

# Online Appendix for the paper “Long-run Impacts of Intergovernmental Transfers”

Irineu de Carvalho Filho and Stephan Litschig

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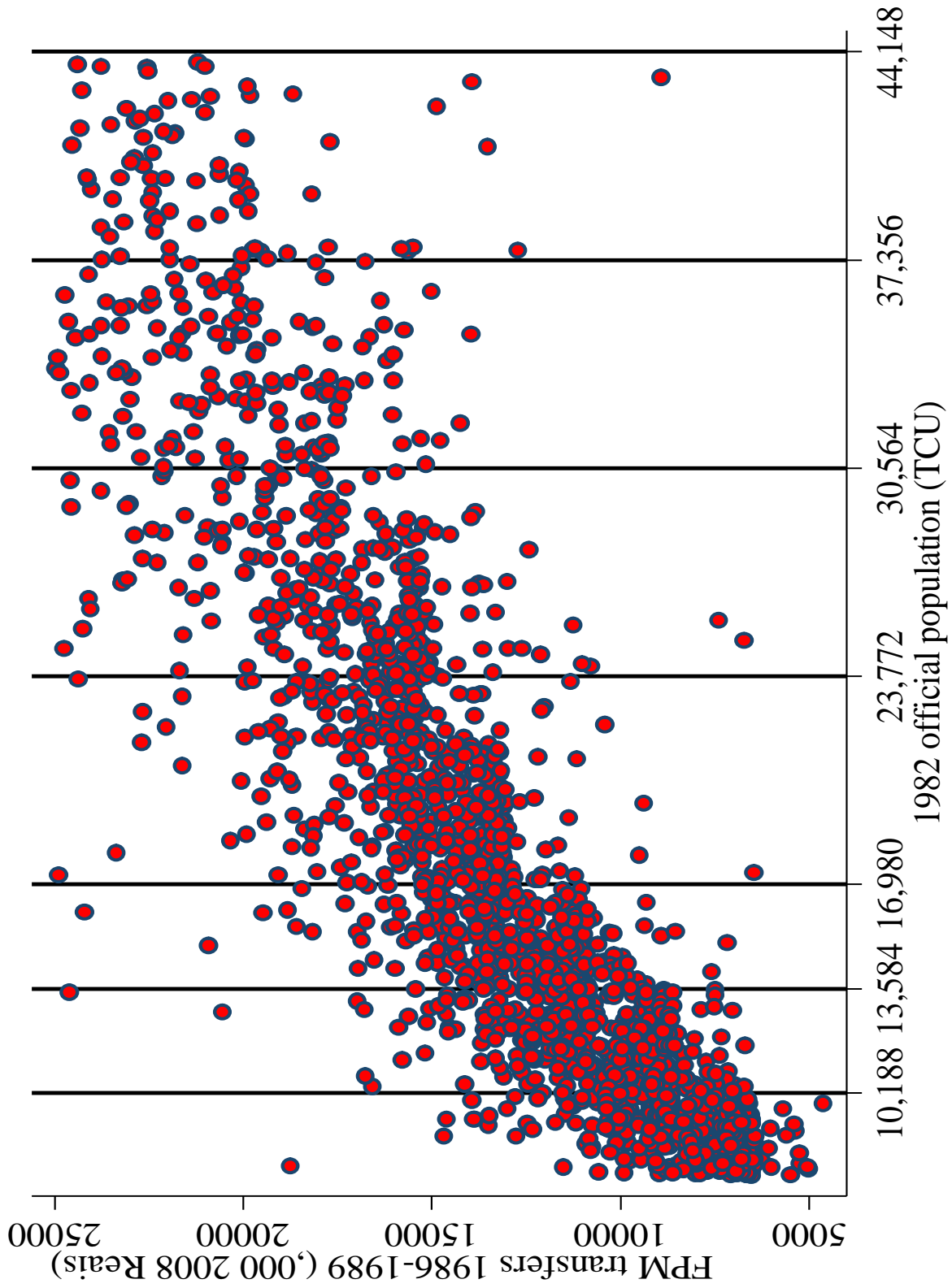
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Figure 1: FPM Transfers 1986-1989 (,000 2008 Reais)



Notes: Each dot represents a municipality. FPM transfers are self-reported by municipalities. 1982 official population is based on the 1980 census conducted by the national statistical agency, IBGE.

Table 1: FPM transfers in 1986, 1987, 1988, 1989, and 1986-1989 (,000 2008 Reais)

