Heterogeneous impact of Results-Based Education Financing

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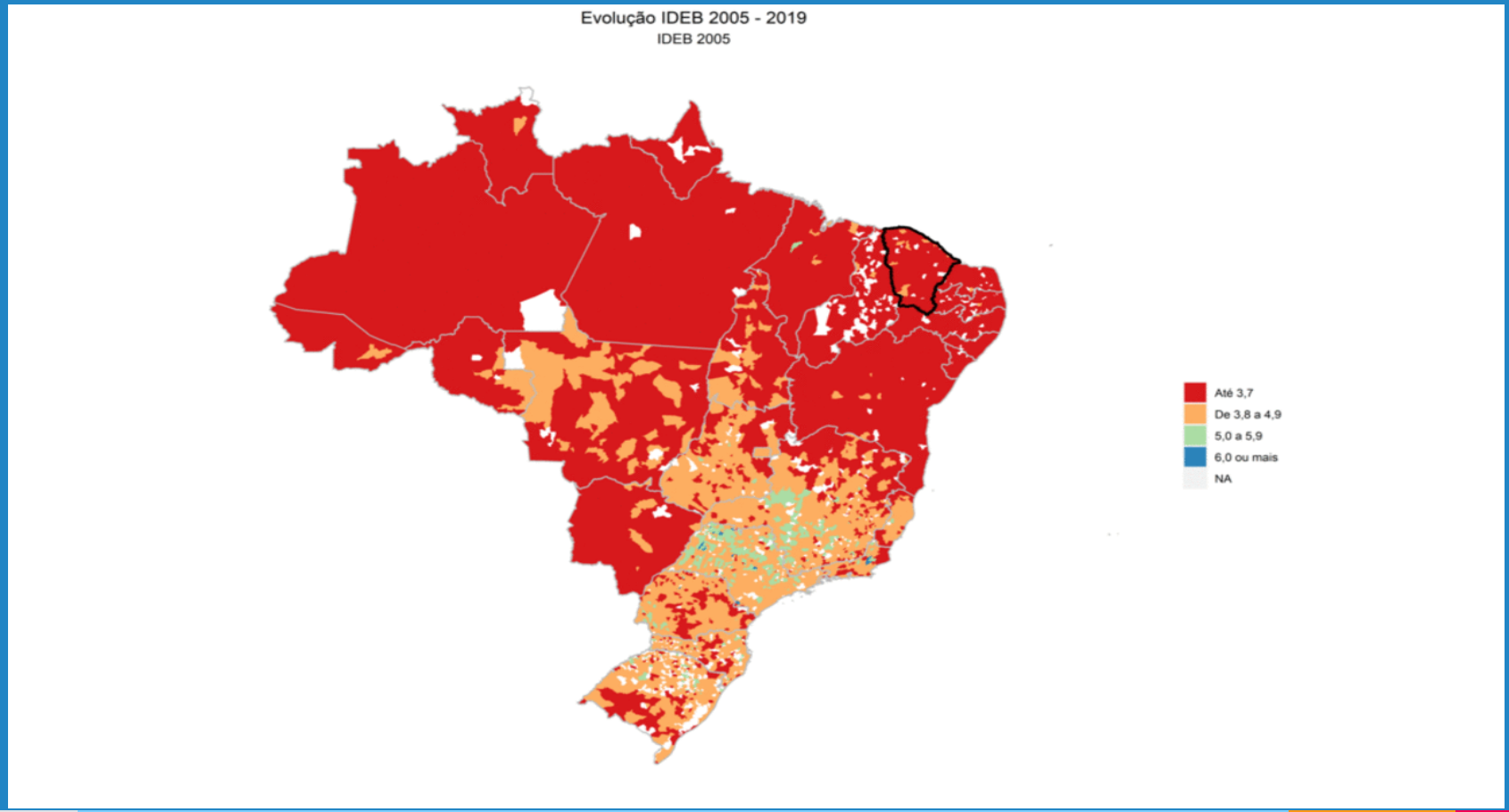
Summary

- Motivation
  - Ceara's Educational Success
  - Uniqueness of the ICMS Policy
  - Spending Incentives and Possible Heterogeneity
  - Database and Empirical Strategy
- Results
  - Spent Results
  - Educational Results
    - Mechanisms
- Conclusions

