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Propagation of Shocks: Public Banks, Trade Liberalization, and Local Labor Markets

By *

This paper sheds new light on the impact of public banks on formal job creation, labor reallocation, and establishment dynamics by looking at a wave of privatization of regional state-owned banks in Brazil in the 1990s and 2000s. To have a clear identification, the early-1990s trade liberalization event is used as an exogenous economic shock. The article combines data on trade-tariffs, bank-presence, and establishment-level employment from 1986 to 2010. The empirical specification tests whether regions facing the privatization of local public banks presented a differentiated response to trade liberalization. The findings suggest that the presence of public banks alleviated the short-run impact of negative demand shocks. After tariff-cuts, local labor markets facing a decline in state-owned banks' presence also experienced relatively higher reductions in job creation, growth in the number of plants, and establishment entry rates, while presenting relatively higher increases in job destruction and establishment exit rates. The privatization of regional public banks seems to have accelerated the process of reallocation that followed the trade liberalization. The results corroborate previous findings in the literature that public banks can have a countercyclical role in the economy. Keywords: Trade liberalization in Brazil, Regional public-bank privatization, Job flows

The presence of state-owned banks is widespread around the world (LaPorta, de Silanes and Shleifer (2014)). Bertay, Demirgüç Kunt and Huizinga (2015) stress that the financial crisis starting in 2008 increased the presence and involvement of governments in the sector. On average, the share of government ownership of banks in high-income countries went from 7.3% in 2007 to 10.8% in 2009, receding to 9.9% in 2010. Firms often depend on public banks as a source of external financing, hence, understanding the role of governments as bank lending actors has increased economic relevance.

The literature indicates that state-owned banks have a credit smoothing role. Public banks seem to respond less to macroeconomic shocks than private banks. Moreover, the evidence suggests lending from public banks in developing countries is less procyclical (or at least not more procyclical) than lending from public banks in high-income countries (Micco and Panizza (2006)). Studies for the Brazilian economy show a non-negligible response of federal banks after 2008 in the direction of preventing further output fall and unemployment (Coleman and Feler (2015)).

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Cortes, Silva and Doornik (2019) present evidence that firms with direct and indirect (via consumers and suppliers) access to government credit had a higher probability of survival after the financial crises.

State-owned banks may smooth credit because the government internalizes the benefits of macroeconomic stability, including it in the objective function. Public banks also enjoy credibility from depositors and use it during difficult times, being able to supply financial services in a recession. Nevertheless, public ownership is also susceptible to rent-seeking and may direct resources in an inefficient fashion (Micco and Panizza (2006)). There is evidence that Brazilian firms eligible to favorable government loans expand employment consonant with local elections (Carvalho (2014)).

Financial development has been shown crucial for firm performance and economic growth (King and Levine (1993)). Physical distance between borrower and lender may also be of importance due to transaction costs and agency problems. Within-country heterogeneity on financial development, however, has been less explored in the literature (Fafchamps and Schundeln (2013)). Joaquim and Doornik (2019) study a series of bank mergers and acquisitions (MA) from 2005 to 2015 in Brazil. The authors find that the initial level of bank competition in the local market is relevant for credit outcomes. In municipalities starting with low competition, MA are followed by decreases in the supply of loans and higher credit spreads.

Regional state-owned banks, either by being present where other financial institutions are not or by providing easier access to credit for small entrepreneurs, may play a relevant role in the financial development of a municipality or region. Exploring the within-country variation in the privatization of regional state-owned banks also serves to test their role as financial intermediaries. If regional public banks facilitated financial intermediation, it is reasonable to expect that the privatization and exit of these public banks changes how economic shocks dissipate in local labor markets.

This paper, using the 1990s trade liberalization in Brazil as an exogenous negative economic shock, tests whether local markets which lost public-bank presence due to a process of privatization of state regional banks suffered differentiated impacts from the demand shock. Whether local markets which lost regional banks faced a relative decline in labor market outcomes is ultimately an empirical question: state-owned banks may be inefficient relative to private ones, but public-sector presence in far-reach areas, and their supply of subsidized credit, might help local development, and partially insulate businesses from hardship.

The main contribution of the paper is three-fold. First, it considers outcomes related to establishment dynamics in the form of job flows and establishment size and entry. The existing literature on financial intermediaries already points to a relationship between external financing and economic development (Rajan and Zingales (1998)) but it does not focus on the allocative consequences of public financing in local labor markets. Second, a well-known shock - trade liberaliza-

tion - and arguably exogenous policy event propels the estimation, much in the spirit of the quasi-experiment and impact evaluation literature. Hence, the estimation bypasses some concerns on endogeneity of bank responses to economic outcomes. Third, the paper evaluates a large-scale privatization program beyond the efficiency and competition analysis (Nakane and Weintraub (2005)). Although privatization was expected to provide gains from increased competition in the financial sector, the short and medium-term impact of public bank shut-down is less studied in the literature.

The empirical specification used in this paper looks at the interaction of the regional tariff reductions with changes in the composition of local financing, exploiting the large cross-section and time series variation in regional state-owned bank presence and industry composition in the country. The identification requires that controlling for region's characteristics, the unobserved factors affecting the local labor market are not correlated with the privatization of a state bank and the trade tariff-reduction. The paper argues that this necessary condition holds given the widespread and top-down design of both policies.

Results suggest that the presence of regional state-owned banks alleviated the short and medium-run response to negative shocks, corroborating previous findings that public banks have a counter-cyclical role in the economy. Regions with shut-down of state-owned banks responded to trade liberalization with proportionally larger reductions in job creation, growth in the number of establishments, and establishment entry rates, while presenting relatively higher job destruction and establishment exit rates.

There is no evidence of a long-run differentiated response of job creation and entry rates to trade liberalization following bank-privatization. One can interpret the lack of long-run divergences in job creation as suggesting that the loss of financial services from regional state-banks was eventually offset by gains from financial intermediation offered by federal and private banks. The results are robust to the following empirical exercises: separating the response of small, medium, and large establishments to public-bank shut-down; considering only local markets where there was a higher initial level of bank competition or at least 5 financial institutions already operating before the sector restructuring; and, using the reduction in the share of regional state-owned bank credit as a measure of privatization.

The present paper is related to several strands of work. It is relevant to the literature on the privatization of state-owned banks. Berkowitz, Hoekstra and Schoors (2014) evaluate whether the post-privatization competition of Russian state-owned banks ("spetsbanks") with private banks allowed the first to contribute to economic growth. The findings indicated that while privatized banks increased lending, they did not promote growth.

The paper can also be linked to the literature on financial development (Rajan and Zingales (1998)). Fafchamps and Schundeln (2013) study whether local financial development is relevant for firm growth in Morocco. The authors look

at the relationship between bank availability and firm growth, entry, and exit and find that value added increases faster in high-growth sectors for small and medium-size firms located near a bank. The results suggest that local financial institutions are particularly important for firm outcomes.

State-owned banks could contribute to the financial development of areas where financial intermediaries are not present or not fully developed. Hence, the present work complements the literature by looking at whether the reduction of availability of financial services, in this case due to privatization, has a negative impact in the economy.

Several works studied the impact of trade liberalization in the labor market for Brazil. The articles most closely related to the present paper are Dix-Carneiro and Kovak (2017) and Feler (2010). Dix-Carneiro and Kovak (2017) study the responses to trade liberalization in local labor markets using tariff-variation in the 1990s. The authors find that regions facing a higher decline in trade protection had medium and long-run relative deterioration in employment and earnings. In the present work, local market responses to trade liberalization are explored in a similar fashion. However, tariff-reduction is used as an exogenous negative demand shock to identify relative changes in local labor markets according to the shutdown of state-owned banks. Labor market outcomes, such as job creation, job reallocation, the number and average size of establishments are also the subject of the present work.

Feler (2010) evaluates empirically the privatization of state-owned banks in Brazil. The author finds that there was a relocation of lending from small cities to large cities favoring the last. The decline in lending led to loss of high-skilled workers, industrial jobs, and population in small cities. Small markets became relatively more intense in agriculture and low-skilled production. The empirical exercises point to a process of deindustrialization and reallocation of labor away from small cities after the loss of favorable regional bank lending.