Neighborhood (percent):	2	2	3	3	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	N	Y	Y
	Comparison mean:								
<u>FPM transfers in 1986 (,000 of 2008 Reais)</u>	3,317								
I[X > 0]	29.07	126.26	-7.03	15.14	-372.11	-330.42	-137.60	-138.30	
R-squared	(161.34)	(140.74)	(170.02)	(162.68)	(313.06)	(292.38)	(243.18)	(472.45)	
Observations	0.40	0.44	0.40	0.43	0.12	0.13			
	199	196	294	291	388	384	1104	449	
<u>FPM transfers in 1987 (,000 of 2008 Reais)</u>	2,857								
I[X > 0]	59.97	98.35	175.19	178.91	87.17	67.59	25.55	-17.27	
R-squared	(165.35)	(162.02)	(122.87)	(124.18)	(119.08)	(119.31)	(83.48)	(108.55)	
Observations	0.61	0.65	0.55	0.57	0.54	0.55			
	197	194	292	289	385	381	794	625	
<u>FPM transfers in 1988 (,000 of 2008 Reais)</u>	2,677								
I[X > 0]	54.79	81.57	103.75	83.27	87.74	64.60	55.67	58.30	
R-squared	(125.15)	(133.13)	(98.07)	(106.95)	(93.35)	(93.40)	(64.18)	(93.69)	
Observations	0.55	0.58	0.53	0.56	0.54	0.56			
	191	188	282	279	370	367	1019	661	
<u>FPM transfers in 1989 (,000 of 2008 Reais)</u>	2,508								
I[X > 0]	107.44	137.91	-763.76	-641.94	435.08	542.34	739.10	809.40	
R-squared	(227.29)	(226.81)	(1040.30)	(956.78)	(398.14)	(484.67)	(559.21)	(584.30)	
Observations	0.55	0.60	0.10	0.11	0.05	0.05			
	194	191	285	282	377	373	1185	1254	
<u>FPM transfers from 1986-1989 (,000 of 2008 Reais)</u>	11,384								
I[X > 0]	33.64	246.43	-912.46	-838.97	-145.59	-26.63	619.70	109.0	
R-squared	(515.20)	(493.69)	(1257.32)	(1208.40)	(614.94)	(646.69)	(705.58)	(604.89)	
Observations	0.63	0.67	0.16	0.17	0.13	0.14			
	178	175	267	264	353	350	955	549	

Notes: All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaraman (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

## **1 Years of schooling coding in the 2010 census**

For 1991 and 2000 the long forms of the census allow for a direct computation of years of schooling based on grade enrollment and completion. But the 2010 long-form census survey sometimes only investigated broad education categories, not specific grade enrollment. For example, someone enrolled in fifth grade of remedial primary or middle school would only report remedial education, not a specific grade enrollment. Similarly, someone who was already out of school at the time of the 2010 census and had completed fifth grade would only report that he or she enrolled in middle school and did not complete middle school, not a specific grade completion.

In order to compare education outcomes of early 1980s school-age cohorts across census years, we impute schooling using the 2000 census in case the highest grade enrollment was not completed. Specifically, we use the years of schooling variable (V4300) computed by IBGE based on detailed grade enrollment and completion responses from the 2000 census. To impute individual schooling in 2010, we use the corresponding weighted average years of schooling from the 2000 census, where the weight is a sample expansion factor calculated by IBGE.

In the first example above, imputed schooling would be 4.5 years, which corresponds to average schooling of respondents who were enrolled in remedial primary or middle school at the time of the census in 2000. In online Appendix Table 2 below, remedial primary or middle school would be included under "Educação de jovens e adultos ou supletivo do ensino fundamental". In the second example above, imputed schooling would be 5.8 years, which is the (weighted) average schooling of out-of-school respondents who had attended but never completed middle school in 2000. In online Appendix Table 3 below, middle school corresponds to "Ensino fundamental ou 1º grau (da 5ª a 8ª série/6º ao 9º ano)" and the 5.8 figure comes from the column for respondents who did not conclude this level of education.

Table 2: Years of schooling coding in the 2010 census for individuals currently enrolled in a grade or program

	Years of schooling	Observations
V0628: Frequenta escola ou creche		
1-2 Sim		6,449,056
V0629: Curso que frequenta		
1 Creche	0.0	231,860
2 Pré-escolar (maternal e jardim da infância)	0.0	559,141
3 Classe de alfabetização - CA	0.0	318,446
4 Alfabetização de jovens e adultos	0.0	111,468
5 Regular do ensino fundamental		3,281,959
V630		
1 Primeiro ano	0.0	178,196
2 Primeira série/Segundo ano	1.0	278,558
3 Segunda série/Terceiro ano	2.0	365,700
4 Terceira série/Quarto ano	3.0	419,598
5 Quarta série/Quinto ano	4.0	447,165
6 Quinta série/Sexto ano	5.0	472,957
7 Sexta série/Sétimo ano	6.0	400,869
8 Sétima série/Oitavo ano	7.0	342,807
9 Oitava série/Nono ano	8.0	361,452
10 Não seriado <sup>1</sup>	3.6	14,657
6 Educação de jovens e adultos ou supletivo do ensino fundamental <sup>2</sup>	4.5	196,374
7 Regular do ensino médio		934,484
V631		
1 Primeira série	8.0	321,022
2 Segunda série	9.0	248,077
3 Terceira série	10.0	228,893
4 Quarta série	11.0	43,889
5 Não seriado <sup>3</sup>	8.7	92,603
8 Educação de jovens e adultos ou supletivo do ensino médio <sup>4</sup>	8.6	175,238
9 Superior de graduação <sup>5</sup>	12.4	561,528
10 Especialização de nível superior (mínimo de 360 horas) <sup>5</sup>	12.4	59,766
11 Mestrado <sup>6</sup>	17.0	13,269
12 Doutorado <sup>6</sup>	17.0	5,523
3 Não, já frequentou <sup>7</sup>		12,079,177
4 Não, nunca frequentou	0.0	2,302,846
Total		20,831,079

<sup>1</sup> This is the weighted average years of schooling (V4300) for V0430=6 in the 2000 census.

