

Cash Transfers and the Local Economy: Evidence from Brazil

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Context: Cash transfers (CTs) in developing countries

- ▶ In recent decades, social assistance increasingly through CTs
 - ▶ Main program in middle-income countries (Honorati et al., 2015)
- ▶ Well-established that CTs reduce poverty and improve well-being of beneficiaries in important ways (e.g., health, education)
- ▶ Controversy over economy-wide effects, e.g, on labor markets
 - If discourage beneficiaries to work
 - + If unlock beneficiaries' liquidity constraints to search for better jobs
 - + If spillover/multiplier effects in the local economy
- ▶ This paper: impacts of Bolsa Familia (PBF) on local economy
 - ▶ Large-scale means-tested CT, majority urban, running for 19 years

Evidence on beneficiaries' labor supply

- ▶ Programs that mostly generate income effects: no micro evidence that CT discourage recipients to work (e.g., Banerjee et al., 2017)
 - ▶ Eligibility proxy-means-tested and infrequently re-assessed
- ▶ Programs that generate substitution effects: evidence that CT can reduce formal labor supply (e.g., Bergolo and Cruces, 2020)
 - ▶ Eligibility means-tested and more frequently re-assessed
 - ▶ Sharper disincentives to work, at least in the formal sector
- ▶ Income is more observable as countries develop (Jensen, 2021)
 - means-testing bound to become more relevant

Less evidence on aggregate effects

- ▶ Evidence on aggregate effects of targeted cash transfers
 - ▶ Angelucci and De Giorgi (2009): spillovers on consumption of non-beneficiaries (*Progresa*, rural Mexico, credit and insurance)
 - ▶ Egger et al. (2022): spillovers on consumption and assets (temporary NGO CT, rural Kenya, no effect on employment)
- ▶ Evidence on aggregate effects of other low-income support
 - ▶ Positive effects of graduation programs on casual wage of ineligible women in rural Bangladesh (Bandiera et al, 2017)
 - ▶ Positive effects of workfare *NREGA* on local rural labor markets (Clement and Papp, 2015; Muralidharan et al., 2021)
 - ▶ Negative effects of *Seguro Popular* (health insurance if informal) on local formal employment in Mexico (e.g., Bosch and Campos-Vazquez, 2014; Conti et al., 2018)

Programa Bolsa Família (PBF)

- ▶ Largest CT program in the developing world
 - ▶ As of 2012: 13.9M families received benefits every month, corresponding to about 25% of population and 0.6% of GDP
 - ▶ Created in 2004 to simplify and expand existing social transfers
 - ▶ Important feature: PBF is not an entitlement program
 - ▶ Total number of slots for PBF beneficiaries set by federal budget
 - ▶ Divided across 5500+ municipalities based on municipal “quotas” (in fact estimates of municipal poverty rates from IBGE)
 - ▶ In 2009: number of slots increased and new way to calculate quotas
- ⇒ Large difference in additional beneficiaries across municipalities

Figure: Total number of slots and families over time in PBF

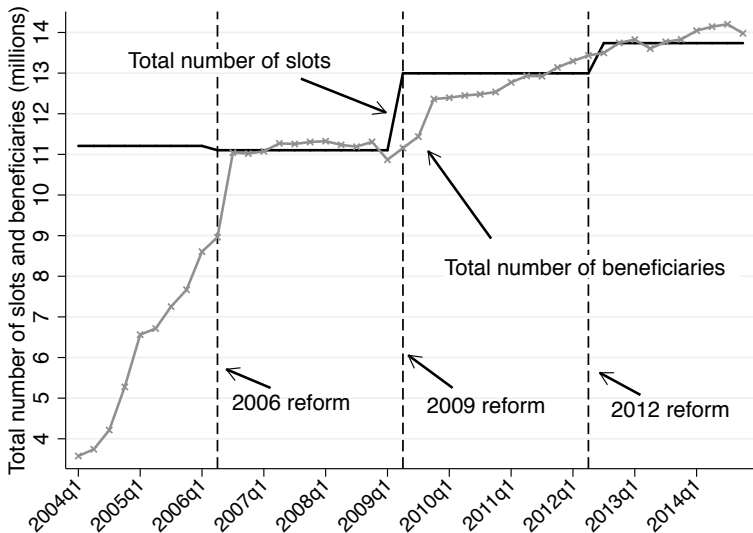


Figure: Distribution of $\Delta Quota_{ms}^{2009}$

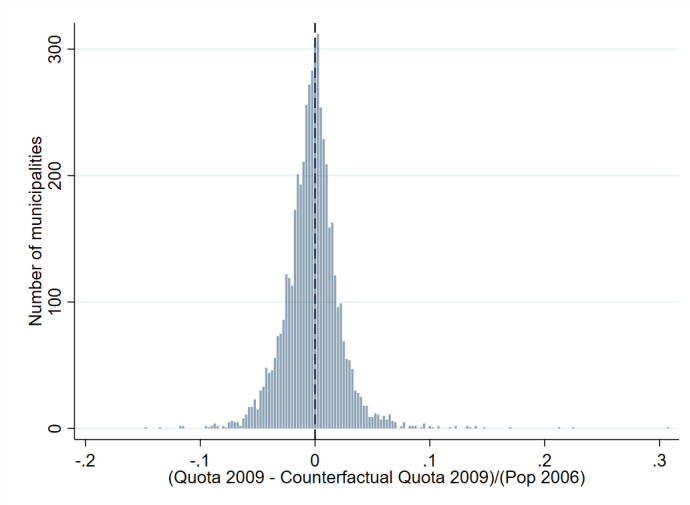
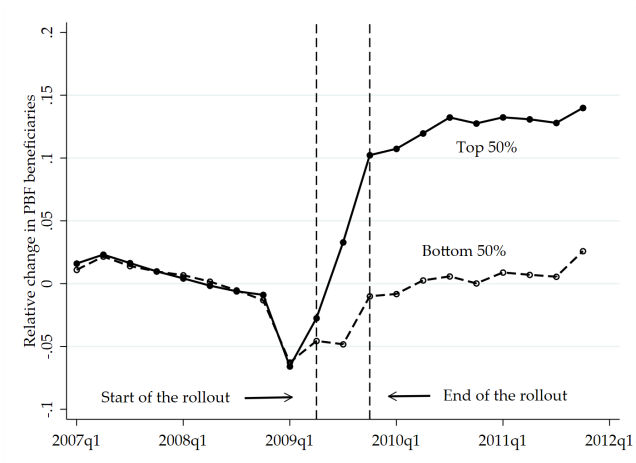