The paper is organized as follows. Section I describes the institutional background in Brazil during the policy changes studied. Section II discusses the data, while Section III lays out the empirical strategy and presents results. Section IV concludes.

I. Institutional Background

A. Trade Liberalization in Brazil

Trade liberalization in Brazil started at the end of the 1980s and early 1990s. Like many developing economies, the country had engaged in a strategy of import substitution as part of its industrialization policy. Average nominal tariffs were as high as 58% in 1987 (Figure 1). But the actual level of protection usually differed from that due to the presence of non-tariff barriers such as the suspension of some import licenses and the existence of "special customs regimes" (Dix-Carneiro and Kovak (2017), Kume, Piani and de Souza (2003)). In 1988 and 1989, trade policy

became more transparent but did not affect the actual protection for Brazilian producers. (Dix-Carneiro and Kovak (2017) and Kune (1990)).

At the beginning of 1990, with the rise of a new government, an unilateral trade liberalization movement took place. Unexpectedly, "special customs regimes" and import bans and licenses were replaced by equivalent import tariffs[1].

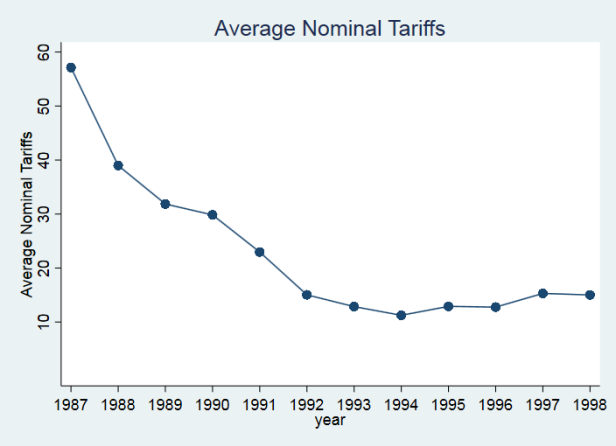


Figure 1. : Average Nominal Tariffs

Trade liberalization occurred mostly between 1990 and 1995, when the average tariff rate changed from 30.5 percent to 12.8 percent. Tariffs were reduced to similar rates regardless of sectors' previous level of protection. This institutional design alleviates the concerns about the endogeneity of specific policies, suggesting that the change in tariffs were not related to sector performance. All in all, the size of the reduction in protectionism was heterogeneous across industries[2] generating policy variation across sectors and effects in local markets.

B. Consolidation of State-Owned Regional Banks

State-owned banks have been central in the Brazilian financial system since its inception.[3] Government banks have operated in the sector under a plethora of goals: development, redistribution, along with fiscal and political reasons (Baer

[1]The WTO (World Trade Organization) recommended the replacement of all non-tariff import restrictions for import tariffs as a way to keep tariffs as the main instrument of trade policy. Following that, Brazil undertook a policy named "tariffication". See de Carvalho(1992) for details.

[2]For a more detailed discussion of how the reduction in tariffs occurred across industries, please refer to Kume, Piani and de Souza (2003).

[3]For a description of the government participation in the Brazilian banking system, see Ness Jr. (2000). Before the macroeconomic stabilization in 1994, the credit provided by the government banks, including state and federal owned ones, corresponded to 60% of total loans. After the *Real Plan*, and as a result of the institutional reforms implemented by the government in the 1990s, this share fell, but state-owned banks continued to exert great economic influence.

and Nazmi (2013)). The decades of high inflation and macroeconomic uncertainty led to scarcity in long-term funding. Hence, state-owned banks established themselves as the main source of long-term credit, granted at favored below-market conditions. Likewise, public banks acted providing resources to sectors not well-served by the private institutions, such as agriculture, infrastructure investments, local communities, and small business (Baer and Nazmi (2013)).

Perhaps more importantly, regional state-owned banks became instruments for local governments engaging in deficit financing and off-budget spending. With these attributions, state-banks developed an important connection with local economies. In fact, these banks often operated as a conduit for patronage from the state government, granting loans to local firms and employing public servants. These practices introduced strong political bias in the allocation of financial' resources in the country (Ness Jr. (2000)).

Not unlike other sectors, the banking industry was affected by the inflationary process rooted in the Brazilian economy. However, the increase in prices benefited the banks in at least three different ways: (i) reducing the real value of liabilities; (ii) adding liquidity; and, (iii) reducing the costs of raising funds and increasing the revenues of floating. Floating operations consisted in raising low cost liabilities (demand deposits and tax collection, for example) and investing these resources in short-term assets that paid high nominal interest rates. During the period of hyperinflation, the revenues from "floating" basic services became disproportionately important to Brazilian banks, especially in the case of state banks. Between 1990 and 1993, inflationary revenues accounted for 38.5% (annual average) of total banking revenues (Baer and Nazmi (2013)).

In July 1994, the Brazilian government launched the *Real Plan* targeting hyperinflation. After a sequence of repeated unsuccessful attempts, the *Real Plan* achieved a large, and even unexpected, success in controlling the inflationary process. Following its implementation, the inflation rate fell drastically from an annual average of 715% by year, between 1980 and 1993, to 22% by year in December 1995.[4]

The transition to the new environment of low inflation rates proved costly to the Brazilian financial sector (Ness Jr. (2000), Baer and Nazmi (2013), and Nakane and Weintraub (2005)). In the presence of stable prices, banks expanded the credit operations to compensate for the loss of revenues from "floating". The total amount of credit granted increased by 44% in the first eight months following the *Real Plan* implementation .

However, the credit expansion exposed Brazilian banks to a higher level of risk. Nakane and Weintraub (2005)) emphasize the absence of adequate risk analysis in granting new loans at that time, and the soft supervision by the Central Bank. In the case of state banks, this problem was aggravated by a

[4] A sequence of stabilization plans failed to reduce inflation in Brazil during the 1980s and early 1990s: the Cruzado Plan, Cruzado 2, the Bresser Plan, the Summer Plan, the Collor Plan, and Collor 2. For a detailed discussion on the experience of previous stabilization attempts, see Dornbush (1997).

history of political interests interfering with lending decisions. Further, the mid-1990s international crises introduced great volatility in the Brazilian economy, forcing a restrictive response from the monetary authority to maintain the fixed exchange rate regime.[5] As a consequence, bank credit had a sudden stop and the rate of non-performing loans increased sharply. The loans with greater likelihood of default jumped from 5.5% in December 1994 to 12.2% of total credit in June 1996.

With the growing fragility of Brazilian banks, both public and private, the federal government proposed a series of restructuring packages for the sector. The *Program of Incentives to the Restructuring and Strengthening of the National Financial System* (PROER) was implemented in November 1995 to confront the insolvency problems in private banks. According to Baer and Nazmi (2013), this program set up a group of fiscal incentives and credit facilities to stimulate mergers and acquisitions.[6] The PROER, though, was designed to bail out only the fragile private banks.

To deal with state-level public banks, the *Program of Incentives to reduce the State-Level Public Sector in the Bank Activity* (PROES) was launched in August 1996. The goal was to reduce the participation of local governments in the bank sector, but also to deal with their chronicle fiscal insolvency. With this purpose, PROES offered debt restructuring packages together with different types of bank interventions: (i) liquidation; (ii) privatization; (iii) federalization and future privatization; and, (iv) transformation into development agency.

Less favorable conditions were offered to the states that opted to keep their bank ownership after the financial rescue (Nakane and Weintraub (2005)). Ultimately, the weak financial situation of Brazilian states and their banks provided sufficient incentives for local governments to join the program. With PROES resources, 10 state-level banks were liquidated, 6 were privatized, and 8 were federalized or restructured and subsequently privatized.[7]

The set of restructuring packages resulted in major changes in the Brazilian financial sector structure.[8] Table 1 shows that the number of commercial banks operating in Brazil reduced from 245 institutions in 1994 to 192 institutions in 2000. In 2010, the number of commercial banks authorized to operate were 157. Foreign-owned banks were the only segment to grow in the period, increasing their market participation and number of financial institutions in Brazil. The figures also show the reduction in importance of public banks in the sector. Between 1994 and 2005, state-owned institutions lost 20 pp of market share in credit operations.

