	(0.040)	(0.014)
F-test for H_0: linearity		1.25			0.83			0.68	
[p-value]		[0.28]			[0.55]			[0.67]	
F-test for H_0: linearity			3.73			5.77			6.84
[p-value]			[0.00]			[0.00]			[0.00]
Pooled cutoffs 1-2									
I[X > 0]	-0.051*	-0.016	-0.049**	-0.039*	-0.007	-0.045**	-0.020	-0.028	-0.019
	(0.029)	(0.094)	(0.026)	(0.023)	(0.063)	(0.021)	(0.020)	(0.053)	(0.019)
F-test for H_0: linearity		1.54			0.89			0.44	
[p-value]		[0.19]			[0.47]			[0.79]	
F-test for H_0: linearity			3.65			5.32			4.95
[p-value]			[0.00]			[0.00]			[0.00]

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 9.1: Impact on the probability of reelection (nonlinear specifications)

Dependent variable: incumbent party reelected for mayor's office in 1988; comparison mean 0.17

Neighborhood (percent):	2	2	4	4	10	10	15	15
Polynomial specification:	Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic
Pooled cutoffs 1-3								
I[X > 0]	0.318*	0.093	0.235*	0.302**	0.083	0.124	0.087	0.144*
	(0.166)	(0.187)	(0.121)	(0.153)	(0.072)	(0.094)	(0.061)	(0.081)
Observations	197	197	379	379	940	940	1242	1242
R-squared	0.33	0.35	0.24	0.25	0.22	0.23	0.22	0.22
F-test for H_0: linearity	0.79	1.32	1.38	0.94	1.04	0.60	2.62	1.64
[p-value]	[0.46]	[0.26]	[0.25]	[0.44]	[0.35]	[0.67]	[0.07]	[0.16]
Pooled cutoffs 1-2								
I[X > 0]	0.289	0.092	0.243	0.232	0.029	0.115	0.083	0.097
	(0.245)	(0.252)	(0.168)	(0.214)	(0.093)	(0.126)	(0.077)	(0.106)
Observations	131	131	254	254	633	633	856	856
R-squared	0.31	0.33	0.24	0.25	0.24	0.24	0.22	0.23
F-test for H_0: linearity	0.51	0.95	1.39	1.03	1.57	0.95	1.59	1.37
[p-value]	[0.73]	[0.48]	[0.23]	[0.41]	[0.18]	[0.47]	[0.17]	[0.20]

Notes: OLS estimations. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and the indicator for whether the county was run by a PDS mayor from 1982-1988 (0) or an opposition party (1). Other covariates such as average years of schooling for individuals 25 years and older, county income per capita, poverty headcount ratio, illiterate percentage of over 15 year olds, infant mortality, school enrollment of 7 to 14 year olds and percent of population living in urban areas do not alter the estimate of interest nor do they help reduce its standard error. All specifications allow for differential curvature on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 10: Joint significance test of education, income and public service outcomes