Figure: Relative change in PBF beneficiaries by size of $\Delta Quota_{ms}^{2009}$



Main specification: Diff-in-Diff with binary treatment ($Treat = 1$ if $\Delta Quota_{ms}^{2009}$ in top 50% of distribution across municipalities)

Data and outcomes

▶ Data

- ▶ Admin data: CADUNICO, PBF, formal labor and banking data
- ▶ Statistical Census Bureau (IBGE): GDP, taxes, household surveys

▶ First outcome: formal employment

- ▶ Quantity; not affected by price effects
- ▶ Can document spillovers directly by looking at non-beneficiaries
- ▶ High frequency data with detailed geographic coverage
- ▶ Margin most likely affected by means-testing (Levy, 2008)
- ▶ Key policy focus in Latin America (Perry et al. 2007, Ulysea, 2020)

▶ Other indicators of economic activity:

- ▶ Total employment, local GDP, taxes, bank deposits, etc.

Figure: Estimated impact on total PBF payments (log)

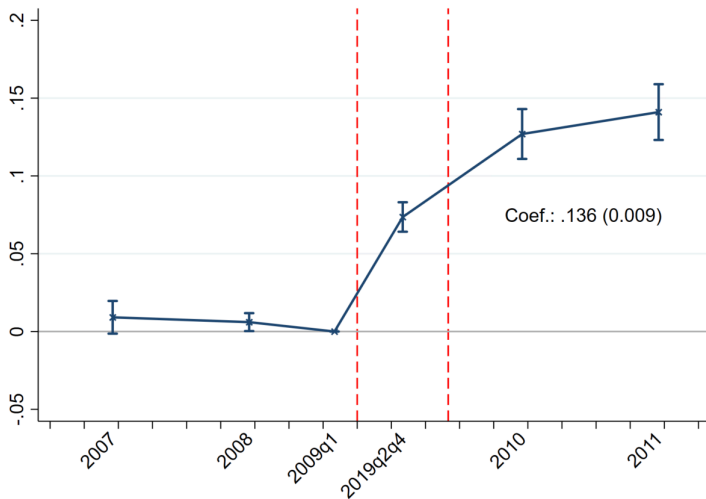
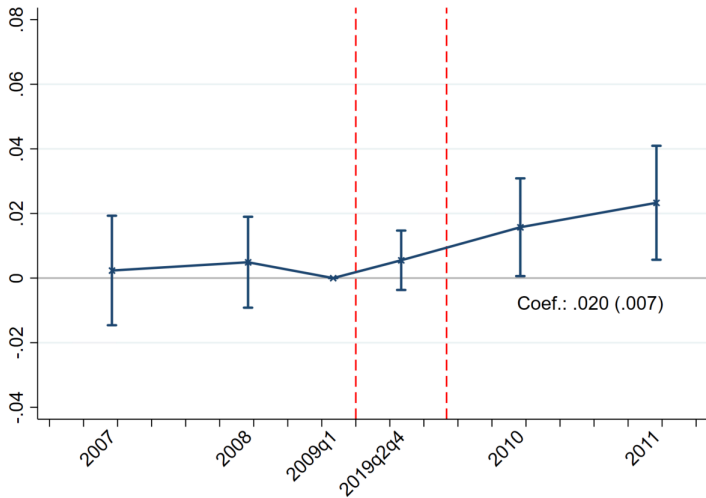


Figure: Estimated impact on private-sector formal employees (log)



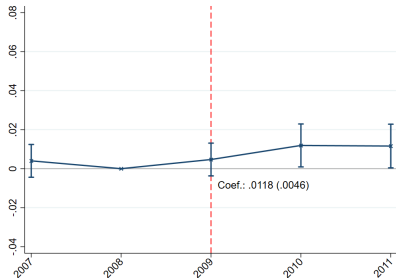
No impact on public employment

Anatomy of changes in formal employment

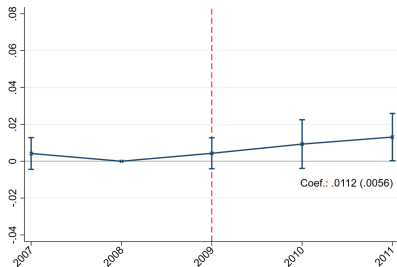
- ▶ Summary specification as in Chodorow-Reich (2012) and Pennings (2021) for 2010-2011 vs. 2008 ($\Delta\%$ in per capita terms)
 - ▶ Estimate: $.033^*(.017)$ easily decomposed by worker characteristic
- ▶ Impact concentrated at bottom of wage distribution
 - ▶ ≤ 2 min. wage: $.030^{**}(.013)$ vs. > 2 min. wage: $.004(.007)$
- ▶ Mostly from non-beneficiaries: spillover effects! ▶ never beneficiaries
 - ▶ Never any interaction with PBF: $.021^{**}(.010)$
- ▶ Mostly from non-tradables: consistent with spillover effects
 - ▶ Tradable industry: $-.006(.009)$ vs. Non-tradable: $.039^{***}(.014)$
- ▶ Not due to reallocation of jobs across neighboring municipalities
 - ▶ Similar magnitude if aggregate data by micro-region ▶ micro-region
 - ▶ Also no evidence of differential population growth