<sup>2</sup> This is the weighted average years of schooling (V4300) for V0430=7 in the 2000 census.

<sup>3</sup> This is the weighted average years of schooling (V4300) for V0430=9 in the 2000 census.

<sup>4</sup> This is the weighted average years of schooling (V4300) for V0430=10 in the 2000 census.

<sup>5</sup> This is the weighted average years of schooling (V4300) for V0430=12 in the 2000 census.

<sup>6</sup> This is the weighted average years of schooling (V4300) for V0430=13 in the 2000 census.

<sup>7</sup> See online Appendix Table 3.

Table 3: Years of schooling coding in the 2010 census for individuals previously enrolled in a grade or program

	V0634: Concluiu o curso no qual estudou?			
	1 Yes Years of schooling	Obs.	2 No Years of schooling	Missing Years of schooling Obs.
V0633: Curso mais elevado que frequentou				
1 Creche, pré-escolar, classe de alfabetização	0.0	38,285	0.0	142,766
2 Alfabetização de jovens e adultos	0.0	53,111	0.0	166,777
3 Antigo primário (elementar) <sup>1</sup>	4.0	422,709	2.5	636,492
4 Antigo ginásio (médio 1º ciclo) <sup>2</sup>	8.0	99,749	6.1	68,223
5 Ensino fundamental ou 1º grau (da 1ª a 3ª série/do 1º ao 4º ano) <sup>3</sup>			2.1	1,909,622
6 Ensino fundamental ou 1º grau (4ª série/5º ano) <sup>4</sup>			4.0	1,138,943
7 Ensino fundamental ou 1º grau (da 5ª a 8ª série/6º ao 9º ano) <sup>5</sup>	8.0	1,057,641	5.8	1,318,831
8 Supletivo do ensino fundamental ou do 1º grau <sup>6</sup>	6.1	176,970	3.9	121,000
9 Antigo científico, clássico, etc.(médio 2º ciclo) <sup>7</sup>	11.0	91,788	9.8	16,837
10 Regular ou supletivo do ensino médio ou do 2º grau <sup>8</sup>	11.0	2,766,695	9.6	625,792
11 Superior de graduação <sup>9</sup>	15.3	783,361	13.2	224,554
12 Especialização de nível superior (mínimo de 360 horas) <sup>9</sup>	15.3	160,779	13.2	11,074
13 Mestrado	17.0	29,428	17.0	3,751
14 Doutorado	17.0	12,810	17.0	1,189
Total				12,079,177

<sup>1</sup> This is the weighted average years of schooling (V4300) for V0432=2 (concluded, V0434=1; did not conclude, V0434=2) in the 2000 census.

<sup>2</sup> This is the weighted average years of schooling (V4300) for V0432=3 (concluded, V0434=1; did not conclude, V0434=2) in the 2000 census.

<sup>3</sup> This is the weighted average years of schooling for V0432=2, when years of schooling (V4300) is less than 4.

<sup>4</sup> By definition.

<sup>5</sup> This is the weighted average years of schooling (V4300) for V0432=5 (concluded, V0434=1; did not conclude, V0434=2 and V4300>4) in the 2000 census.

<sup>6</sup> This is the weighted average years of schooling (V4300) for V0432=2, 3, 5 (concluded, V0434=1; did not conclude, V0434=2) in the 2000 census.

<sup>7</sup> This is the weighted average years of schooling (V4300) for V0432=4 (concluded, V0434=1; did not conclude, V0434=2) in the 2000 census.

<sup>8</sup> This is the weighted average years of schooling (V4300) for V0432=6 (concluded, V0434=1; did not conclude, V0434=2) in the 2000 census.

<sup>9</sup> This is the weighted average years of schooling (V4300) for V0432=7 (concluded, V0434=1; did not conclude, V0434=2) in the 2000 census.

Table 4: Impacts on migration flows between 1981 and 1991, overall and for 1980s school-age cohorts