Neighborhood (percent):	2	2	3	3	4	4
Pre-treatment covariates	N	Y	N	Y	N	Y
Education Outcomes						
Literacy rate (19- to 28-year-olds)	0.057** (0.027)	0.047*** (0.016)	0.062*** (0.019)	0.049*** (0.012)	0.059*** (0.016)	0.041*** (0.011)
Literacy rate (9- to 18-year-olds)	0.037 (0.028)	0.028 (0.019)	0.043** (0.020)	0.027* (0.014)	0.046*** (0.017)	0.024** (0.012)
Average years of schooling (19- to 28-year-olds)	0.322 (0.260)	0.225 (0.151)	0.516*** (0.198)	0.301*** (0.114)	0.528*** (0.171)	0.275*** (0.102)
Average years of schooling (9- to 18-year-olds)	0.207 (0.157)	0.155* (0.096)	0.287** (0.117)	0.166** (0.071)	0.288*** (0.099)	0.136** (0.062)
Household income						
Poverty headcount ratio (National poverty line)	-0.037 (0.039)	-0.064*** (0.022)	-0.060** (0.029)	-0.051*** (0.017)	-0.054** (0.024)	-0.037*** (0.015)
Income per capita (R$ 2008)	7.56 (24.23)	16.96 (17.78)	15.16 (19.45)	4.873 (16.01)	18.06 (17.41)	4.967 (14.26)
School resources						
Number of municipal elementary schools	5.087 (5.796)	4.247 (5.170)	-1.009 (4.561)	2.162 (4.174)	-2.813 (4.042)	-0.146 (3.601)
Primary school Teacher-student ratio	0.012** (0.005)	0.010** (0.005)	0.008** (0.004)	0.007* (0.004)	0.008** (0.004)	0.005* (0.003)
Housing and urban services						
Individuals with access to electricity (%)	3.739 (4.524)	5.095* (2.983)	5.386 (3.668)	3.437 (2.541)	3.785 (3.119)	1.635 (2.101)
Individuals with access to water (%)	5.176 (3.616)	5.862* (3.532)	6.078** (3.033)	5.668* (2.886)	0.882 (2.826)	-0.019 (2.737)
Individuals with access to sewer (%)	2.249 (7.468)	4.783 (7.086)	8.265 (5.797)	8.806 (5.566)	1.679 (5.074)	2.650 (4.790)
Individuals living in inadequate housing (%)	0.042 (0.671)	0.197 (0.641)	0.003 (0.315)	-0.016 (0.357)	-0.171 (0.399)	-0.133 (0.387)
F-statistic [p-value]	1.43 [0.16]	2.69 [0.00]	1.75 [0.06]	3.29 [0.00]	1.80 [0.05]	2.14 [0.01]

Notes: All entries are local linear estimates from the pooled specification across the first three cutoffs described in Section IV, equation (2) in the main text. The F-statistic tests the joint null hypotheses of no discontinuities in any outcome variable. All outcome variables from the 1991 school or population census. Clustered (at the municipality level) standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications allow for differential slopes by segment and on each side of the cutoff.

Table 11: Total spending and teacher-student ratio, north vs. south

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Quartic
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Panel A: South of Brazil (South, Southeast and Center-west regions)							
Dependent variable: log total public spending per capita (1982-1985)							
I[X > 0]	0.188*	0.246***	0.172**	0.166**	0.213***	0.191***	0.180***
	(0.108)	(0.085)	(0.086)	(0.071)	(0.078)	(0.067)	(0.082)
Observations	112	109	161	158	215	211	688
R-squared	0.59	0.77	0.57	0.75	0.53	0.71	0.65
Dependent variable: primary school teacher-student ratio in 1991; comparison mean: 0.060							
I[X > 0]	0.018**	0.019**	0.013*	0.012**	0.011*	0.010*	0.017**
	(0.010)	(0.008)	(0.007)	(0.006)	(0.006)	(0.005)	(0.007)
Observations	87	84	129	126	171	167	550
R-squared	0.32	0.46	0.30	0.45	0.24	0.39	0.41
Panel B: North of Brazil (North and Northeast regions)							
Dependent variable: log total public spending per capita (1982-1985)							
I[X > 0]	0.134	0.143*	0.182**	0.127**	0.198***	0.101**	0.085
	(0.094)	(0.081)	(0.080)	(0.072)	(0.072)	(0.059)	(0.075)
Observations	86	86	130	130	169	169	547
R-squared	0.34	0.61	0.40	0.60	0.28	0.55	0.40
Dependent variable: primary school teacher-student ratio in 1991; comparison mean: 0.047							
I[X > 0]	0.005	0.001	0.003	0.001	0.005*	0.004	0.007
	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)
Observations	88	88	134	134	174	174	575
R-squared	0.36	0.47	0.40	0.48	0.42	0.49	0.40

Notes: All entries are local linear estimates (standard errors) from the pooled specification across the first 3 cutoffs. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 12: Schooling, literacy and poverty, north vs. south