Results not just formalization effect

Impact on total employment using household surveys



(a) Labor force participation



(b) Employment (formal or informal)

- ▶ Note: 731 municipalities; sample not representative at municipal level; regression at individual level with demographic controls
- ▶ Point estimate consistent with mostly employment effect

Additional evidence consistent with local demand effects

- ▶ Increase in other indicators of economic activity
 - ▶ Banking activity ▶ banking
 - ▶ National accounts: municipal GDP, taxes paid ▶ national accounts
- ▶ No evidence of changes in prices
 - ▶ Zero effect on formal wages ▶ wage
 - ▶ No evidence of (measurable) local price effects ▶ prices
- ▶ No evidence that PBF directly increases formal labor supply of beneficiaries ▶ RDD
 - ▶ Compare families eligible for different benefits within a municipality
 - ▶ If eligible for more benefits → less likely to be formally employed

Implications: cost per formal job and GDP multiplier

- ▶ Cost per formal job per year (2SLS): \$17,992* (9,452)
 - ▶ U.S. estimates: about \$30,000 (Chodorow-Reich, 2012, Suarez Serrato and Wingender, 2016; Zidar, 2019)
 - ▶ Brazil estimate from local government spending: \$8,000 (Corbi et al., 2019; but different specification)

- ▶ From cost per job to GDP multiplier
 - ▶ Own estimate of formal earnings multiplier: 0.268***(0.092)
 - ▶ For GDP multiplier: adapt formula in Chodorow-Reich (2012)
 - ▶ Because based on formal employment effect (Cunha et al., 2023)
 - ▶ Because impact from low-wage workers (new)
 - ▶ Obtain GDP multiplier of \$0.638 per \$1 of PBF transfer
 - ▶ Low compared to Egger et al. (2022) or Pennings (2021)
 - ▶ Lower than many estimates of purchase multipliers, but they are mechanically higher (+1) than transfer multipliers (Pennings, 2021)

Marginal Value of Public Funds (MVPF)

- ▶ Approach to evaluate public policies (Hendren and Sprung-Keyser, 2020; policyimpacts.org):

$$\text{MVPF} = \frac{\text{Benefits}}{\text{Net cost}}$$

- ▶ Full welfare analysis depends also on welfare weights
- ▶ For program like PBF, focusing first on **costs of the policy itself**:

$$\text{MVPF} = \frac{WTP_M \times dCost_M}{dCost_M + dCost_B}$$

- ▶ Egger et al (2022): MVPF = 1 (lump-sum transfer)
- ▶ In our setting: $\text{MVPF} = \frac{1}{1+0.122} = .891$
 - ▶ Existing beneficiaries more likely to remain eligible ($dCost_{B1}$)
 - ▶ More newly registered eligibles ($dCost_{B2}$)

Marginal Value of Public Funds (MVPF)

- ▶ Adding fiscal externalities on government budget:

$$\text{MVPF} = \frac{WTP_M \times dCost_M}{dCost_M + dCost_B + dCost_{other}}$$

- ▶ Egger et al (2022): doesn't discuss impact on tax revenues
- ▶ In our setting: net increase in tax revenues ($dCost_{other} < 0$)

$$\text{MVPF} = \frac{1}{1 + 0.122 - 1.437 * 0.3} = 1.447$$

- ▶ Possibly net of decrease in taxes revenues from new beneficiaries

Marginal Value of Public Funds (MVPF)

- ▶ **Adding other spillovers in local economy** (work-in-progress):

$$\text{MVPF} = \frac{WTP_M \times dCost_M + WTP_G \times dGains_{other}}{dCost_M + dCost_B + dCost_{other}}$$

- ▶ Egger et al (2022) argue that increase in GDP comes at no cost (pure productivity gain) $\rightarrow WTP_G = 1 \rightarrow MVPF = 1 + 2.4 = 3.4$
- ▶ In our setting:
 - ▶ clearly some costs as total employment increases $\rightarrow WTP_G < 1$
 - ▶ also potential productivity gains: formalization of informal work

Marginal Value of Public Funds (MVPF)

- ▶ Still $WTP_G > 0$ only if wedges between marginal benefits and costs clearly some costs (e.g., labor) $\rightarrow WTP_G < 1$
 1. GDP: If average mark-up over marginal cost of, e.g., 30%
 2. Formal employment: “*Brazilian workers took home only 50 cents for every marginal dollar they generated for the firm*” (Felix, 2022)
 $\rightarrow MVPF=2.24$
- ▶ Considering smaller estimates for average mark-up(1.16) and wage mark-down (20%): 1.847
- ▶ Even if all the formal employment effect comes from formalization of informal work, the MVPF could be >1 from productivity gains