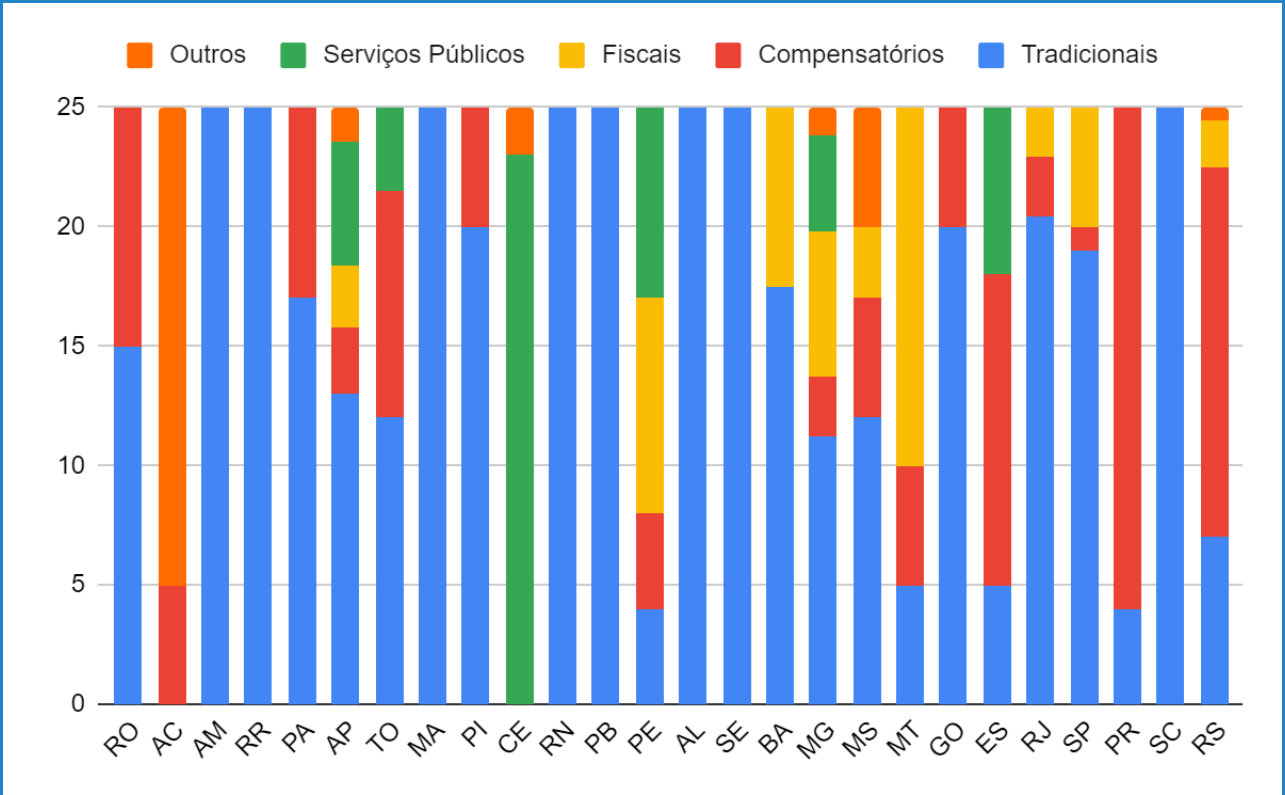
Motivation

Ceará was the first state to introduce a tax transfer redistribution policy based on the municipalities' aggregate educational performance, achieving relevant educational results.

What are the Educational Outcomes over the last 14 years?



How ICMS is distributed by the States



Tradicionais referentes ao VAF, parte igualitária, população e área geográfica; **Compensatórios** que visam ressarcir determinados municípios de situações ou atividades que não integram a base de incidência do ICMS; **Fiscais** que levam em conta a receita tributária própria municipal e algumas medida de carência de recursos com vistas à equalização da capacidade orçamentária municipal; **Serviços públicos** incluem as políticas de educação, saúde e saneamento; **Outros** contemplam entre os programas estaduais de caráter bem particular como a preservação do patrimônio cultural, atividades ligadas ao esporte e ao turismo, bem como o número de eleitores.