The restructuring of Brazilian state-owned banks by PROES has characteristics

[5]See Baer and Nazmi (2013) for a presentation of the 90s Brazilian economy and banking system

[6]Seven private banks were restructured using the incentives provided by the PROER, including the large operations of Banco Bamerindus (6th largest Brazilian bank in December 1994) and Banco Nacional (8th largest Brazilian bank in December 1994).

[7]The next section describes the banking restructuring figures in more detail.

[8]The Brazilian government also launched a program to restructure and strengthen the federal banks in June 2001, the *Program for the Strengthening of the Federal Financial Institutes* (PROEF). See Nakane and Weintraub (2005).

Table 1—: Brazilian bank system

Number of commercial banks					
	1994	1995	2000	2005	2010
Domestic private banks	175	172	105	90	88
Foreign banks	38	38	70	57	60
State-owned banks	32	32	17	14	9
Percentage of total credit					
	1994	1995	2000	2005	2010
Domestic private banks	32%	37%	30%	39%	40%
Foreign banks	8%	7%	20%	22%	18%
State-owned banks	60%	57%	50%	39%	42%

Source: Estban, Central Bank of Brazil, from 1994 to 2010.

that make it a singular event in economics of banking. Beck, Crivelli and Summerhill (2005) argue that the PROES resembled a quasi-experiment, since the starting point was the *Real Plan*, with a macroeconomic motivation, namely hyperinflation, outside the control of any individual state. In addition, the program reached virtually the entire state-level banking sector in a short period of time, impacting a variety of localities with different economic and political structures.[9]

II. Data

A. *Trade Shocks*

The paper follows Topalova (2010) and Dix-Carneiro and Kovak (2018) to define the measure of local economic shocks. The authors exploit the fact that regions within a country often produce a different set of goods. Additionally, assuming that there is no free mobility, economic conditions may vary across regions. Hence, trade shocks affect locations differently constituting a shock to local labor demand.

We adopt the regional "tariff reduction" variable used in Dix-Carneiro, Soares and Ulyssea (2018). The authors follow Kovak (2013), when defining the local shock as the tariff change in region j:

$$RTR_j = \sum_{i \in T} \psi_{ji} \Delta log(1 + \tau_i)$$

with,

$$\psi_{ji} = \frac{\frac{\lambda_{ji}}{\phi_i}}{\sum_{i \in T} \frac{\lambda_{ji}}{\phi_i}}$$

[9]Some empirical studies on bank intervention programs in the 90s reported statistically significant effects of restructuring on financial sector efficiency Nakane and Weintraub (2005) and competition Belaisch (2003).

where τ_i is the tariff on industry i, λ_{ji} is the initial share of region j workers employed in industry i, ϕ_i, equals one minus the wage bill share of industry i, and T denotes the set of all tradable industries (manufacturing, agriculture and mining).

The regional tariff reduction (RTR) is calculated using data on the Census from the Brazilian Statistical Agency (IBGE) together with tariff data obtained from Kume et al (2003) and is constructed at the micro-region level, which corresponds to a group of contiguous municipalities with similar demographic and economic characteristics analogous to local labor markets. RTR data are available in Dix-Carneiro, Soares and Ulyssea (2018) on-line appendix[10].

The regional tariff change from 1990 to 1995 is on average, as expected, negative and it equals -0.11. Considering that the average tariff was approximately 30 percent in 1990, the change in trade protection is non-trivial and quantitatively important.

B. Bank data

The bank data come from the Monthly Banking Statistics by Municipality available from the Brazilian Central Bank (Estatística Bancária Mensal por Município - ESTBAN- BCB). The dataset provides information on monthly balance sheets of all operating branches owned by both private and public banks at the municipality-level and reported to the monetary authority from December 1994 up to date.

The data cover 39,162 branches linked to 294 financial institutions. There is information on the origin of capital (ownership), credit operations, and assets at the branch level. Monthly data were averaged annually and aggregated by micro-region.

Figure 2 shows the evolution in the number of branches after the implementation of the *Real Plan* in 1994. In general, there was an expansion in the network during the period, with the number of branches rising from 17,597 in 1995 to 20,699 in 2010. This is a well-known phenomenon of financial deepening in the country (Mello and Garcia (2012)).

The private banking sector expanded the number of branches in the period from 8,823 to 12,452. Meanwhile, public banks maintained approximately 8,000 branches throughout the period. In this segment, state-level banks had a strong reduction in the number of branches from 3,760 in 1995 to 701 in 2010, as a result of restructuring and privatization programs in the period. In the opposite direction, federal public banks increased their presence, with the number of branches going from 5,014 in 1995 to 7,546 in 2010.

Regional state-owned banks have had a relevant role as a credit provider in Brazil, in general, and especially in those locations with a small number of bank branches. Table 2 reports these numbers: in the period of 1994-1996 regional

[10]For more details on how RTR is constructed see Kovak (2013) and Dix-Carneiro and Kovak (2018).

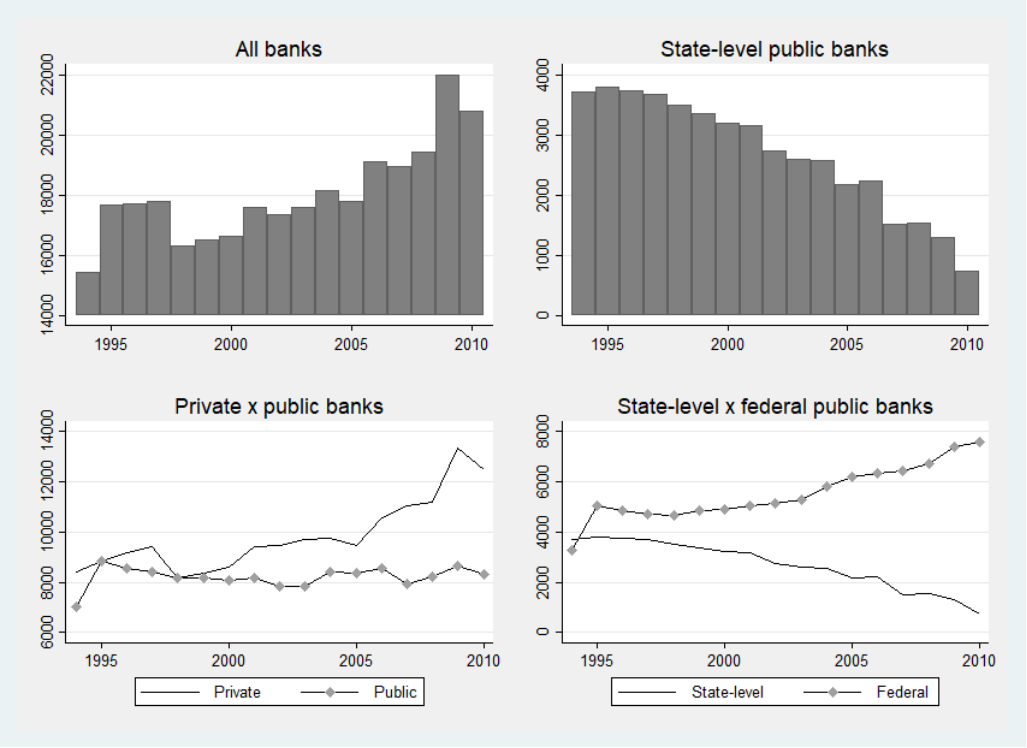


Figure 2. : Number of banking branches

Table 2—: Balance sheet composition, by bank type (1994-1996)

	All localities	# Branches <10	# Branches <5
Credit			
Private banks	29.4%	30.3%	27.2%
Regional public banks	32.7%	35.5%	38.0%
Federal public banks	33.3%	26.9%	18.1%
Saving deposits			
Private banks	10.3%	8.5%	10.6%
Regional public banks	20.8%	19.4%	16.8%
Federal public banks	13.1%	12.4%	10.6%

Source: Estban, Central Bank of Brazil. The table presents the Bank Balance Sheet Composition by ownership type: the share each type of bank allocates to credit (first three lines) and to savings (last three lines). Localities are defined as micro-regions: contiguous geographical areas grouping municipalities with similar economic and demographic characteristics.

public banks allocated around 33 percent of assets in credit operations, similar amount if compared to private and federal banks. In areas with less access to

banking services (less than 10 or 5 branches), regional public banks directed more resources towards credit operations when compared to their counterparts (third and fourth columns, respectively).