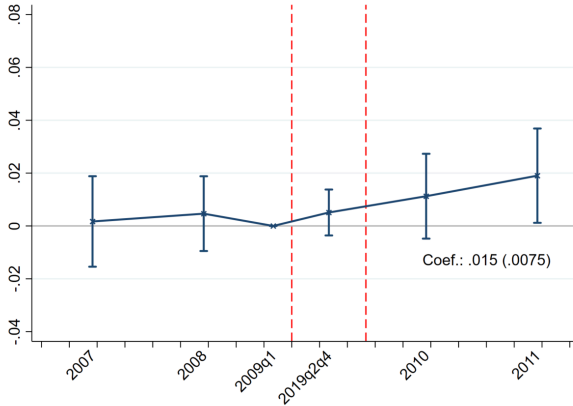
Outline

Conclusion

Conclusion

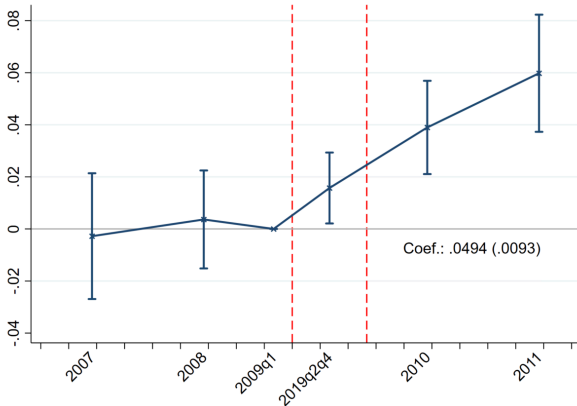
- ▶ Positive effect of means-tested CT on local economies
 - ▶ Employment increases mostly among never beneficiaries (64%); also increases among already beneficiaries
 - ▶ Formal employment increases *despite* disincentives to work formally for beneficiaries
 - ▶ Employment gains concentrated in low-skill (low education and wages)
- ▶ Consistent with local multiplier effects: positive effects on GDP, taxes, bank deposits, loans
 - ▶ Cost per formal job of 17,992 per year
 - ▶ considering spillovers the MVPF increases substantively and higher than a non-distortionary transfer
 - ▶ is PBF the best “bang for the buck”? Depends on the MVPF for other policies that target a similar population, and welfare weights

Spillovers on non-beneficiaries



► Workers that were never beneficiaries [▶ back](#)

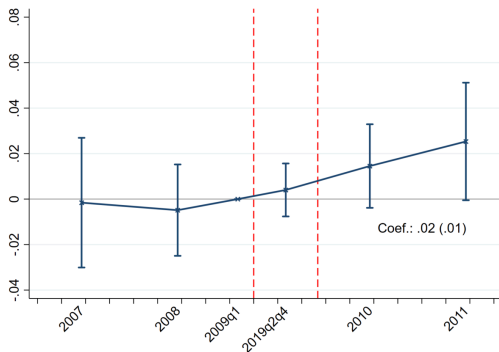
Formal employment increases among already beneficiaries



► Workers that were already PBF beneficiaries [▶ back](#)

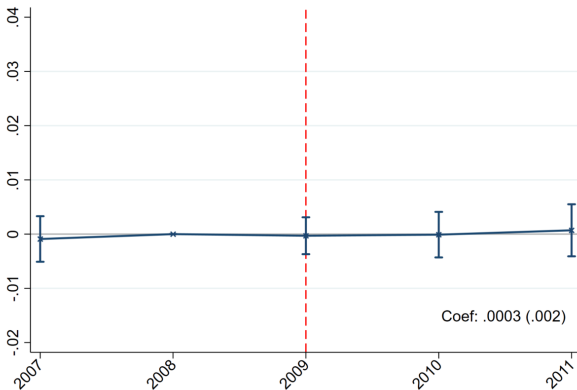
Not reallocation of jobs across neighboring municipalities

Figure: Impact on private formal employment (micro-regions)



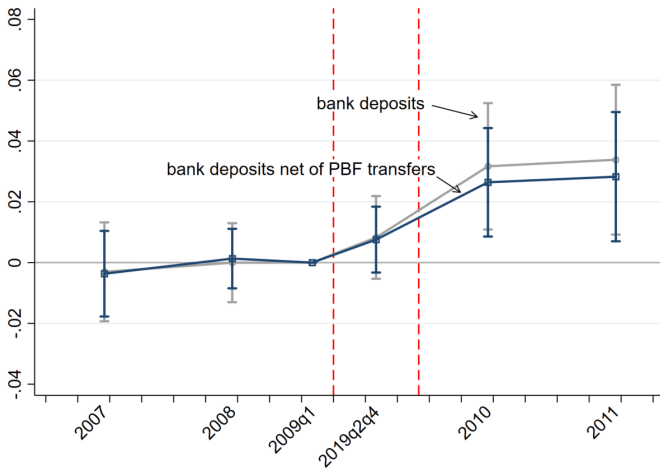
- Consistent with other labor demand shocks in Brazil (Costa et al., 2016; Corbi et al., 2019; Dix-Carneiro and Kovac, 2017, 2019) [▶ back](#)

Zero effect on wages



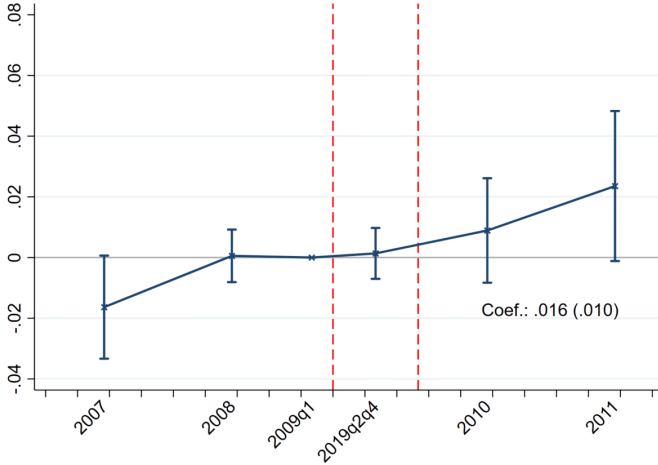
► Workers employed throughout the sample period [► back](#)

Impact on bank deposits

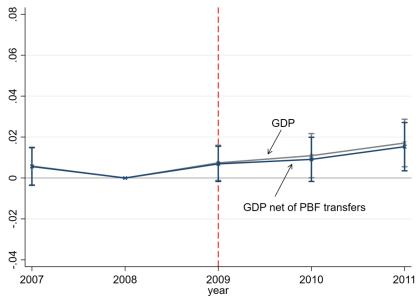


► Deposits: .033 (.011); net of PBF transfers .023 (.008) [▶ back](#)