Neighborhood (percent):	2	2	3	3	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	N	Y	Y
	Comparison mean:								
<u>Out-migration rate, 1981 to 1991</u>									
II $X > 0$ ]	0.016 (0.019)	0.002 (0.019)	0.014 (0.015)	0.007 (0.014)	0.010 (0.013)	0.004 (0.013)	0.010 (0.013)	-0.004 (0.009)	-0.006 (0.011)
R-squared/Observations	0.46	0.50	0.40	0.45	0.37	0.41	0.37	0.86	854
<u>Out-migration rate, 9- to 18-yr., 1981 to 1991</u>									
II $X > 0$ ]	0.020 (0.023)	0.006 (0.022)	0.016 (0.019)	0.007 (0.017)	0.014 (0.016)	0.007 (0.016)	0.014 (0.016)	-0.009 (0.011)	-0.006 (0.015)
R-squared/Observations	0.47	0.51	0.41	0.46	0.37	0.41	0.37	0.92	715
<u>Out-migration rate, 19- to 28-yr., 1981 to 1991</u>									
II $X > 0$ ]	0.012 (0.020)	-0.007 (0.019)	0.015 (0.016)	0.006 (0.015)	0.013 (0.014)	0.004 (0.013)	0.013 (0.014)	-0.000 (0.009)	0.000 (0.010)
R-squared/Observations	0.40	0.47	0.33	0.40	0.28	0.36	0.28	0.851	756
<u>In-migration rate, 1981 to 1991</u>									
II $X > 0$ ]	-0.030 (0.040)	-0.015 (0.042)	0.012 (0.057)	0.001 (0.056)	0.032 (0.059)	0.021 (0.054)	0.032 (0.059)	0.025 (0.031)	0.025 (0.038)
R-squared/Observations	0.42	0.50	0.20	0.26	0.15	0.22	0.15	1.041	1034
<u>In-migration rate, 9- to 18-yr., 1981 to 1991</u>									
II $X > 0$ ]	-0.036 (0.044)	-0.020 (0.045)	0.005 (0.053)	-0.006 (0.052)	0.027 (0.053)	0.016 (0.049)	0.027 (0.053)	0.025 (0.027)	0.020 (0.038)
R-squared/Observations	0.40	0.50	0.22	0.30	0.18	0.27	0.18	1.164	886
<u>In-migration rate, 19- to 28-yr., 1981 to 1991</u>									
II $X > 0$ ]	-0.016 (0.035)	0.000 (0.036)	0.026 (0.052)	0.017 (0.049)	0.041 (0.053)	0.031 (0.053)	0.041 (0.053)	0.032 (0.026)	0.034 (0.034)
R-squared/Observations	0.44	0.52	0.22	0.29	0.17	0.25	0.17	1.113	954
Observations	202	199	297	294	391	387	391		

Notes: Authors' calculations of migration rates are based on long-form samples from the 1991 census. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaram (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.



Table 5: Impacts on schooling for 1980s school-age cohorts, 1991, natives, in- and out-migrants

Neighborhood (percent):	2	3	3	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	Y	Y
	Comparison mean:							
<u>Avg. schooling, natives (19- to 28-yr in 1991)</u>								
I[X > 0]	0.390 (0.278)	0.306* (0.164)	0.590*** (0.211)	0.377*** (0.123)	0.573*** (0.181)	0.320*** (0.110)	0.304*** (0.100)	0.395*** (0.126)
R-squared/Observations	0.72	0.89	0.71	0.89	0.68	0.88	557	430
<u>Avg. schooling, out-migrants (19- to 28-yr in 1991)</u>								
I[X > 0]	0.286 (0.300)	0.226 (0.241)	0.526** (0.208)	0.390** (0.173)	0.574*** (0.184)	0.374** (0.149)	0.219** (0.107)	0.219* (0.118)
R-squared/Observations	0.53	0.69	0.53	0.68	0.50	0.69	794	886
<u>Avg. schooling, in-migrants (19- to 28-yr in 1991)</u>								
I[X > 0]	0.299 (0.331)	0.135 (0.298)	0.401 (0.264)	0.196 (0.248)	0.490** (0.232)	0.244 (0.218)	0.152 (0.141)	0.213 (0.182)
R-squared/Observations	0.44	0.55	0.46	0.54	0.49	0.58	926	725
<u>Avg. schooling, natives (9- to 18-yr in 1991)</u>								
I[X > 0]	0.189 (0.167)	0.154 (0.094)	0.271** (0.123)	0.155** (0.073)	0.268*** (0.103)	0.119* (0.064)	0.113** (0.066)	0.113** (0.055)
R-squared/Observations	0.84	0.94	0.83	0.93	0.81	0.93	611	761
<u>Avg. schooling, out-migrants (9- to 18-yr in 1991)</u>								
I[X > 0]	-0.047 (0.162)	-0.082 (0.141)	0.039 (0.119)	-0.018 (0.103)	0.103 (0.100)	0.028 (0.090)	-0.005 (0.059)	0.010 (0.079)
R-squared/Observations	0.70	0.77	0.70	0.75	0.69	0.74	1044	794
<u>Avg. schooling, in-migrants (9- to 18-yr in 1991)</u>								
I[X > 0]	0.362* (0.209)	0.314 (0.191)	0.296* (0.153)	0.190 (0.141)	0.223* (0.129)	0.102 (0.123)	0.094 (0.085)	0.087 (0.089)
R-squared/Observations	0.62	0.69	0.63	0.69	0.65	0.71	776	1004
Observations	202	199	297	294	391	387		

Notes: Authors' calculations of average schooling are based on the long-form sample of the 1991 census. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaram (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 6: Impacts on literacy for 1980s school-age cohorts, 1991, natives, in- and out-migrants