Still according to Table 2, regional public banks allocate approximately 17 to 20% of their assets to the provision of basic financial services such as savings accounts, a higher share than the one allocated by private banks.

Table 3—: Share by bank type (1994-1996)

	All localities	# Branches <10	# Branches <5
Credit			
Private banks	20.3%	7.7%	6.8%
Regional public banks	12.9%	12.2%	13.3%
Federal public banks	66.8%	80.1%	79.9%
Total Credit	100%	100%	100%
Number of branches			
Private banks	32.0%	15.1%	9.5%
Regional public banks	26.8%	22.6%	17.1%
Federal public banks	41.2%	62.2%	73.5%
Total # of Branches	100%	100%	100%
Assets			
Private banks	18.9%	6.9%	5.7%
Regional public banks	12.4%	9.6%	8.4%
Federal public banks	68.7%	83.5%	85.9%
Total Assets	100%	100%	100%

Source: Estban, Central Bank of Brazil. Localities are defined as micro-regions: contiguous geographical areas grouping municipalities with similar economic and demographic characteristics.

Table 3 shows the share of credit and total assets in the sector by capital ownership. Regional public banks were responsible for 13% of total credit provided during 1994-1996. This share was relatively stable across localities, contrasting to private banks that responded for less than 10% of the credit provided in localities with fewer financial intermediaries (columns 2 and 3 in Table 3). Nevertheless, regional public banks had a lower share in total assets in areas with less than 10 or 5 branches. That is, regional banks also provided relatively more credit in areas with restricted access to financial services.

Reduction in Regional Public Bank Presence

The regional bank sector restructuring process was a pervasive phenomenon that reached 11 out of 27 states in Brazil (Table 4), including the most populated and economically relevant areas of Sao Paulo, Minas Gerais, and Rio de Janeiro. The paper uses the presence of regional public banks as a measure of public credit

availability. Therefore, the reduction in the number of local public banks through privatization may be interpreted as a negative economic shock.

Table 4—: Restructuring of Regional Public Banks

(1)	(2)	(3)	(4)
	Δ Status: Privatized		
Bank name	State	Date	Acquiring Institution
BANERJ	Rio de Janeiro	Jun. 1997	Itau
BANDEPE	Pernambuco	Nov. 1998	ABN
BANEB	Bahia	Jun. 1999	Bradesco
BANESTADO	Parana	Oct. 2000	Itau
CREDITO REAL	Minas Gerais	Aug. 1997	Bradesco
BEMGE	Minas Gerais	Sep. 1998	Itau
	Δ Status: Privatized after PROES		
Bank name	State	Date	Acquiring Institution
PARAIBAN	Paraiba	Nov. 2001	ABN
	Δ Status: Federalized and privatized		
Bank name	State	Date	Acquiring Institution
BEA	Alagoas	Jan. 2002	Bradesco
BEC	Ceara	Jan. 2005	Bradesco
BEG	Goias	Dec. 2001	Itau
BANESPA	Sao Paulo	Dec. 2000	Santander
BEM	Maranhao	Feb. 2004	Bradesco

Note: The table lists all regional public banks that were privatized and changed status during the restructuring of the banking sector in Brazil starting in 1997. The name of the institution, the state (or province) of ownership, the date of change in the status, and the acquiring institution, are presented in the first, second, third, and fourth columns, respectively.

Figure 2 and Figure 3 show the decline over time in the presence of regional public banks. From 1995 to 2005 there was an exit of regional public banks in approximately 39 percent of the local markets, while in 2007, when the privatization process was finished, 70 percent of micro-regions had experienced reduction in local public bank presence. The remaining 30 percent of micro-regions never had an operating regional public bank branch or did not experience their exit through privatization.

The variable representing variation in regional public bank insertion is the change in the dummy that captures the presence of regional public banks ΔSB_{jt}. The dummy of the presence of privatized regional state-owned SB_{jt} assumes value 1 if there is at least one branch of the privatized bank in the micro-region j and time t, and zero otherwise. The change in the dummy assumes value of 1 when there were no regional public banks in j in 1995 but there is at at least one branch in t. It assumes value 0 if the presence of regional public banks has not been mod-

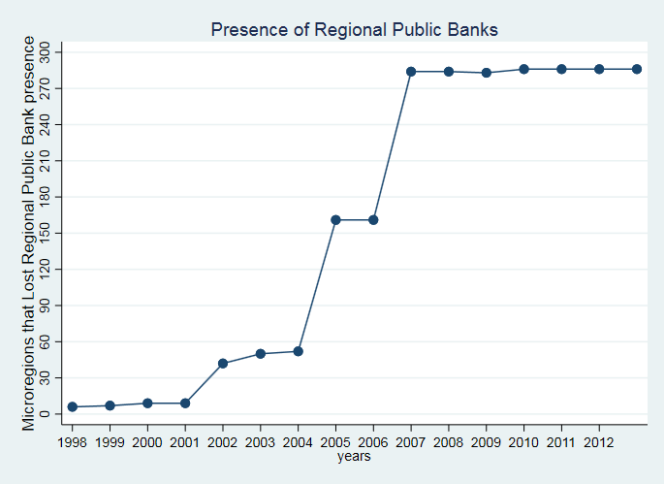


Figure 3. : Number of Micro-regions that Lost the Presence of Regional Public Bank

ified. And it assumes value -1 if there was a regional public branch in 1995 but there is none in t. Hence, an increase in the dummy corresponds to an increase in the presence of regional state-owned banks, and the privatization corresponds to the case when the change in the dummy equals -1. The variable ΔSB_{jt} captures, then, whether a privatized regional public bank left the region j.

Table 5—: Summary Statistics -Regional State Bank Presence and Share of Credit

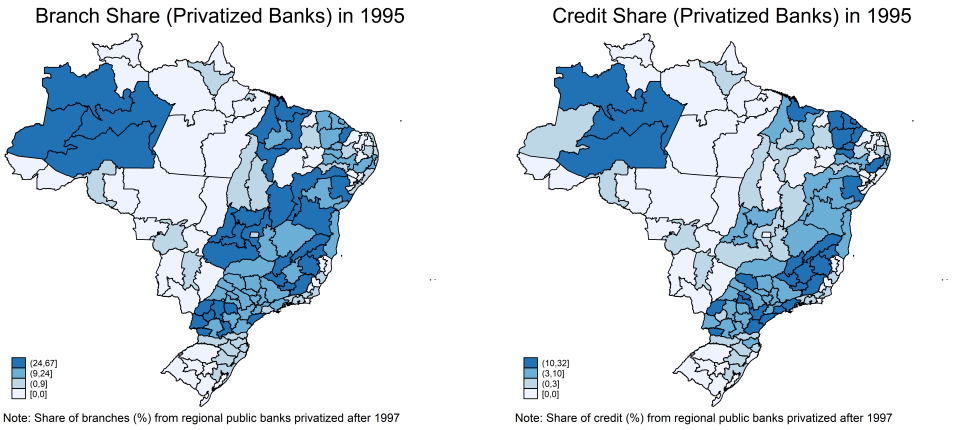
Statistics	Mean	Std	Perc. 10th	Perc. 90th
ΔSB_{95-00}	-0.02	0.16	0.00	0.00
ΔSB_{95-05}	-0.39	0.49	-1.00	0.00
ΔSB_{95-10}	-0.70	0.46	-1.00	0.00
$\Delta ShareCredit_{95-00}$	-0.02	0.10	-0.13	0.05
$\Delta ShareCredit_{95-05}$	-0.05	0.12	-0.18	0.03
$\Delta ShareCredit_{95-10}$	-0.09	0.13	-0.22	0.00

Note: Data from RAIS 1990 and Estban (Central Bank of Brazil) 1995-2010. The change in the presence and share of credit in local markets considers the privatized regional state-owned banks starting in 1997. Employment-weighted statistics.