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Quartic
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Panel A: South of Brazil (South, Southeast and Center-west regions)							
Dependent variable: average years of schooling, 19- to 28-year-olds in 1991; comparison mean: 5.35							
I[X > 0]	0.162	0.148	0.362	0.198	0.293	0.139	0.229
	(0.349)	(0.171)	(0.273)	(0.136)	(0.230)	(0.122)	(0.174)
Observations	114	111	163	160	217	213	696
R-squared	0.33	0.75	0.33	0.78	0.24	0.76	0.76
Dependent variable: literacy rate, 19- to 28-year-olds in 1991; comparison mean: 0.90							
I[X > 0]	0.035	0.038***	0.033*	0.028***	0.023	0.020**	0.027***
	(0.023)	(0.010)	(0.019)	(0.008)	(0.016)	(0.008)	(0.010)
Observations	114	111	163	160	217	213	696
R-squared	0.39	0.87	0.36	0.85	0.28	0.81	0.80
Dependent variable: poverty rate in 1991; comparison mean: 0.48							
I[X > 0]	-0.038	-0.085***	-0.068	-0.070***	-0.072*	-0.062***	-0.069**
	(0.064)	(0.031)	(0.046)	(0.024)	(0.039)	(0.021)	(0.028)
Observations	114	111	163	160	217	213	696
R-squared	0.50	0.87	0.46	0.86	0.39	0.83	0.83
Panel B: North of Brazil (North and Northeast regions)							
Dependent variable: average years of schooling, 19- to 28-year-olds in 1991; comparison mean: 3.15							
I[X > 0]	0.584	0.245	0.740**	0.300	0.873***	0.311**	0.346
	(0.416)	(0.270)	(0.306)	(0.210)	(0.256)	(0.168)	(0.217)
Observations	88	88	134	134	174	174	575
R-squared	0.35	0.77	0.31	0.71	0.26	0.70	0.69
Dependent variable: literacy rate, 19- to 28-year-olds in 1991; comparison mean: 0.61							
I[X > 0]	0.090	0.053	0.105***	0.068**	0.108***	0.053**	0.069**
	(0.060)	(0.038)	(0.039)	(0.030)	(0.031)	(0.023)	(0.030)
Observations	88	88	134	134	174	174	575
R-squared	0.34	0.73	0.38	0.71	0.37	0.71	0.68
Dependent variable: poverty rate in 1991; comparison mean: 0.81							
I[X > 0]	-0.036	-0.017	-0.039**	-0.004	-0.036**	0.002	-0.022
	(0.025)	(0.023)	(0.022)	(0.021)	(0.021)	(0.017)	(0.020)
Observations	88	88	134	134	174	174	575
R-squared	0.46	0.75	0.48	0.71	0.41	0.69	0.62

Notes: All entries are local linear estimates (standard errors) from the pooled specification across the first 3 cutoffs. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 13: Total spending and teacher-student ration, urban vs. rural municipalities

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Quartic
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Panel A: urban municipalities (percent urban residents in 1980 > 24.07)							
Dependent variable: log total public spending per capita (1982-1985)							
I[X > 0]	0.146	0.159	0.096	0.070	0.154*	0.136*	0.147**
	(0.134)	(0.102)	(0.103)	(0.090)	(0.089)	(0.075)	(0.061)
Observations	102	102	145	145	194	194	573
R-squared	0.72	0.84	0.69	0.78	0.59	0.72	0.75
Dependent variable: primary school teacher-student ratio in 1991; comparison mean: 0.057							
I[X > 0]	0.002	0.001	0.004	0.004	0.003	0.001	0.002
	(0.013)	(0.012)	(0.009)	(0.008)	(0.008)	(0.007)	(0.010)
Observations	78	78	117	117	155	155	508
R-squared	0.44	0.54	0.42	0.51	0.40	0.49	0.46
Panel B: rural municipalities (percent urban residents in 1980 < 24.07)							
Dependent variable: log total public spending per capita (1982-1985)							
I[X > 0]	0.168***	0.268***	0.221***	0.225***	0.215***	0.196***	0.178***
	(0.077)	(0.072)	(0.066)	(0.064)	(0.055)	(0.052)	(0.072)
Observations	93	93	143	143	186	186	612
R-squared	0.83	0.89	0.84	0.90	0.81	0.87	0.82
Dependent variable: primary school teacher-student ratio in 1991; comparison mean: 0.050							
I[X > 0]	0.012***	0.011**	0.007**	0.007	0.008**	0.008***	0.015***
	(0.004)	(0.005)	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)
Observations	94	94	143	143	186	186	617
R-squared	0.62	0.63	0.60	0.63	0.56	0.59	0.57