Neighborhood (percent):	2	2	3	3	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	Y	Y
	Comparison mean:							
<u>Literacy rate, natives (19- to 28-yr in 1991)</u>								
I[X > 0]	0.062** (0.028)	0.054*** (0.016)	0.069*** (0.020)	0.056*** (0.013)	0.063*** (0.017)	0.044*** (0.011)	0.039*** (0.010)	0.048*** (0.012)
R-squared/Observations	0.77	0.91	0.79	0.91	0.79	0.91	512	420
<u>Literacy rate, out-migrants (19- to 28-yr in 1991)</u>								
I[X > 0]	0.002 (0.022)	-0.004 (0.018)	0.020 (0.016)	0.012 (0.014)	0.026* (0.014)	0.014 (0.012)	0.008 (0.008)	0.009 (0.010)
R-squared/Observations	0.69	0.79	0.69	0.78	0.70	0.79	901	714
<u>Literacy rate, in-migrants (19- to 28-yr in 1991)</u>								
I[X > 0]	0.056* (0.034)	0.046 (0.029)	0.047* (0.026)	0.036 (0.025)	0.057** (0.023)	0.041* (0.022)	0.019 (0.014)	0.028 (0.020)
R-squared/Observations	0.60	0.65	0.64	0.68	0.66	0.69	1098	714
<u>Literacy rate, natives (9- to 18-yr in 1991)</u>								
I[X > 0]	0.035 (0.030)	0.026 (0.020)	0.040* (0.022)	0.024 (0.015)	0.042** (0.018)	0.021 (0.013)	0.020* (0.010)	0.018* (0.010)
R-squared/Observations	0.81	0.92	0.81	0.91	0.81	0.91	649	902
<u>Literacy rate, out-migrants (9- to 18-yr in 1991)</u>								
I[X > 0]	0.019 (0.029)	0.010 (0.026)	0.029 (0.020)	0.020 (0.018)	0.027 (0.017)	0.016 (0.016)	0.006 (0.009)	0.007 (0.013)
R-squared/Observations	0.72	0.77	0.72	0.76	0.73	0.78	1130	823
<u>Literacy rate, in-migrants (9- to 18-yr in 1991)</u>								
I[X > 0]	0.054 (0.035)	0.047 (0.031)	0.056** (0.024)	0.041* (0.023)	0.061*** (0.022)	0.043** (0.021)	0.042** (0.019)	0.049** (0.021)
R-squared/Observations	0.67	0.71	0.68	0.72	0.69	0.73	616	656
Observations	202	199	297	294	391	387		

Notes: Authors' calculations of literacy rates are based on the long-form sample of the 1991 census. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaram (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 7: Impacts on the proportion of native residents in 1991, 2000 and 2010, by age group

Neighborhood (percent):	2	3	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
	Comparison mean:						
<u>Proportion of native residents 19- to 28-yo in 1991</u>							
I[X > 0]	0.034 (0.038)	0.020 (0.033)	0.023 (0.032)	0.026 (0.028)	0.019 (0.028)	0.019 (0.016)	0.000 (0.019)
R-squared/Observations	0.54	0.67	0.48	0.57	0.44	0.53	845
<u>Proportion of native residents 28- to 37-yo in 2000</u>							
I[X > 0]	0.047 (0.033)	0.033 (0.032)	0.026 (0.030)	0.031 (0.028)	0.017 (0.026)	0.007 (0.012)	0.005 (0.018)
R-squared/Observations	0.49	0.61	0.44	0.53	0.40	0.49	899
<u>Proportion of native residents 38- to 47-yo in 2010</u>							
I[X > 0]	0.056 (0.037)	0.039 (0.033)	0.038 (0.032)	0.043 (0.028)	0.024 (0.027)	-0.005 (0.011)	0.013 (0.019)
R-squared/Observations	0.51	0.62	0.44	0.56	0.42	0.52	810
<u>Proportion of native residents 9- to 18-yo in 1991</u>							
I[X > 0]	0.002 (0.029)	-0.010 (0.025)	-0.001 (0.025)	0.003 (0.023)	-0.008 (0.022)	-0.012 (0.019)	-0.011 (0.016)
R-squared/Observations	0.50	0.67	0.43	0.56	0.40	0.52	848
<u>Proportion of native residents 18- to 27-yo in 2000</u>							
I[X > 0]	0.037 (0.031)	0.019 (0.027)	0.026 (0.028)	0.031 (0.025)	0.012 (0.024)	0.019 (0.013)	0.009 (0.016)
R-squared/Observations	0.46	0.62	0.40	0.53	0.37	0.49	877
<u>Proportion of native residents 28- to 37-yo in 2010</u>							
I[X > 0]	0.056* (0.033)	0.045 (0.029)	0.036 (0.028)	0.050** (0.025)	0.009 (0.024)	0.024 (0.021)	0.018 (0.017)
R-squared/Observations	0.53	0.69	0.47	0.61	0.44	0.57	732
Observations	202	199	297	294	391	387	

Notes: Authors' calculations of proportion of native residents are based on long-form samples from the 1991, 2000, and 2010 censuses. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaram (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 8: Impacts on in-migration flow rates between 1980 and 1991, 2000, and 2010, by age-group