Table 5 shows that the number of privatized regional state-owned branches experienced a pronounced reduction in the period under consideration, confirming the importance of $PROES$ and in line with Table 4, Table 2, and Figure 3.[11]

[11] $PROES$ allowed the possibility of liquidation, federalization, and transformation of regional public banks into development agency. In order to construct ΔSB_{jt} only straight privatization events were used since they represent the change of public financial institutions into private banks.

Reductions from 1995 to 2010 are sharper since by 2010 the restructuring program was already consolidated. By the end of the 2000's, almost 80 percent of local markets had lost regional public banks through privatization. Figure 4 shows the geographical distribution of regional public banks before the start of $PROES$.



(a) Distribution of Privatized Bank Branch Share

(b) Distribution of Privatized Bank Credit Share

Figure 4. : Geographical Distribution of Privatized Regional Public Banks Before PROES - 1995

In order to explore the mechanism linking the exit of regional public banks and the propagation of demand shocks in local markets, an additional variable is constructed: the share of credit by type of financial institution, $ShareCredit_{jt}$. The share of credit accounted by the privatized regional public banks experience a steady decline since 1995. The share decreases in the short, medium, and long-run, going from a 2 percent reduction in 1995-2000 to a 9 percent reduction in the 1995-2010 period (Table 5). The size of the reduction depended on the relevance of regional public banks in the local markets before $PROES$, and varied according to the geographical distribution of banks in 1995 (Figure 4).

Regional public banks are not the only source of public external financing for firms in Brazil. Federal public banks can also provide facilitated credit access similarly to regional banks. Hence, the exit of regional public banks from a local market may not necessarily imply a reduction in public bank credit if federal public banks replaced regional banks in their role. The absence or exit of regional banks would still be relevant if federal institutions did not occupy the vacuum generated by the privatization of regional banks. Table 6 and Table 7 report the change in the share of total public bank credit and the change in the share of total public bank branches at the micro-region level. The results are separated in

Table 6—: Heterogeneity in the Share of Public Bank Credit

Δ Share Public Credit (includes Regional and Federal Credit)					
Micro-regions that Lost Regional Banks up to 2003					
Year	N. Regions	Mean	Std.Dev.	Min	Max
1995-2000	50	0.093	0.092	-0.062	0.311
1995-2005	50	0.011	0.101	-0.240	0.226
1995-2010	50	0.028	0.109	-0.220	0.284
Micro-regions that Lost Regional Banks from 2003 to 2005					
Year	N. Regions	Mean	Std.Dev.	Min	Max
1995-2000	111	0.038	0.119	-0.251	0.464
1995-2005	111	-0.032	0.149	-1	0.433
1995-2010	111	-0.004	0.125	-0.271	0.431
Micro-regions that Lost Regional Banks from 2005 to 2010					
Year	N. Regions	Mean	Std.Dev.	Min	Max
1995-2000	125	0.080	0.122	-0.204	0.566
1995-2005	125	0.014	0.126	-0.357	0.373
1995-2010	125	-0.023	0.133	-0.352	0.410

Note: Data from Estban (Central Bank of Brazil) 1995-2010. Local markets are defined as micro-regions: contiguous geographical areas grouping municipalities with similar economic and demographic characteristics.

Table 7—: Heterogeneity in the Share of Public Bank Branches

Δ Share of Public Branches (includes Regional and Federal Branches)					
Micro-regions that Lost Regional Banks up to 2003					
Year	N. Regions	Mean	Std.Dev.	Min	Max
1995-2000	50	0.034	0.066	-0.086	0.228
1995-2005	50	-0.133	0.230	-0.600	0.259
1995-2010	50	-0.104	0.188	-0.600	0.250
Micro-regions that Lost Regional Banks from 2003 to 2005					
Year	N. Regions	Mean	Std.Dev.	Min	Max
1995-2000	111	-0.021	0.081	-0.205	0.222
1995-2005	111	-0.277	0.152	-1 0.044	
1995-2010	111	-0.252	0.127	-0.667	0.013
Micro-regions that Lost Regional Banks from 2005 to 2010					
Year	N. Regions	Mean	Std.Dev.	Min	Max
1995-2000	125	0.011	0.053	-0.134	0.300
1995-2005	125	0.031	0.076	-0.243	0.375
1995-2010	125	-0.136	0.111	-0.600	0.200

Note: Data from Estban (Central Bank of Brazil) 1995-2010. Local markets are defined as micro-regions: contiguous geographical areas grouping municipalities with similar economic and demographic characteristics.

three waves of privatization: areas that lost regional state banks until 2003, areas

that lost regional state banks from 2003 to 2005, and areas that lost regional state banks from 2005 to 2010.

On average the share of public - regional plus federal - bank credit and the share of public bank branches decreased over time after the privatization of local public bank. Hence, there is no evidence that federal banks fully replaced the role of privatized regional banks. In the period following the privatization, there is a decrease in the share of public branches in local markets of approximately 13 percentage points in the micro-regions that lost regional public banks up to 2003, and 28 percentage points in micro-regions that lost regional public banks from 2003 to 2005. The reductions in the share of public bank credit are comparatively smaller. Nevertheless, there is substantial heterogeneity across regions. In some local markets, the reduction in the share of public bank credit can go as high as 30 percentage points.

Table 8—: Change in the number of state-level public banking branches: Correlation with other financial institutions

	1995-2000	1995-2005	1995-2010
Private banks	-0.472***	-0.472***	-0.813***
Federal public banks	-0.291***	-0.247***	-0.733***

Note: Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Change computed at the local level. Localities are defined as micro-regions: contiguous geographical areas grouping municipalities with similar economic and demographic characteristics.

Figure 2 suggests that the reduction in the presence of Brazilian regional banks occurred simultaneously with the expansion of the rest of the financial sector. Table 8 reports the correlation between the change in the number of branches from 1995 to 2000, 2005, and 2010 by origin of capital. The micro-regions that lost more state-level public bank branches experienced greater entry of private and federal public banks. In addition, the correlation is higher with private banks which, in some cases, substituted in local markets the state-level banks acquired in the privatization process ($PROES$).

Table 9—: Variation in the number of banking branches

	2000-1995	2005-1995	2010-1995
All Localities	-2.50	0.26	7.61
Localities with Loss of Regional Branches in 2000	-3.51	2.69	20.48
Localities with Exit of Regional Branches in 2000	-7.13	-0.22	9.67

Source: Estban, Central Bank of Brazil.Changes computed at the local level. Localities are defined as micro-regions: contiguous geographical areas grouping municipalities with similar economic and demographic characteristics. Regional branches correspond to branches from privatized state-level public banks.

Table 9 shows the average variation of the number of branches in micro-regions between 1995 and 2000, 2005 and 2010, respectively. There was a reduction in the number of branches between 1995 and 2000, followed by a reversion in 2005, and mainly in 2010. The second and third lines report the variation in areas that had loss of regional branches, and complete exit of regional banks in 2000, respectively. Micro-regions directly affected by the privatization of regional public banks (loss of branches or complete exit) had a stronger de-banking movement in 2000. On the other hand, the expansion in banking network was more pronounced in these areas in 2005 and 2010.