Spending Incentives

Fungible resources

Results at the municipal level

Potential Heterogeneity

Database

Quota Part Effect

- FINBRA
- IPECEDATA

Impact of ICMS Change

- Microdata SPAECE-Alfa
- School Census

Empirical Strategy

Impact of LCP on municipal public spending

$$\Delta Y_{gmt} = \sum_{t=2004}^{2007} \beta_{1t} \Delta CP_{mt} \times I(m = Q_1) + \sum_{t=2009}^{2017} \beta_{2t} \Delta CP_{mt} \times I(m = Q_1) \times I(After) + \delta' X_{gmt} + \tau_m + \tau_t + \gamma_{mt} + \varepsilon_{mt}$$

$$\Delta Y_{gmt} = \frac{G_{gmt} - G_{gm,2008}}{Pop_{m,2008}}$$

$$\Delta CP_{mt} = \frac{CP_{mt} - C_{m,2008}}{Pop_{m,2008}}$$

Effect of LCP on educational inequality

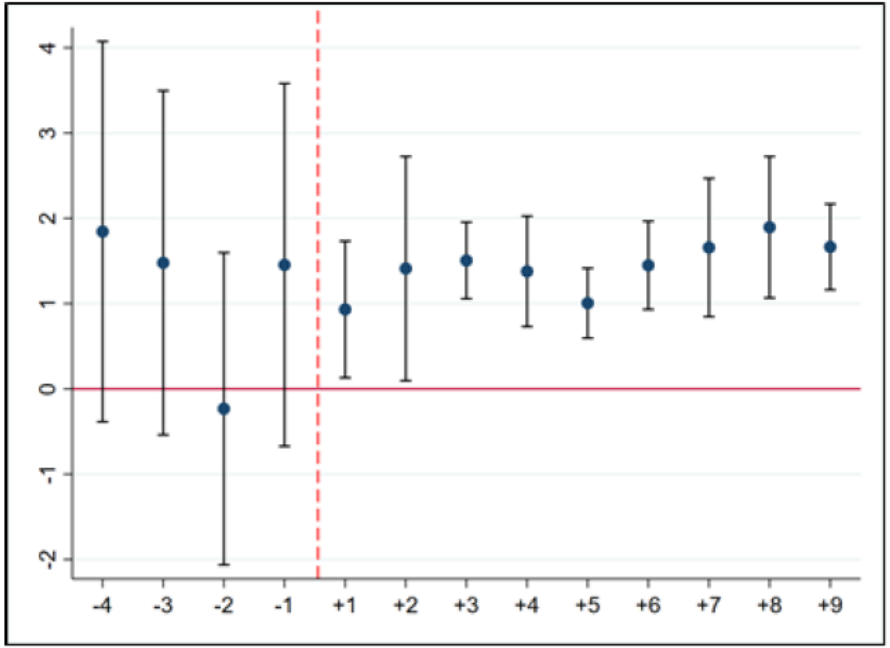
$$y_{imt} = \beta_0 + \sum_{k=1}^{2} \beta_k \times I(CP_m) + \delta' X_{imt} + \tau_t + \theta_m + u_{imt}$$

Results

Spent Results

Effect on Total Spending of the Quota Part Law

Figure 2: Effect on Total Expenditure of the Share *Quota-Parte* program



Note: Figure 2 presents the estimated impact of the introduction of *Quota Parte* program, denoted in a red vertical dash line. The results after implementation indicate that total municipal spending increased significantly. Such impact is persistent over time, suggesting that QLP produced long-term changes in the number of resources spent.