Neighborhood (percent):	2	2	3	3	4	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	N	Y	Y	Y
Comparison mean:										
<u>In-migration rate, 9- to 18-yr., 1981 to 1991</u>										
I[X > 0]	-0.036 (0.044)	-0.020 (0.045)	0.005 (0.053)	-0.006 (0.052)	0.027 (0.053)	0.016 (0.049)	0.025 (0.027)	0.020 (0.038)	0.025 (0.027)	0.020 (0.038)
R-squared/Observations	0.40	0.50	0.22	0.30	0.18	0.27	0.164	0.886	1.164	886
<u>In-migration rate, 18- to 27-yr., 1981 to 2000</u>										
I[X > 0]	-0.083 (0.095)	-0.043 (0.095)	-0.012 (0.115)	-0.041 (0.115)	0.047 (0.114)	0.017 (0.109)	0.030 (0.055)	0.040 (0.071)	0.030 (0.055)	0.040 (0.071)
R-squared/Observations	0.36	0.44	0.20	0.29	0.16	0.25	1.129	1.053	1.129	1053
<u>In-migration rate, 28- to 37-yr., 1981 to 2010</u>										
I[X > 0]	-0.093 (0.142)	-0.032 (0.136)	-0.006 (0.144)	-0.044 (0.143)	0.055 (0.137)	0.016 (0.131)	0.022 (0.082)	0.032 (0.095)	0.022 (0.082)	0.032 (0.095)
R-squared/Observations	0.31	0.41	0.21	0.31	0.18	0.28	0.847	0.954	0.847	954
<u>In-migration rate, 19- to 28-yr., 1981 to 1991</u>										
I[X > 0]	-0.016 (0.035)	0.000 (0.036)	0.026 (0.052)	0.017 (0.049)	0.041 (0.053)	0.031 (0.053)	0.032 (0.026)	0.034 (0.034)	0.032 (0.026)	0.034 (0.034)
R-squared/Observations	0.44	0.52	0.22	0.29	0.17	0.25	1.113	0.954	1.113	954
<u>In-migration rate, 28- to 37-yr., 1981 to 2000</u>										
I[X > 0]	-0.065 (0.086)	-0.039 (0.089)	0.011 (0.118)	-0.017 (0.118)	0.064 (0.120)	0.036 (0.115)	0.030 (0.052)	0.049 (0.058)	0.030 (0.052)	0.049 (0.058)
R-squared/Observations	0.38	0.44	0.19	0.25	0.14	0.20	1.248	1.099	1.248	1099
<u>In-migration rate, 38- to 47-yr., 1981 to 2010</u>										
I[X > 0]	-0.061 (0.110)	-0.024 (0.112)	0.010 (0.127)	-0.022 (0.129)	0.051 (0.125)	0.021 (0.122)	0.023 (0.056)	0.032 (0.081)	0.023 (0.056)	0.032 (0.081)
R-squared/Observations	0.32	0.38	0.17	0.24	0.14	0.21	1.237	1.011	1.237	1011
Observations	202	199	297	294	391	387				

Notes: Authors' calculations of migration rates are based on long-form samples from the 1991, 2000 and 2010 censuses. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaraman (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 9: Impacts on primary and middle school net enrollment rates and ENEM participation rate

Neighborhood (percent):	2	2	3	3	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	N	Y	Y
Comparison mean:									
<u>Net enrollment rate of 7- to 10-year-olds in 2010</u>									
II[X > 0]	-0.002 (0.006)	-0.007 (0.006)	-0.006 (0.006)	-0.010* (0.006)	-0.002 (0.005)	-0.006 (0.005)	-0.003 (0.004)	-0.003 (0.004)	-0.002 (0.003)
R-squared/Observations	0.48	0.58	0.40	0.48	0.35	0.40	0.35	0.40	0.24
<u>Net enrollment rate of 11- to 14-year-olds in 2010</u>									
II[X > 0]	-0.003 (0.007)	-0.008 (0.006)	-0.005 (0.005)	-0.010** (0.005)	0.002 (0.005)	-0.002 (0.004)	-0.003 (0.003)	-0.003 (0.003)	-0.005 (0.004)
R-squared/Observations	0.43	0.52	0.38	0.46	0.33	0.39	0.33	0.39	0.75
<u>Net enrollment rate of 7- to 10-year-olds in 2010 (public)</u>									
II[X > 0]	-0.028* (0.015)	-0.032** (0.014)	-0.030** (0.013)	-0.028** (0.013)	-0.025** (0.011)	-0.022* (0.011)	-0.012 (0.008)	-0.012 (0.008)	-0.007 (0.008)
R-squared/Observations	0.27	0.37	0.22	0.33	0.20	0.32	0.20	0.32	0.40
<u>Net enrollment rate of 11- to 14-year-olds in 2010 (public)</u>									
II[X > 0]	-0.016 (0.012)	-0.019 (0.012)	-0.020* (0.011)	-0.017 (0.011)	-0.012 (0.010)	-0.009 (0.009)	-0.007 (0.006)	-0.007 (0.006)	-0.010 (0.008)
R-squared/Observations	0.33	0.44	0.26	0.39	0.23	0.35	0.23	0.35	0.85
<u>ENEM participation rate of 16- to 21-year-olds in 2010</u>									
II[X > 0]	0.013 (0.023)	-0.003 (0.022)	0.026 (0.018)	0.012 (0.017)	0.037** (0.015)	0.020 (0.014)	0.013 (0.011)	0.013 (0.011)	0.011 (0.011)
R-squared/Observations	0.46	0.57	0.48	0.56	0.48	0.55	0.48	0.55	0.18
Observations	202	199	297	294	391	387	391	387	387

Notes: Authors' calculations of net enrollment rates and ENEM participation rates are based on the 2010 census and ENEM 2007-2011 test-taker samples of high school (12th grade) graduating cohorts. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaram (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 10: Impacts on the distribution of Prova Brasil test scores, 2007, 2009 and 2011, 4th or 5th graders