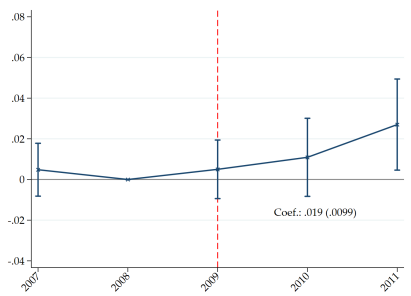
Impact on bank loans



Impact on GDP and Taxes



(a) Municipal GDP (net of PBF transfers)



(b) Taxes paid in municipality

▶ back

No evidence of price increase

	DD estimate (linear)	(s.e.)	DD estimate (binary)	(s.e.)	N
Log Diesel retail price	0.060	(0.067)	0.002	(0.002)	2,315
log Cooking gas retail price	0.020	(0.382)	-0.002	(0.009)	1,780
log Ethanol retail price	0.087	(0.200)	0.002	(0.005)	2,125
Log Gasoline retail price	0.006	(0.105)	0.001	(0.002)	2,375
Log Milk price	-0.385*	(0.222)	-0.017*	(0.009)	24,610
Log Honey price	-0.198	(0.597)	-0.012	(0.019)	15,550
log Chicken eggs price	-0.421*	(0.245)	-0.001	(0.009)	24,010

► Use agricultural production surveys and fuel retail price surveys

► back

Details for first estimate of MVPF

Comparing cadastros before (2008/12) and after (2010/08) reform

- ▶ Diff-in-diff results (in per capita terms as in Pennings, 2021)
 - ▶ PBF payments: .1832 (incl. mech. and beh. responses)
 - ▶ Number of eligibles : .0279 (evidence of beh. responses)
- ▶ Existing beneficiaries in 2008/12:
 - ▶ PBF payments: .0047 (only due to beh. responses)
 - ▶ Number of eligibles: .0090
 - ▶ So behavioral responses account for $\frac{.0047}{.1832} = .025$ of total cost
- ▶ Non-beneficiaries in 2008/12 (including newly registered):
 - ▶ PBF payments: .1785 (2/3 already eligible; 1/3 newly registered)
 - ▶ IV: .0002 eligible per R\$1 in PBF
 - ▶ Given their average PBF payment if eligible (treatment), behavioral responses account for .108 of total cost

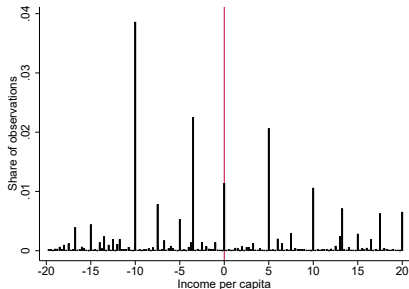
$$\text{MVPF} = \frac{1 \times (1 - .025 - .108)}{1} = .867$$

No evidence that PBF increases formal labor supply

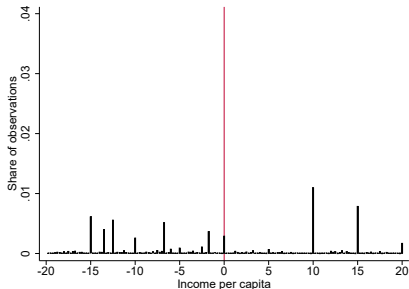
- ▶ RDD around eligibility thresholds in August 2010 Cadastro Unico
- ▶ Benefits
 - ▶ Unconditional benefit: R\$68 (for extreme poor families)
 - ▶ Conditional benefits: R\$22 per child younger than 15; R\$33 per child between 15 and 18 (for poor and extreme poor families)
- ▶ Eligibility threshold based on monthly income per capita
 - ▶ Extreme poverty: below R\$70.00 per capita
 - ▶ Poverty: below R\$140.00 per capita
- ▶ Incentives around threshold (Bergolo and Cruces, 2021)
 - ▶ Below threshold: risk of losing eligibility if increase formal income
 - ▶ Above threshold: unlikely to gain eligibility if decrease formal income (PBF not entitlement, no additional slots over period)



Distribution of per capita income (August 2010)



(c) Extreme Poverty

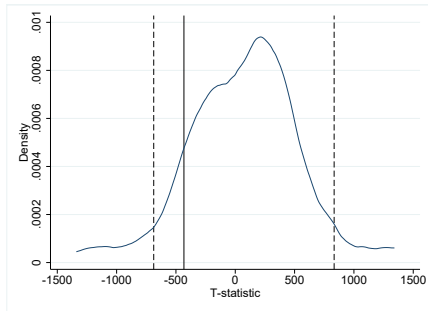


(d) Poverty

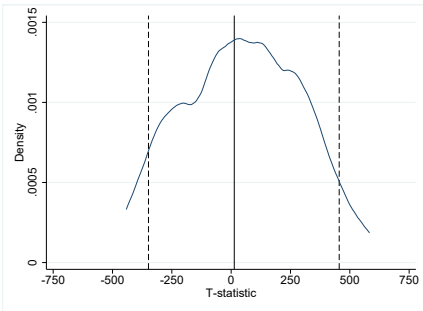
- ▶ Income per capita distribution not smooth
- ▶ Excess mass at threshold unlikely from strategic bunching



Distribution of T-statistics (from Cattaneo et al., 2017)



(a) Extreme Poverty



(b) Poverty

- ▶ Density tests detect manipulation in many points of distribution (compute test for 200 points around eligibility thresholds)
- ▶ Discontinuities at eligibility thresholds (solid line) not outliers



Research Design

- ▶ Z_0 is (extreme) poverty line; Z_f is income per capita of family f
- ▶ $D_f = 1$ if $Z_f \leq Z_0$; $D_f = 0$ otherwise

$$Y_f = f(Z_f) + \beta D_f + \alpha_m + \mathbf{X}_f + \epsilon_f$$

- ▶ With municipality fixed effects α_m and vector of covariates \mathbf{X}_f
- ▶ $f(\cdot)$ linear function allowed to differ on each side of the cutoff
- ▶ Bandwidth of R\$20 and rectangular kernel (but robustness checks)
- ▶ Check: similar “permutation” tests around eligibility thresholds



