

13th CCA Annual Research Conference

BIS and Bank of Canada

The Impact of ICTs on Banks, Credit, and Savings: An Examination of Brazil

Flavia Alves

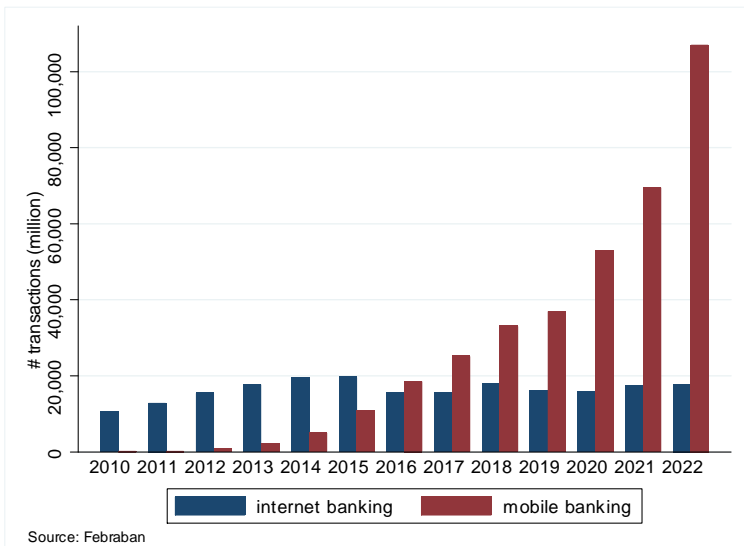
Carleton University

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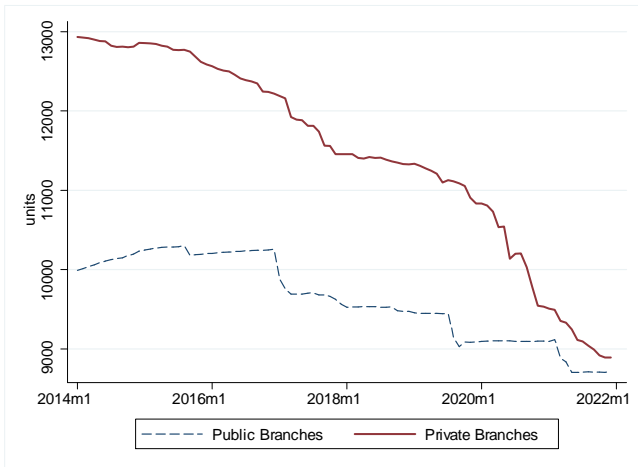
Motivation

Explosive volume in digital transactions



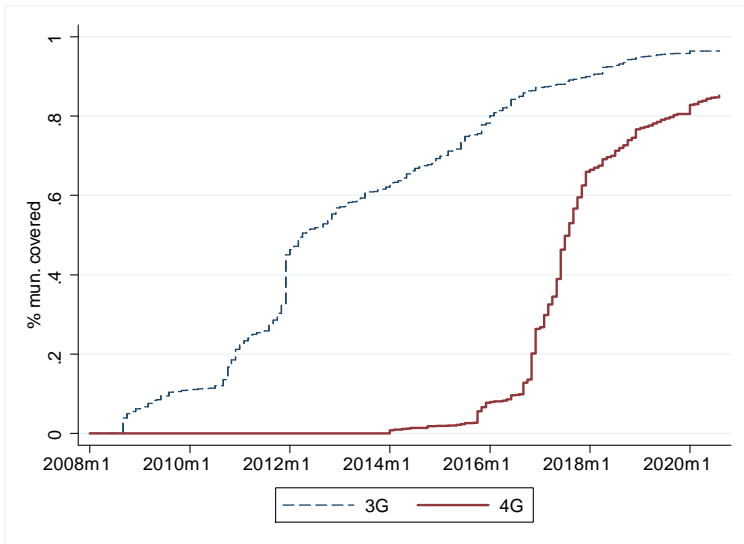
Motivation

Downsize of Branches



Motivation

Uneven Internet Technology Distribution



Research Questions

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2. *How do credit and savings respond?*
3. *Are there differences in patterns for public and private banks in response to more technology?*

Setting

Why Brazil?

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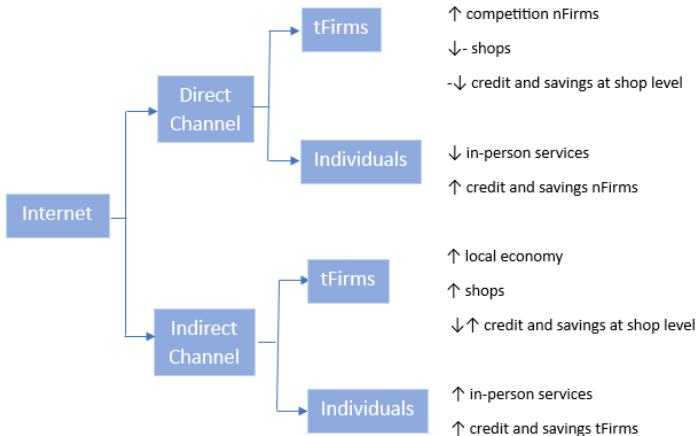
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2. Mobile network expansion under infrastructure implemented over tight regulation
3. Rich granularity in banking and telecom data
4. Benchmark in adoption of digital transactions
5. Other features: strong bank concentration, high profitability, fair distribution of public/private banks, other players (fintechs, digital banks)