Neighborhood (percent):	2	3	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	Y
	Comparison mean:						
<u>Average test score</u>							
I[X > 0]	-0.023 (0.099)	-0.030 (0.099)	-0.003 (0.073)	-0.032 (0.071)	0.022 (0.062)	-0.018 (0.060)	-0.029 (0.051)
R-squared/Observations	0.74	0.77	0.76	0.80	0.76	0.80	683
<u>10<sup>th</sup> percentile</u>							
I[X > 0]	0.027 (0.085)	0.025 (0.088)	0.041 (0.063)	0.021 (0.064)	0.055 (0.053)	0.028 (0.053)	0.001 (0.041)
R-squared/Observations	0.62	0.66	0.65	0.69	0.63	0.68	769
<u>25<sup>th</sup> percentile</u>							
I[X > 0]	0.002 (0.098)	0.002 (0.100)	0.025 (0.072)	0.001 (0.072)	0.050 (0.061)	0.015 (0.060)	-0.001 (0.047)
R-squared/Observations	0.67	0.71	0.70	0.74	0.68	0.73	729
<u>Median test score</u>							
I[X > 0]	-0.029 (0.108)	-0.035 (0.109)	-0.008 (0.080)	-0.038 (0.078)	0.021 (0.067)	-0.023 (0.065)	-0.031 (0.055)
R-squared/Observations	0.72	0.76	0.75	0.78	0.74	0.79	696
<u>75<sup>th</sup> percentile</u>							
I[X > 0]	-0.036 (0.113)	-0.046 (0.111)	-0.024 (0.085)	-0.058 (0.082)	0.002 (0.072)	-0.044 (0.069)	-0.057 (0.162)
R-squared/Observations	0.75	0.79	0.78	0.81	0.78	0.81	646
<u>90<sup>th</sup> percentile</u>							
I[X > 0]	-0.051 (0.116)	-0.067 (0.111)	-0.038 (0.087)	-0.071 (0.083)	-0.011 (0.073)	-0.055 (0.070)	-0.045 (0.061)
R-squared/Observations	0.76	0.80	0.79	0.82	0.79	0.82	696
Observations	202	199	297	294	391	387	

Notes: PB 2007 4<sup>th</sup> grade, 2009 5<sup>th</sup> grade, and 2011 5<sup>th</sup> grade test-taker samples. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaram (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 11: Impacts on parents' education levels, Prova Brasil 2007, 2009 and 2011, 4th or 5th graders

Neighborhood (percent):	2	2	3	3	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	Y	Y	Y
	Comparison mean:								
<u>No more than primary school</u>	0.42								
I[X > 0]	-0.028** (0.014)	-0.027** (0.013)	-0.025** (0.011)	-0.018* (0.011)	-0.032*** (0.009)	-0.026*** (0.009)	-0.015** (0.006)	-0.018** (0.008)	623
R-squared/Observations	0.60	0.66	0.59	0.65	0.58	0.62	0.62	0.860	623
<u>Some middle school</u>	0.21								
I[X > 0]	0.010 (0.011)	0.006 (0.011)	-0.002 (0.009)	-0.001 (0.009)	-0.001 (0.008)	-0.000 (0.008)	0.009* (0.005)	0.007 (0.007)	742
R-squared/Observations	0.37	0.44	0.35	0.42	0.30	0.39	0.39	1.234	742
<u>Some high school</u>	0.15								
I[X > 0]	0.008 (0.008)	0.008 (0.007)	0.013** (0.006)	0.011* (0.006)	0.008 (0.005)	0.006 (0.005)	0.005 (0.004)	0.005 (0.005)	656
R-squared/Observations	0.28	0.40	0.24	0.35	0.21	0.30	0.30	0.756	656
<u>Completed at least high school</u>	0.22								
I[X > 0]	0.011 (0.012)	0.013 (0.012)	0.014 (0.010)	0.008 (0.010)	0.025*** (0.009)	0.020** (0.009)	-0.000 (0.005)	0.005 (0.008)	722
R-squared/Observations	0.53	0.58	0.53	0.58	0.51	0.57	0.57	1.367	722
Observations	202	199	297	294	391	387	387	387	387

Notes: PB 2007 4th grade, 2009 5th grade, and 2011 5th grade test-taker samples. The four categories correspond to the highest education level of the most educated parent. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaraman (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 12: Impacts on schooling for 1980s school-age cohorts, 1991, 2000 and 2010, native non-migrants