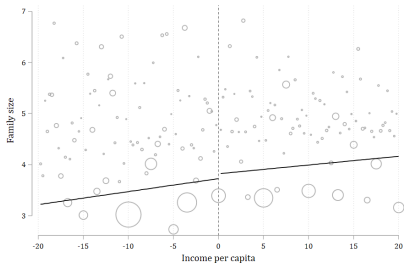
Impact of PBF eligibility on formal labor supply

	[1]	[2]	[3]	[4]
	Extreme Poverty Cutoff		Poverty Cutoff	
	RD estimate	(s.e.)	RD estimate	(s.e.)
A. Covariates (August 2010)				
Family size	-0.0931	(0.544)	0.0572	(0.481)
Number of rooms in dwelling	-0.000339	(0.111)	0.00446	(0.103)
Living in rural area (dummy)	0.00436	(0.0173)	0.0219	(0.0195)
Receives any pension or UI benefit (dummy)	-0.0144	(0.0464)	0.0848	(0.0806)
Share of women in household	-0.000983	(0.0165)	-0.00693	(0.0198)
Household head completed high school	-0.00269	(0.0126)	0.0162	(0.0114)
B. Outcomes (September 2010-August 2011)				
PBF benefits				
<i>No controls</i>	467.9***	(96.23)	234.9***	(65.19)
<i>Covariates and municipality fixed effects</i>	451.8***	(36.72)	229.4***	(37.23)
Adult-months in formal employment				
<i>No controls</i>	-0.610	(0.668)	-0.768	(1.226)
<i>Covariates and municipality fixed effects</i>	-0.403**	(0.204)	-0.580*	(0.310)
Income in formal employment				
<i>No controls</i>	-549.8	(508.0)	-962.2	(1,030)
<i>Covariates and municipality fixed effects</i>	-355.5**	(167.9)	-738.0***	(248.4)

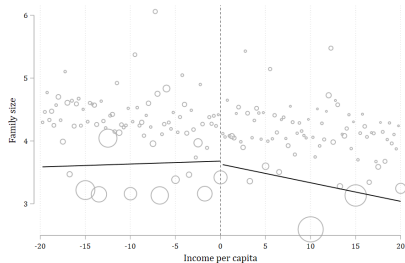
Summary of RD analysis

- ▶ Additional results in the paper
 - ▶ RD graphs for covariates ▶
 - ▶ RD graphs for outcomes ▶
 - ▶ Permutation tests using 200 points around each threshold ▶
 - ▶ Robustness checks varying bandwidths from R\$5 to R\$40 ▶
- ▶ Conclusion: using variation creating income & substitution effect
 - ▶ Find no evidence of positive effects on formal labor supply
 - ▶ Evidence suggests negative effects on formal labor supply
 - ▶ Most likely from substitution effect (Barbosa and Corseuil, 2014)

Family size



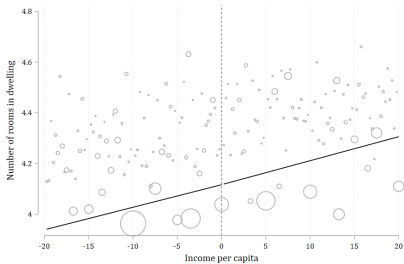
(a) Extreme poverty line



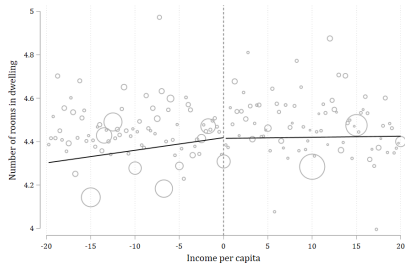
(b) Poverty line



Number of rooms in dwelling



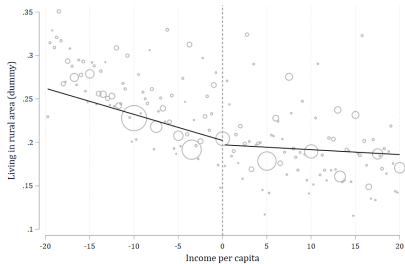
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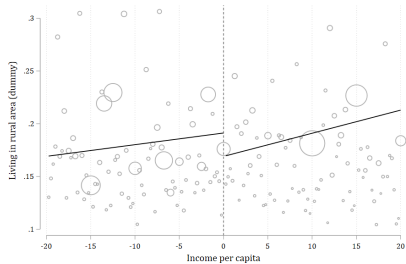
(b) Poverty line



Living in rural area



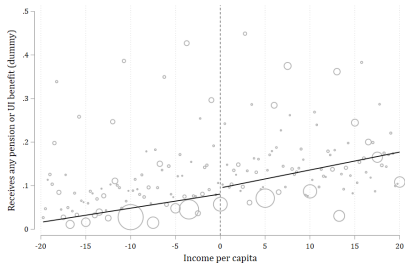
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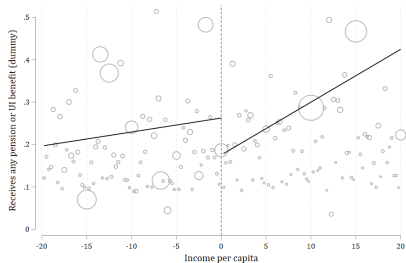
(b) Poverty line