Figure 3: Total intergovernmental transfers received by municipals

Figure A

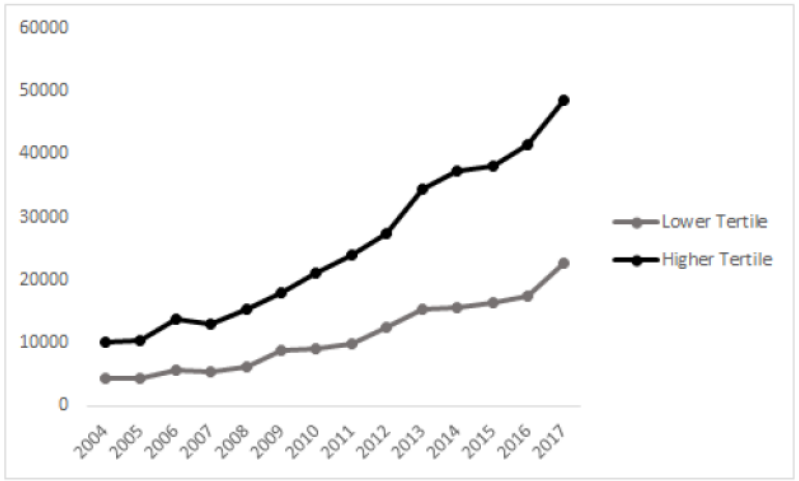
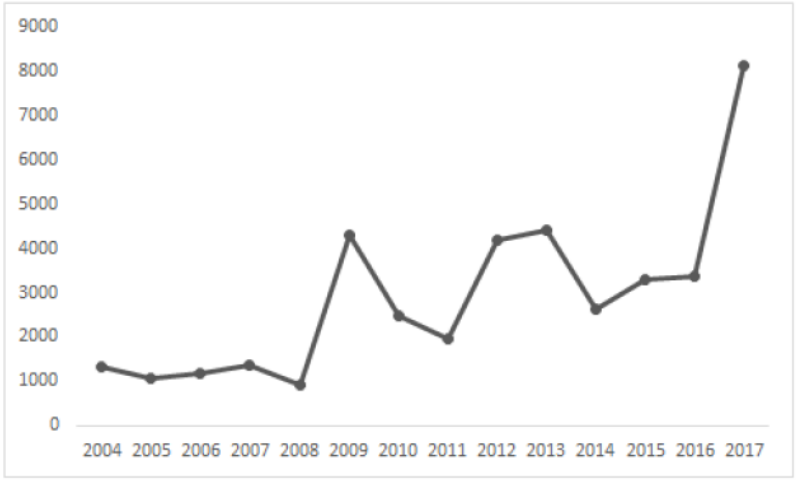