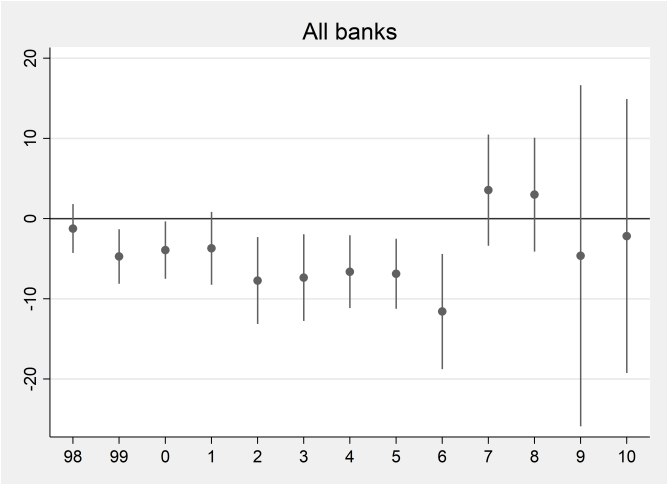


Figure 5. : Variation in bank branches in micro-regions that lost regional public banks: all banks

According to Table 9, the micro-regions that lost regional public banks suffered a greater loss of bank branches. Figure 5 to Figure 7 have in more detail this adjustment process in the local banking sector. Figure 5 shows that the micro-regions that lost regional public banks had a greater loss of bank branches than the average. This effect is consistent from 1998 to 2006. On the other hand, the same regions had an increase in the share of federal public and private bank branches (Figure 6). A similar change in the composition of credit is observed in the variation of local bank credit, mainly with federal public banks increasing their participation in those regions (Figure 7).[12]

[12]Each point estimate in Figure 5 to Figure 7 corresponds to the coefficient α_t in the regression $\Delta y_{jt} = k_t + \alpha_t \Delta SB_{jt} + \epsilon_{jt}$, with t varying annually until 2010. Δy_t is the variation in the number of branches (Figure 5), the variation in the share of branches (Figure 6) and the variation in the share of bank credit (Figure 7) between the years 1995 and t in area j. ΔSB_{jt} is the variation in the dummy of the presence of privatized regional state-owned banks between the years 1995 and t in area j. In this specification, the parameter k_t represents the average variation in the variable y_{jt} in the year t.

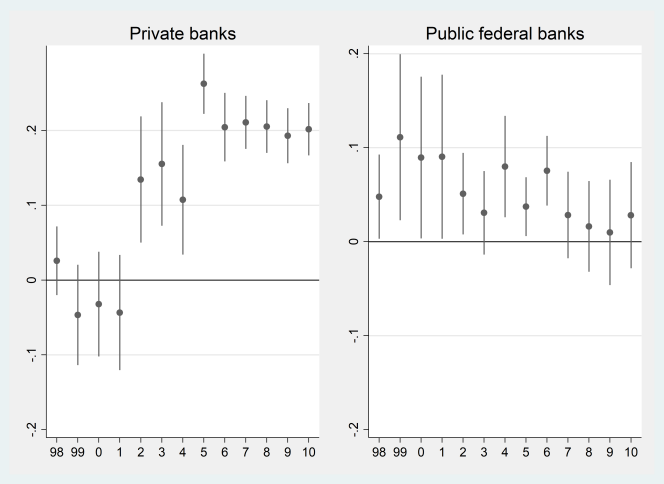


Figure 6. : Variation in bank branches share in micro-regions that lost regional public banks: private and federal public banks

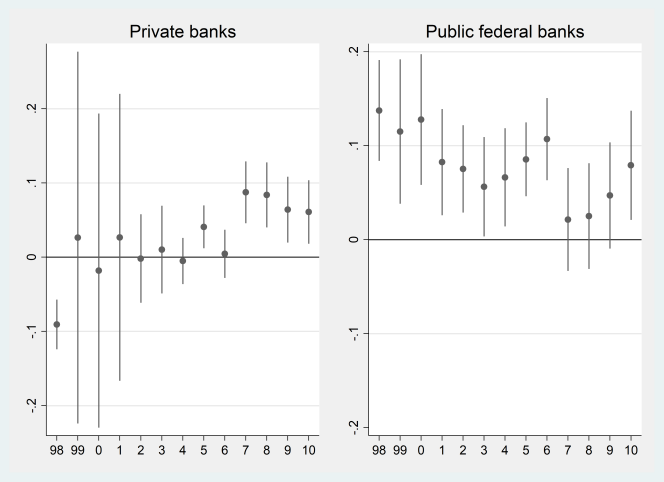


Figure 7. : Variation in bank credit in micro-regions that lost regional public banks

Therefore, the coefficient α_t is the additional variation in regions that had experienced the privatization of state public banks ($\Delta SB_{jt} = -1$) until the year t.

C. Job Flows and RAIS data

High job and worker reallocation rates are a salient feature of the Brazilian labor market. Since late 1990s, total annual worker and job reallocation rates have stayed above 80 percent and 30 percent, respectively. One can contrast these numbers with the same flow rates in the US economy, which stood at less than 40 percent and 20 percent, respectively (Hyatt and Spletzer (2013))[13]. The labor market information used to build job flows comes from RAIS (Relação Anual de Informações Sociais), an administrative database collected annually from all registered establishments in the country. The dataset used goes from 1986 to 2010, and it is considered a high quality census of the Brazilian formal labor market. Since RAIS is the basis for calculating government benefits extended to formal workers and firms face fines for failure to report, there is an incentive to provide updated information.[14] Let's define job creation and job destruction rates at region j and year t as follows:

$$JC_{jt} = 100 * \sum_{i \in j} \frac{\Delta n_{it} I(\Delta n_{it} > 0)}{N_{jt}}$$

$$JD_{jt} = 100 * \sum_{i \in j} \frac{|\Delta n_{it}| I(\Delta n_{it} < 0)}{N_{jt}}$$

where $\Delta n_{i,t}$ denotes the employment change between t_0 and t at the establishment i. Establishments with increase (decrease) in employment contribute to job creation (job destruction). The employment variation is aggregated within the region and normalized by total employment averaged between in t_0 and t. The paper also considers another standard measure derived from $JC_{j,t}$ and $JD_{j,t}$, excess job reallocation ($REAL_{j,t}$), or the extent of job flows above and beyond the necessary to account for net employment growth ($NET_{j,t}$). These variables are constructed and interpreted following Davis, Haltiwager and Schuh (1996):

$$NET_{jt} = JC_{jt} - JD_{jt}$$
$$REAL_{jt} = JC_{jt} + JD_{jt} - |NET_{jt}|$$

The Brazilian economy experienced a decade of consistent output growth and formal job creation following the events of state bank privatization and trade

[13]The reason for the constant reallocation of workers in Brazil is often the subject of debate (Gonzaga (2003)). The Brazilian labor market presents some particular regulations that raise concerns about the high rates of reallocation (Barros, Corseuil and Foguel (2001)). Workers are endowed with a fund (Fundo de Garantia por Tempo de Serviço, FGTS) that accumulates during formal employment spells and can be accessed only when the employee is fired without cause. Hence, severance pay contingencies provide incentives for separations by transforming low liquidity savings held in the FGTS into readily available compensation. Additionally, the unemployment insurance scheme does not burden individual firms at the time of discharge.

[14]Since the paper studies the reallocation consequences of public bank financing, it is appropriate to consider formal or registered firms, as informality hinders access to financial institutions.

liberalization. A first inspection of the data shows the increase in formalization in the labor market coming from a decline in job destruction over time. The result was positive net employment growth in formal jobs (Figure 8).

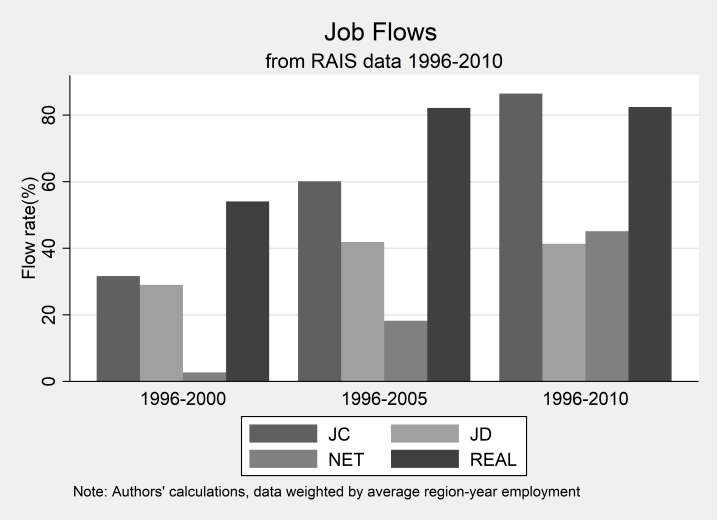


Figure 8. : Job Creation and Destruction Rates

The job flow rates can be separated into an extensive margin - destruction and creation of jobs coming from exit and entry of establishments -, and an intensive margin - destruction and creation of jobs coming from contracting and expanding establishments. As shown in Figure 9a, in the long run job creation is dominated by the extensive margin due to entering establishments.