Framework and Channels



Contributions to the Literature

On ICT and the Bank Industry. Efficiency, innovation, performance (Loukis et al., 2020). Larger banks tend to lend at a greater distance, interact more impersonally, have shorter and less exclusive relationships (Berger et al., 2005)

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4. Socioeconomic and demographic characteristics

Empirical Strategy 1: Differences-in-Differences

Main Specification

$$y_{mt} = \alpha_m + \lambda_t + \beta_t X_{m,t} + \sum_{\tau} \delta_{\tau} \text{Internet}_{m,t-\tau} + \varepsilon_{mt}$$

where α_m are municipality fixed effects to remove time-invariant heterogeneity across cities,

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ε_{mt} is the municipality time-varying error and is assumed to be distributed independently of all α_m and λ_t .

Empirical Strategy 2: Instrumental Variable

Lightning Strikes - Robustness Check

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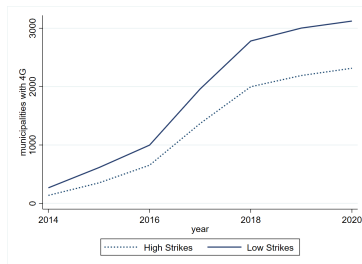
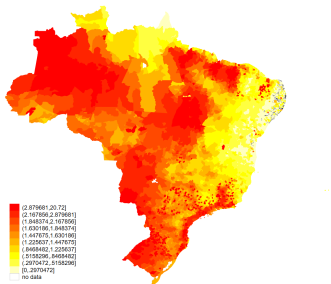
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(a) Distribution of Lightning Strikes (b) Impact of LS on the 4G Rollout



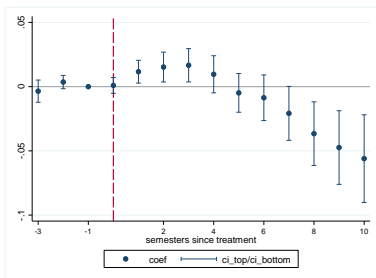
Source: WWLLN

Main Findings

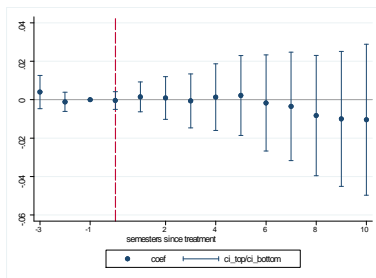
Banks ("Firms")

Private banks initially open as a response to the internet, but close at about 6% on average after five years post-4G rollout. No response from public banks is detected.

Private Banks



Public Banks

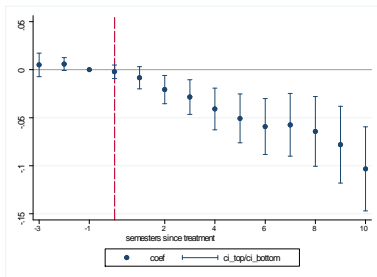


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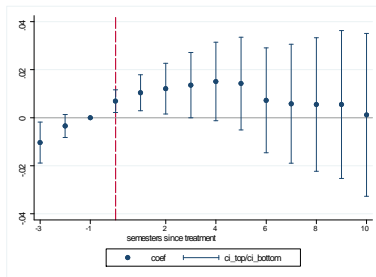
Branches ("Shops")

Private branches show a strong reaction to more connectivity (about -11%). There seems to be a slight expansion of public branches in the first periods post-4G rollout, but this movement annulates with time

Private Branches



Public Branches



Main Findings

Dep. Variable	CreditPr	CreditPu	SavingsPr	SavingsPu	DepositsPr	DepositsPu
12 months	-0.038*	-0.020	-0.011	-0.048**	-0.125***	-0.041
	(0.022)	(0.024)	(0.016)	(0.023)	(0.035)	(0.060)
24 months	-0.041	-0.094***	-0.079***	-0.111***	-0.256***	-0.056
	(0.030)	(0.034)	(0.024)	(0.031)	(0.053)	(0.092)
36 months	-0.031	-0.180***	-0.162***	-0.229***	-0.435***	-0.030
	(0.038)	(0.044)	(0.034)	(0.040)	(0.073)	(0.115)
48 months	-0.124**	-0.288***	-0.227***	-0.414***	-0.715***	-0.133
	(0.058)	(0.059)	(0.043)	(0.057)	(0.103)	(0.179)
60 months	-0.135**	-0.345***	-0.239***	-0.463***	-0.813***	-0.167
	(0.058)	(0.065)	(0.047)	(0.061)	(0.114)	(0.199)
Obs.	165,740	130,336	157,433	128,834	158,399	123,651
Mun x Time FE	y	y	y	y	y	y
Controls	y	y	y	y	y	y

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6. Alternative definition of 4G by the local authorities (measured sign)

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5. As bank branches close, vulnerable populations at risk of financial exclusion; local economy affected
6. New forthcoming technologies may accelerate what has been shown here.