Receives any pension or UI benefit



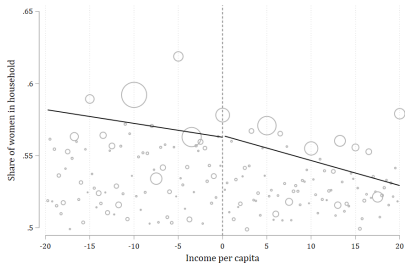
(a) Extreme poverty line



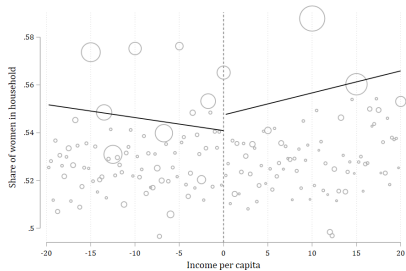
(b) Poverty line



Share of female in household



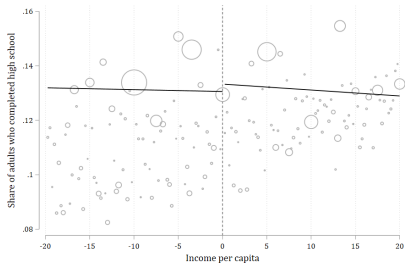
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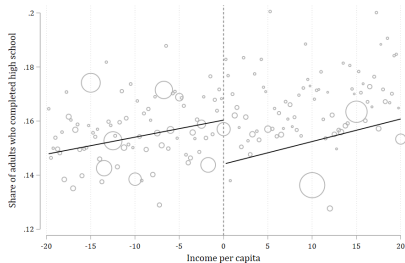
(b) Poverty line



Share of adults who completed high school



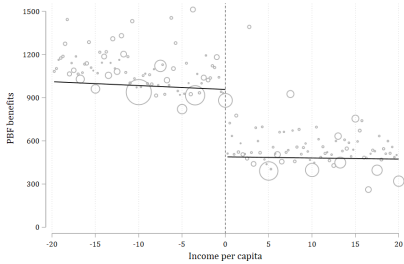
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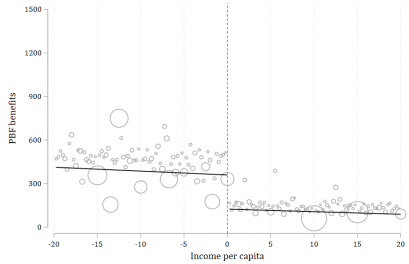
(b) Poverty line



PBF benefits



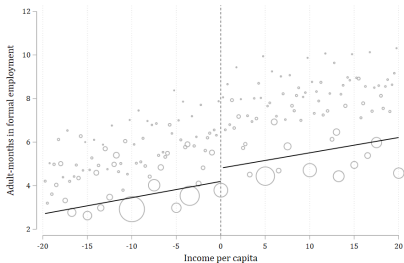
(a) Extreme poverty line



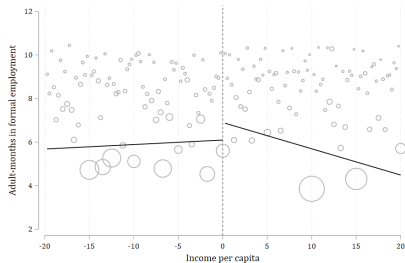
(b) Poverty line



Adult-months in formal employment



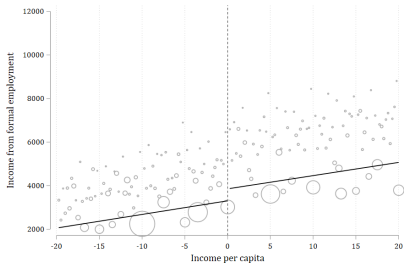
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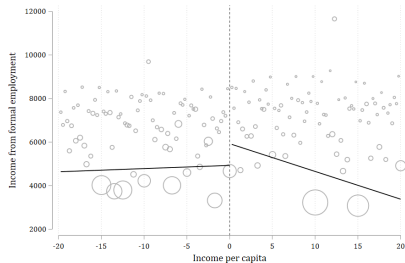
(b) Poverty line