The paper studies four measures of establishment dynamics defined at the micro-region level: change in the log of average plant size, change in the log of total number of plants, establishment entry rates and exit rates.[15] The average establishment size measured as the number of employees divided by the number of establishments has not changed significantly in the 2000s (Figure 9b). But the number of plants in a micro-region has increased, indicating again that establishment entry played a role in the availability of more formal jobs (Figure 9b and Figure 10a).

There is substantial heterogeneity in labor dynamics across establishment characteristics in the economy. Figure 10b shows job creation and job destruction rates according to average establishment size. As expected, smaller establishments face a higher pace of reallocation.

[15]The entry rate is measured as the number of new establishments appearing in a micro-region between 1996 and t divided by the average number of establishments in 1996 and t. The exit rate is analogous and considers the number of closing or exiting establishments in the region between 1996 and t.

Table 10—: Summary Statistics -Job flows

Job Flows Rates					
Year	Dep. Variables	Mean	Std	Perc. 10th	Perc. 90th
2000	$LogJC$	-0,88	0,20	-1,06	-0,61
	$LogJCNew$	-1,36	0,25	-1,59	-1,01
	$LogJCExp$	-1,86	0,21	-2,02	-1,55
2005	$LogJC$	-0,38	0,17	-0,57	-0,16
	$LogJCNew$	-0,74	0,20	-0,91	-0,51
	$LogJCExp$	-1,58	0,21	-1,81	-1,30
2010	$LogJC$	-0,08	0,13	-0,25	0,08
	$LogJCNew$	-0,39	0,17	-0,55	-0,19
	$LogJCExp$	-1,41	0,19	-1,58	-1,20
2000	$LogJD$	-1,00	0,19	-1,22	-0,85
	$LogJDExit$	-1,61	0,26	-1,92	-1,37
	$LogJDShr$	-1,82	0,27	-2,17	-1,58
2005	$LogJD$	-0,87	0,26	-1,12	-0,68
	$LogJDExit$	-1,29	0,27	-1,58	-1,08
	$LogJDShr$	-1,98	0,38	-2,43	-1,64
2010	$LogJD$	-0,93	0,27	-1,22	-0,72
	$LogJDExit$	-1,25	0,27	-1,61	-1,03
	$LogJDShr$	-2,26	0,44	-2,78	-1,82

Note: Data from RAIS (employer-employee) 1990 to 2010. The job flows are calculated as the logarithm of the accumulated rate from 1996 to t. Average size and number of plants are calculated as the difference in the logarithm from t to 1996. The pre-trends are calculated as the accumulated rate for flows, and the difference in logarithm from 1995 to 1986 for average size and number of plants. Statistics are weighted by micro-region employment.

Table 11—: Summary Statistics - Establishment Dynamics

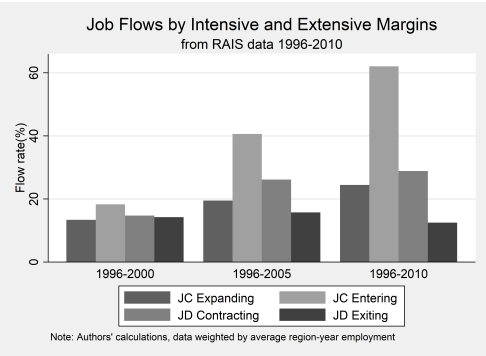
Establishment Variables					
Year	Dep. Variables	Mean	Std.Dev.	Perc. 10th	Perc. 90th
2000	$LogEntry$	-0,66	0,16	-0,88	-0,49
2005	$LogEntry$	-0,24	0,16	-0,46	-0,04
2010	$LogEntry$	0,00	0,14	-0,23	0,17
2000	$LogExit$	-1,08	0,08	-1,16	-1,01
2005	$LogExit$	-0,85	0,13	-1,02	-0,73
2010	$LogExit$	-0,84	0,17	-1,04	-0,65
2000	$\Delta LogN.Establ.$	0,18	0,10	0,06	0,30
2005	$\Delta LogN.Establ.$	0,38	0,19	0,14	0,60
2010	$\Delta LogN.Establ.$	0,59	0,24	0,28	0,88
2000	$\Delta LogSize$	-0,13	0,09	-0,21	-0,05
2005	$\Delta LogSize$	-0,11	0,12	-0,21	0,03
2010	$\Delta LogSize$	-0,04	0,13	-0,16	0,08

Note: Data from RAIS (employer-employee) 1990 to 2010. The job flows are calculated as the logarithm of the accumulated rate from 1996 to t. Average size and number of plants are calculated as the difference in the logarithm from t to 1996. The pre-trends are calculated as the accumulated rate for flows, and the difference in logarithm from 1995 to 1986 for average size and number of plants. Statistics are weighted by micro-region employment.

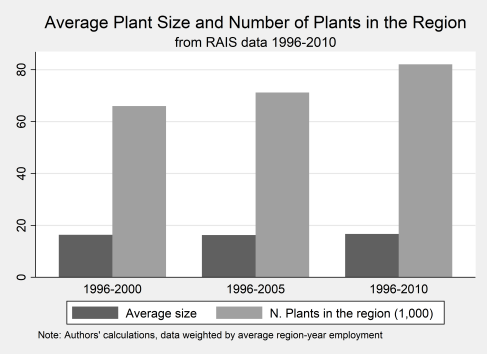
Table 12—: Summary Statistics: Pre-Trends

Pre-Trends 1986 to 1995				
Dep. Variables	Mean	Std.Dev.	Perc. 10th	Perc. 90th
Log JC rate	-0,54	0,20	-0,71	-0,31
Log JC from New	-0,93	0,26	-1,11	-0,65
Log JC from Exp.	-1,74	0,30	-2,11	-1,39
Log JD rate	-0,73	0,21	-0,94	-0,52
Log JD from Exit.	-1,25	0,24	-1,44	-1,06
Log JD from shr.	-1,67	0,35	-2,14	-1,31
Log Exit rate	-0,82	0,13	-0,96	-0,64
Log Entry rate	-0,13	0,15	-0,33	0,03
Δ Log of N. of Establ.	-5,46	0,47	-6,07	-5,04
Δ Log of Average Size	-0,14	0,93	0,00	0,00

Note: Data from RAIS (employer-employee) 1990 to 2010. The job flows are calculated as the logarithm of the accumulated rate from 1996 to t. Average size and number of plants are calculated as the difference in the logarithm from t to 1996. The pre-trends are calculated as the accumulated rate for flows, and the difference in logarithm from 1995 to 1986 for average size and number of plants. Statistics are weighted by micro-region employment.



(a) Intensive and Extensive Margins

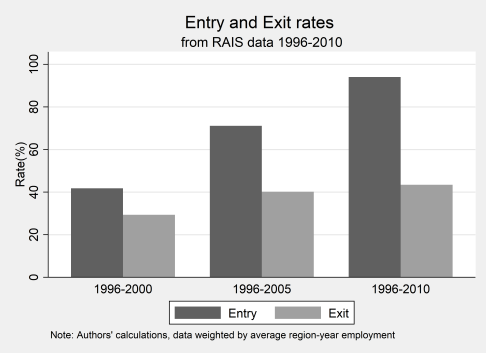


(b) Establishments: size and number of plants

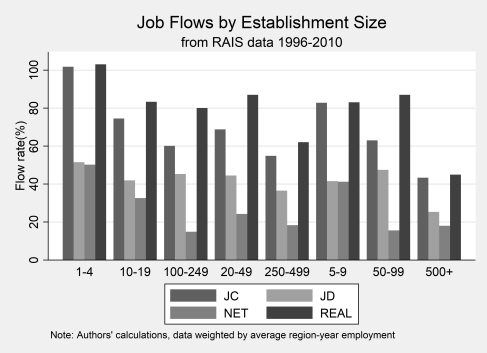
Figure 9. : Job Flows

D. Probing into the Exogeneity of Privatization Events

This section makes a three-part argument for the exogeneity of regional state-bank privatization. Firstly, the tariff-reduction described in section 2 was a one-time event that brought down a convoluted system of trade protection. The system had a heterogeneous geographical impact in the country. Secondly, the consolidation of the bank industry was spurred by the *Real Plan* and its unexpected success in reducing hyperinflation. This success came after the tariff-reduction, and the policy was conceived by a different economic team and government.