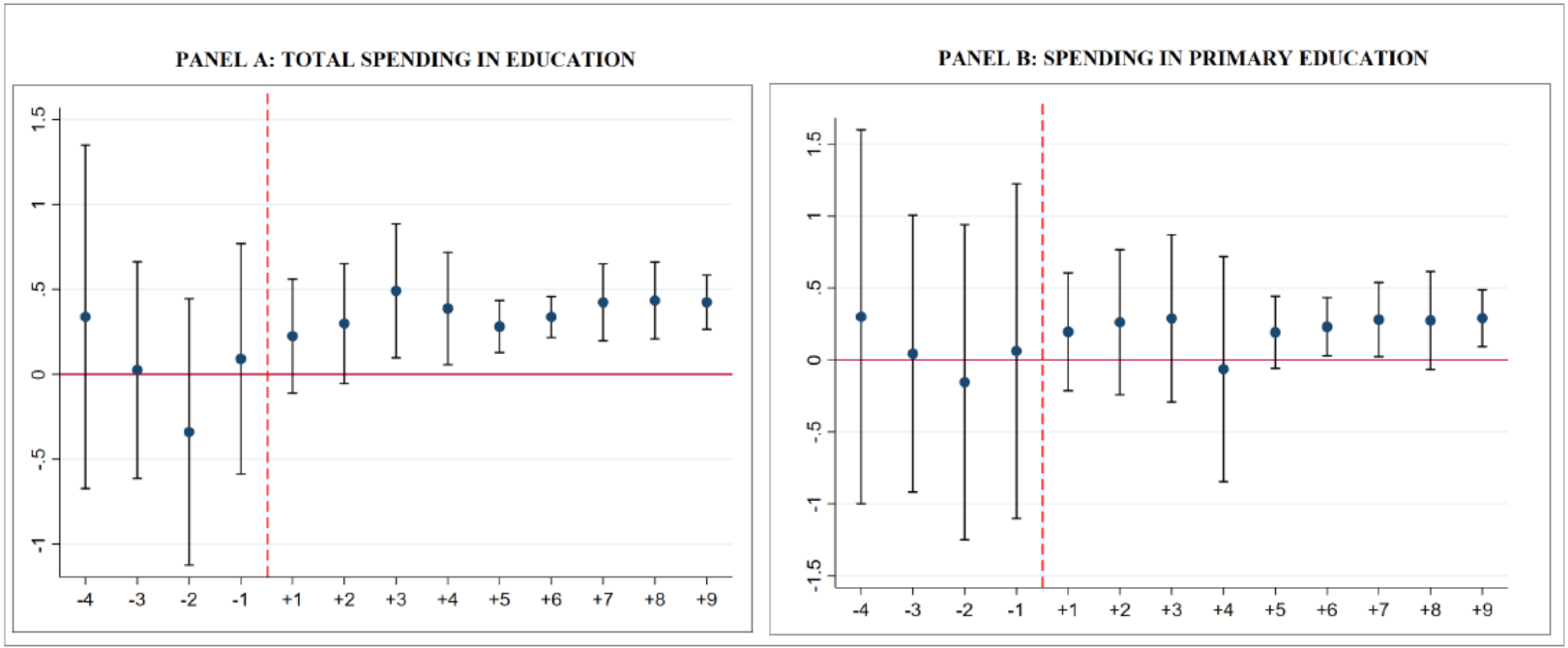
Figure B



Note: Figure 3 presents the total of intergovernmental transfers received by municipals separated in two groups: Lower and higher tercile according to our main measure of municipal educational achievement (IQE).

Effect of the Quota Parte Law on Spending on Education and Elementary Education

Figure 4: Effect of the Share *Quota-Parte* program on Education and Elementary Education Spending



Note: Panel A shows spending on education. It is noticed that expenditure increased due to LCP. Panel B showing spending on primary education has not shown significant results in almost every year (before and after LCP).

Educational Results

Table 3: Educational Results

	k=1	k=2
Treatment	0.537	1.112***
	(0.340)	(0.376)
Obs	10,120	10,200
R^2	0.689	0.551
Municipal F.E.	Y	Y
Year F.E.	Y	Y

Robust Standard Errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Note: k=1 ->Lower school median + 3rd tertile cp in relation to 1st tertile cp

k=2 ->Upper median school + 3rd tertile cp in relation to 1st tertile cp

Table 4: Educational robustness results

Panel A: Adding Controls	k=1	k=2
Treatment	0.498	1.631***
	(0.440)	(0.518)
Obs	8,389	8,648
R^2	0.702	0.575
Panel B: Matching by Entropy	**k=1**	**k=2**
Treatment	0.327	1.116***
	(0.354)	(0.393)
Obs	8,389	8,648
R^2	0.718	0.604
Municipal F.E. by Cohort	Y	Y
Year F.E.	Y	Y

Robust Standard Errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Note: The treatment parameter analyzes the impact of the interaction between schools' proficiency and the transfer of the quota, previously part of the change in legislation. Each column represents a median of proficiency (lowest performance (1) to upper performance (2), respectively). The median is associated with the transfer of LCP (municipalities most benefited with the affected ones) in order to be able to define the treatment variable.

Mechanisms

Table 5: Mechanisms Results

	Management Complexity		Teacher's Adequacy		Teacher's Effort I		Teacher's Effort II		Teacher's Effort III	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
treatment	0.500	0.160	1.062	-0.274	0.203	0.284	0.203	0.284	-0.770***	-0.802*
	(0.435)	(0.298)	(0.683)	(0.384)	(0.418)	(0.238)	(0.418)	(0.238)	(0.247)	(0.464)
Obs	2,404	2,513	2,179	2,373	2,179	2,373	2,179	2,373	2,179	2,373
R^2	0.339	0.306	0.442	0.406	0.312	0.271	0.312	0.271	0.382	0.382

	Teacher's Regularity		Students per Class		Class Duration		Teacher's with College Degree		(PCA)	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
treatment	0.895**	0.825***	-0.014	-.0007	2.540	-3.037	0.421**	-1.099***	-0.012	-1.488***
	(0.401)	(0.292)	(0.109)	(0.875)	(0.672)	(0.255)	(0.202)	(0.005)	(0.098)	(0.005)
Obs	2,395	2,513	1,571	1,848	1,703	2,029	1,631	1,692	1,188	1,274
R^2	0.370	0.382	0.414	0.318	0.699	0.638	0.444	0.424	0.003	0.547
Municipal and Year F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Matching by Entropy	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Robust Standard Errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Note: The variables are standardized to have mean zero and variance one, except for student per classand class duration, those variables arerelated to the supply and quality of public education. A heterogeneous variation of QLP program on those variables may indicate that mayors selected schools with different performances to spent the municipal resources.

Conclusions

Spent	Performance	Combined
LCP did not induce municipalities to increase their spending on education	Existence of a differentiated allocation of resources in the benefited municipalities	Spending in municipalities that benefited from the Cota Parte Law was more relevant for the best schools.

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Thank you !

Any Question?

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