Income from formal employment



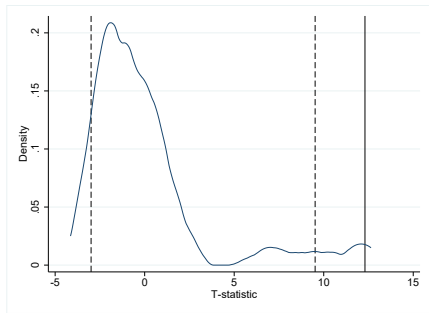
(a) Extreme poverty line



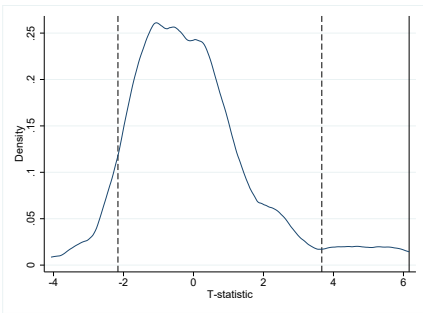
(b) Poverty line



PBF benefits



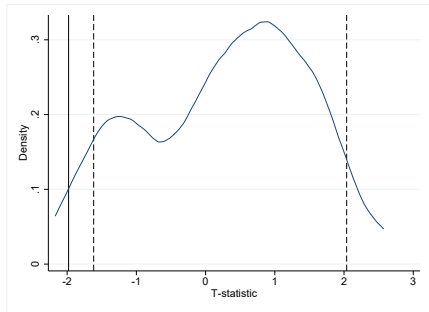
(a) Extreme poverty line



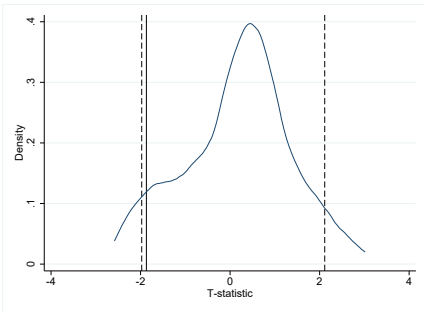
(b) Poverty line



Adult-months in formal employment



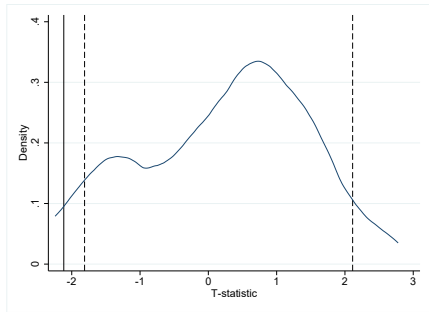
(a) Extreme poverty line



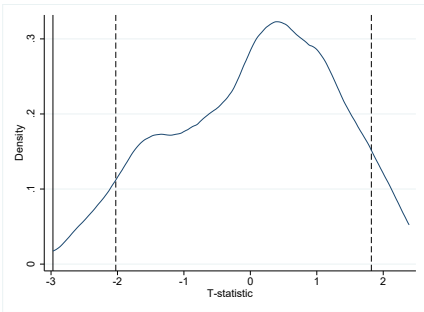
(b) Poverty line



Income from formal employment



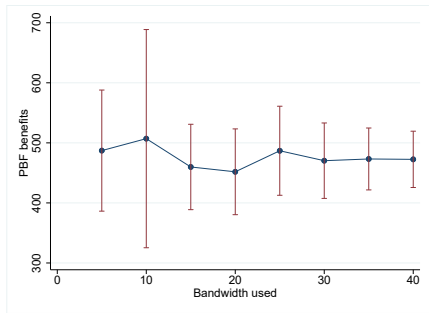
(a) Extreme poverty line



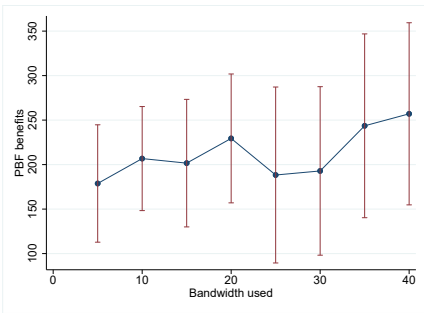
(b) Poverty line



PBF benefits



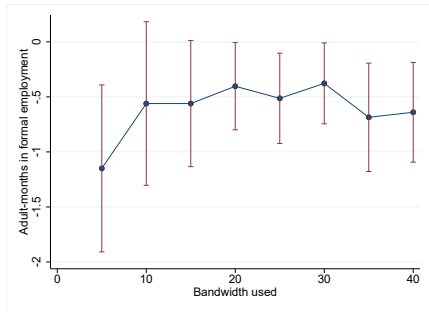
(a) Extreme poverty line



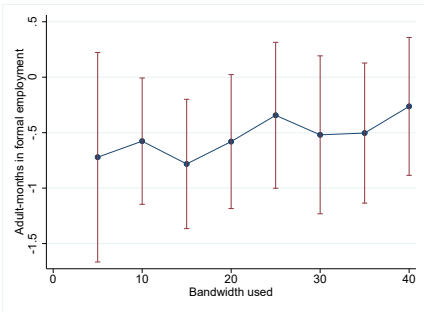
(b) Poverty line



Adult-months in formal employment



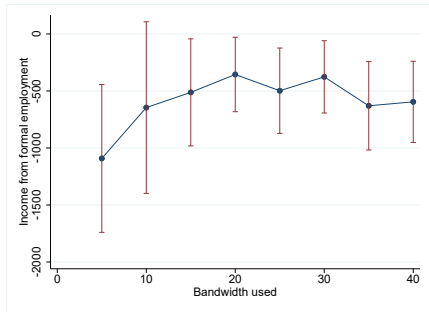
(a) Extreme poverty line



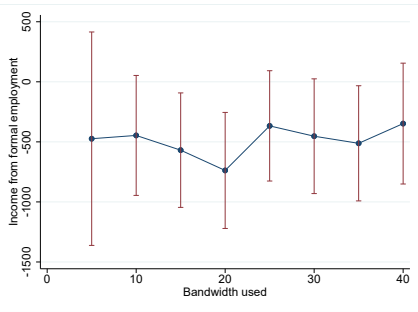
(b) Poverty line



Income from formal employment



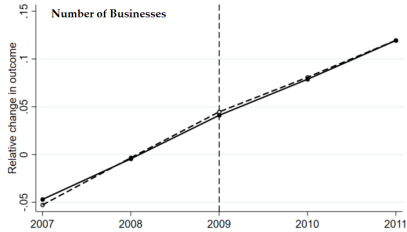
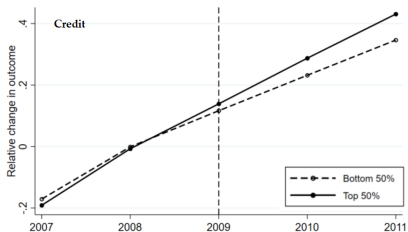
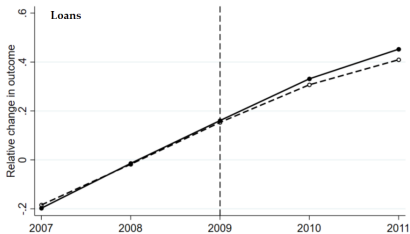
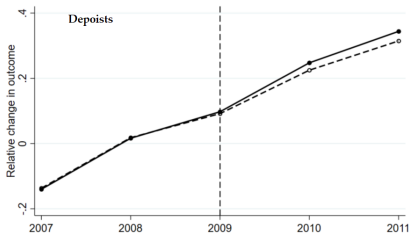
(a) Extreme poverty line



(b) Poverty line



Bank deposits, loans, credit and number of business



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