Notes: All entries are local linear estimates (standard errors) from the pooled specification across the first 3 cutoffs. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 14: Schooling, literacy, poverty, urban vs. rural municipalities

Polynomial specification:	Linear	Linear	Linear	Linear	Linear	Linear	Quartic
Neighborhood (percent):	2	2	3	3	4	4	15
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
Panel A: urban municipalities (percent urban residents in 1980 > 24.07)							
Dependent variable: average years of schooling,19- to 28-year-olds in 1991; comparison mean: 4.94							
I[X > 0]	0.053	0.122	0.287	0.160	0.307	0.142	0.110
	(0.315)	(0.186)	(0.261)	(0.154)	(0.225)	(0.137)	(0.166)
Observations	104	104	148	148	197	197	636
R-squared	0.73	0.88	0.71	0.87	0.69	0.86	0.86
Dependent variable: literacy rate, 19- to 28-year-olds in 1991; comparison mean: 0.82							
I[X > 0]	0.039*	0.038**	0.052***	0.039***	0.056***	0.040***	0.036***
	(0.023)	(0.015)	(0.020)	(0.012)	(0.019)	(0.012)	(0.014)
Observations	104	104	148	148	197	197	636
R-squared	0.87	0.94	0.86	0.94	0.85	0.93	0.92
Dependent variable: poverty rate in 1991; comparison mean: 0.56							
I[X > 0]	-0.059	-0.057**	-0.063*	-0.051**	-0.047	-0.037**	-0.029
	(-0.046)	(0.028)	(0.036)	(0.021)	(0.032)	(0.018)	(0.024)
Observations	104	104	148	148	197	197	636
R-squared	0.82	0.95	0.84	0.94	0.81	0.94	0.92
Panel B: rural Municipalities (percent urban residents in 1980 < 24.07)							
Dependent variable: average years of schooling, 19- to 28-year-olds old in 1991; comparison mean: 3.5							
I[X > 0]	0.351	0.237	0.624**	0.457**	0.648***	0.472***	0.549**
	(0.412)	(0.276)	(0.314)	(0.216)	(0.252)	(0.173)	(0.224)
Observations	95	95	146	146	190	190	635
R-squared	0.72	0.89	0.75	0.89	0.73	0.88	0.87
Dependent variable: literacy rate, 19- to 28-year-olds in 1991; comparison mean: 0.68							
I[X > 0]	0.057	0.037	0.062	0.051*	0.057*	0.045*	0.060**
	(0.054)	(0.038)	(0.037)	(0.029)	(0.029)	(0.023)	(0.026)
Observations	95	95	146	146	190	190	635
R-squared	0.72	0.91	0.79	0.91	0.78	0.90	0.88
Dependent variable: poverty rate in 1991; comparison mean: 0.74							
I[X > 0]	-0.002	-0.041	-0.046	-0.038	-0.048	-0.033	-0.057**
	(0.045)	(0.031)	(0.035)	(0.029)	(0.030)	(0.023)	(0.028)
Observations	95	95	146	146	190	190	635
R-squared	0.77	0.88	0.73	0.88	0.71	0.86	0.85

Notes: All entries are local linear estimates (standard errors) from the pooled specification across the first 3 cutoffs. Heteroskedasticity-robust standard errors in parentheses. Neighborhood (percent) is percent distance from respective cutoff. All specifications include state fixed effects and segment dummies. Pretreatment covariates (1980 census) include county income per capita, average years of schooling for individuals 25 years and older, poverty headcount ratio, illiterate percentage of people over 14 years old, infant mortality, enrollment of 7- to 14-year-olds and percent of population living in urban areas. All specifications allow for differential slopes or curvature by segment and on each side of the cutoff. (***, **, and *) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.