Neighborhood (percent):	2	2	3	3	4	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	N	Y	Y	Y
Comparison mean:										
<u>Avg. schooling (19- to 28-year-olds in 1991)</u>	4.23									
I[X > 0]	0.390 (0.278)	0.306* (0.164)	0.590*** (0.211)	0.377*** (0.123)	0.573*** (0.181)	0.320*** (0.110)	0.304*** (0.100)	0.395*** (0.126)		
R-squared/Observations	0.72	0.89	0.71	0.89	0.68	0.88	0.57	430		
<u>Avg. schooling (28- to 37-year-olds in 2000)</u>	4.84									
I[X > 0]	0.058 (0.258)	-0.012 (0.192)	0.379* (0.211)	0.165 (0.150)	0.354** (0.178)	0.105 (0.131)	0.106 (0.108)	0.153 (0.134)		
R-squared/Observations	0.73	0.86	0.69	0.85	0.66	0.85	0.639	550		
<u>Avg. schooling (38- to 47-year-olds in 2010)</u>	5.00									
I[X > 0]	0.049 (0.269)	-0.052 (0.215)	0.372 (0.227)	0.134 (0.175)	0.348* (0.188)	0.103 (0.145)	-0.040 (0.099)	0.027 (0.139)		
R-squared/Observations	0.65	0.80	0.58	0.77	0.56	0.77	0.932	683		
<u>Avg. schooling (9- to 18-year-olds in 1991)</u>	2.67									
I[X > 0]	0.189 (0.167)	0.154 (0.094)	0.271** (0.123)	0.155** (0.073)	0.268*** (0.103)	0.119* (0.064)	0.113** (0.066)	0.113** (0.055)		
R-squared/Observations	0.84	0.94	0.83	0.93	0.81	0.93	0.611	761		
<u>Avg. schooling (18- to 27-year-olds in 2000)</u>	5.83									
I[X > 0]	0.267 (0.270)	0.216 (0.201)	0.475** (0.209)	0.282* (0.155)	0.479*** (0.174)	0.271** (0.132)	0.133 (0.106)	0.270** (0.135)		
R-squared/Observations	0.74	0.86	0.72	0.85	0.72	0.85	0.695	544		
<u>Avg. schooling (28- to 37-year-olds in 2010)</u>	6.26									
I[X > 0]	0.128 (0.265)	0.047 (0.228)	0.453** (0.227)	0.228 (0.179)	0.512*** (0.195)	0.276* (0.154)	0.061 (0.112)	0.204 (0.158)		
R-squared/Observations	0.65	0.79	0.59	0.77	0.57	0.76	0.843	595		
Observations	202	199	297	294	391	387				

Notes: Authors' calculations of average schooling are based on long-form samples from the 1991, 2000 and 2010 censuses. Samples were restricted to native non-migrants. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaraman (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.



Table 13: Impacts on literacy for 1980s school-age cohorts, 1991, 2000 and 2010, native non-migrants

Neighborhood (percent):	2	2	3	3	4	4	4	IK	CCT
Pretreatment covariates:	N	Y	N	Y	N	Y	Y	Y	Y
	Comparison mean:								
<u>Literacy rate (19- to 28-year-olds in 1991)</u>									
I[X > 0]	0.062** (0.028)	0.054*** (0.016)	0.069*** (0.020)	0.056*** (0.013)	0.063*** (0.017)	0.044*** (0.011)	0.039*** (0.010)	0.048*** (0.012)	0.048*** (0.012)
R-squared/Observations	0.77	0.91	0.79	0.91	0.79	0.91	0.91	0.512	420
<u>Literacy rate (28- to 37-year-olds in 2000)</u>									
I[X > 0]	0.019 (0.024)	0.012 (0.016)	0.047** (0.019)	0.033** (0.014)	0.037** (0.016)	0.019* (0.012)	0.014 (0.009)	0.018 (0.011)	0.018 (0.011)
R-squared/Observations	0.77	0.89	0.77	0.88	0.76	0.88	0.612	534	
<u>Literacy rate (38- to 47-year-olds in 2010)</u>									
I[X > 0]	0.029 (0.022)	0.019 (0.013)	0.039** (0.016)	0.027** (0.010)	0.040*** (0.014)	0.024*** (0.009)	0.016** (0.009)	0.021** (0.010)	0.021** (0.010)
R-squared/Observations	0.80	0.92	0.80	0.91	0.80	0.90	0.536	473	
<u>Literacy rate (9- to 18-year-olds in 1991)</u>									
I[X > 0]	0.035 (0.030)	0.026 (0.020)	0.040* (0.022)	0.024 (0.015)	0.042** (0.018)	0.021 (0.013)	0.020* (0.010)	0.018* (0.010)	0.018* (0.010)
R-squared/Observations	0.81	0.92	0.81	0.91	0.81	0.91	0.625	902	
<u>Literacy rate (18- to 27-year-olds in 2000)</u>									
I[X > 0]	0.026 (0.017)	0.020* (0.012)	0.032*** (0.012)	0.024** (0.009)	0.027*** (0.010)	0.017** (0.008)	0.008 (0.006)	0.016** (0.008)	0.016** (0.008)
R-squared/Observations	0.75	0.86	0.75	0.85	0.75	0.84	0.696	466	
<u>Literacy rate (28- to 37-year-olds in 2010)</u>									
I[X > 0]	0.021 (0.017)	0.012 (0.012)	0.031** (0.013)	0.021** (0.010)	0.031*** (0.011)	0.019** (0.009)	0.015** (0.007)	0.017** (0.008)	0.017** (0.008)
R-squared/Observations	0.78	0.88	0.77	0.86	0.77	0.85	0.651	644	
Observations	202	199	297	294	391	387			

Notes: Authors' calculations of literacy rates are based on long-form samples from the 1991, 2000 and 2010 censuses. Samples were restricted to native non-migrants. All specifications pool across the first three cutoffs and include state fixed effects and segment dummies. Columns 1 through 6 are OLS local linear discontinuity estimates with robust standard errors in parentheses. OLS specifications allow for differential slopes by segment and on each side of the cutoff. Columns 7 and 8 give estimates and standard errors based on Imbens-Kalyanaraman (IK) and Calonico, Cattaneo, and Titiunik (CCT) optimal bandwidths. Neighborhood (percent) is percent distance from respective cutoff. 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. (\*\*\*, \*\*, and \*) denote significance at the 1 percent, 5 percent and 10 percent levels, respectively.