(a) Establishment Dynamics: entry and exit



(b) Job Creation and Destruction Rates by Establishment Size

Figure 10. : Job Flows

Thirdly, bank privatization was extensive, but it remains a concern that places most affected by trade openness were forced to consolidate early the state-owned system. The paper probes into the third concern with the following auxiliary linear regression exercise:

$$\Delta SB_{jt} = \gamma_t RTR_j + \theta_{st} + \alpha_t X_j + \zeta_{jt}$$

where $\Delta SB_{j,t} \equiv SB_{jt} - SB_{j1995}$ is the variation in the privatized regional bank outcome SB_{jt} between the years 1995 and t in area j, with t varying annually until 2010; RTR_j is the local tariff-shock in area j; θ_{st} are state-level dummies; X_j are control variables that capture initial economic conditions in area j ; and, ζ_{jt} is the idiosyncratic term uncorrelated with right-hand variables. Not statistically significant estimates of γ_t suggest exogeneity of state-bank privatization.

The regression model includes controls X_j for local demographic and economic characteristics taken from the 1990 RAIS data. The information on the share of employment of young workers, male workers, unskilled workers, and small businesses in 1990 capture the formal labor market prior to the liberalization.

Table 13 reports ordinary least square estimates of the auxiliary equation. The estimates cannot reject the null hypothesis of no partial correlation between demand shocks and privatization of regional state-owned banks.

III. Empirical Analysis

A. Empirical Strategy

The empirical specification to test whether local market responses to demand shocks interacted with bank privatization is the following:

Table 13—: Regression of Regional Tariff Reductions on the Change in the Privatization Dummy and the Change in the Share of Regional State-owned Bank Credit

	ΔSB			$\Delta Share\ Credit$		
	(1)	(2)	(3)	(4)	(5)	(6)
	2000	2005	2010	2000	2005	2010
RTR	-0.254	1.675	-1.640	-0.082	-0.200	0.015
	(0.491)	(1.152)	(1.585)	(0.231)	(0.238)	(0.198)
N.Obs.	411	411	411	411	411	411
R^2	0.577	0.647	0.334	0.408	0.576	0.641

Note Each column corresponds to a different regression. In the first panel the dependent variable is the change in the dummy for privatization of regional state-owned banks between 1995 and t. In the second panel the dependent variable is the change in the share of regional state-owned bank credit between 1995 and t. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). Statistically insignificant results suggest exogeneity of tariff reduction at the local market. Dummy variables for the 26 states in Brazil and control variables that capture the 1990 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 14—: Summary Statistics - Regional Tariff Reduction and Local Labor Market Controls

Statistics	Mean	Std	Perc. 10th	Perc. 90th
Regional Tariff Reduction	0.11	0.04	0.04	0.15
Share of young workers	0.25	0.05	0.18	0.31
Share of male workers	0.65	0.06	0.60	0.72
Share of unskilled workers	0.69	0.09	0.62	0.82
Share of small businesses	0.12	0.05	0.07	0.19

Note: Data from RAIS 1990 and Estban (Central Bank of Brazil) 1995-2010. The variables from RAIS 1990 are the share of employment of each demographic category in the micro-region. Young workers are less than 25-years-old. Unskilled workers have less than a high-school diploma. Small businesses employ fewer than 5 employees. Employment-weighted statistics.

$$Y_{jt} = \theta_{1t} RTR_j + \theta_{2t} \Delta SB_{jt} + \theta_{3t} RTR_j * \Delta SB_{jt} + \delta_t X_j' + \theta_{st} + \epsilon_{jt}$$

where the dependent variables are labor market outcomes and establishment outcomes by micro-region and time; RTR_j is a local tariff-shock; SB_{jt} is state-bank insertion as defined previously; X_j are controls from the 1990 RAIS along with pre-trends in Y_{jt}; θ_{st} are state dummies; and, ϵ_{jt} is the idiosyncratic term uncorrelated with right-hand variables.

The labor market outcomes included in the analysis are the log of the accumulated job creation and job destruction rates. The job creation and job creation rates are also separated in extensive margin (job flows due to expanding

and shrinking establishments) and intensive margins (job flows due to entry and exit).[16] Establishment outcomes, namely the change in the average size of the establishment, the change in the number of establishments in the micro-region, entry and exit rates were also included. The variable representing variation in regional state-bank insertion in area j from 1995 to t is the change in a dummy that captures the presence of privatized state-level public banks.

The identification rests on the assumption that after controlling for X_j and θ_{st} the unobserved confounders affecting Y_{jt} are not correlated with both RTR_j and ΔSB_{jt}. It is important to consider the time-span and control variables so that the widespread state-bank privatization and top-down tariff-reduction policies approximately guarantee identification.

It is worthy emphasizing that the privatization is an important event in the empirical analysis, being itself an exogenous shock to the presence of state-owned banks in a local market, which allows for the identification. Because of the institutional design of $PROES$, the regression specification is likely to test whether the presence of regional state-owned banks has an important role in smoothing credit.

The coefficient of interest θ_{3t} corresponds to the coefficient of the interaction between RTR_j and ΔSB_{jt}. It captures the differential impact of demand shocks according to the presence of state-owned local banks, which depends on the speed of privatization and degree of bank consolidation in the local market.

Consider, for instance, the case of job creation rates. A higher negative economic shock (represented by an increase in RTR_j) is related to a proportional decline in job creation rates in area j, captured by a negative θ_{1t}. If the presence of state-owned banks is counter-cyclical, regions that suffered negative economic shocks but had an increase in the presence of public banks (captured by a positive ΔSB_{jt}) should display relatively smaller declines in labor market outcomes than regions where there was no change in SB_{jt}, or a decrease in the presence of state-owned banks.

Therefore, if the presence of regional public banks has a counter-cyclical role, one should observe $\theta_{3t} > 0$ for job creation rates. Another way to see this relationship is by looking at the partial derivative of the labor market outcome Y_{jt} with respect to RTR_j:

$$\frac{\partial Y_{jt}}{\partial RTR_j} = \theta_{1t} + \theta_{3t} * \Delta SB_{jt}$$

This expression shows that an increase in RTR_j - which corresponds to a fall in trade protection or an increase in trade liberalization - in the absence of a change in the state-owned banks presence, is related to the outcome variables by θ_{1t}. Hence, θ_{1t} is expected to be negative in the case of job creation (or establishment

[16]We follow Dix-Carneiro and Kovak (2017) to compute the accumulated job flows rates, but we use the accumulated rates from 1996 to 2000. The reason for this choice is that the present analysis is done for the period beginning in 1996 with state-bank privatization

entry rates and growth in number of plants, for instance). In the presence of a privatization event - which is captured by $\Delta SB_{jt} < 0$ - and if θ_{3t} is positive, the second term has a negative sign reinforcing θ_{1t}.

Following the same reasoning, a higher presence of state-owned banks - captured by $\Delta SB_{jt} > 0$ - and a positive sign in θ_{3t} gives a positive second term, partially offsetting the negative sign in θ_{1t}. In this case, the presence of regional state-owned banks has a counter-cyclical role on Y_{it} if $\theta_{3t} > 0$.

B. Estimation Results

Table 15 to Table 20 display estimates from the main specification using ordinary least square. The regression coefficients are shown for three different timeframes, namely, short-run from 1996 to 2000 (Tables 15 and Table 16), medium-run from 1996 to 2005 (Tables 17 and Table 18), and long-run from 1996-2010 (Table 19 and Table 20).

Local labor markets are impacted in the short-run - five years after the end of tariff reductions, i.e., 1995 - by trade liberalization. Job destruction, exit rates, growth in average size and number of plants respond to the labor demand shock. Areas that in conjunction with the trade shock also suffered regional public-bank credit restriction, compared to similar areas in the same state, suffered a proportionally higher impact of demand shocks on job creation, job destruction from shrinking plants, entry rates, and average establishment size. The magnitude of the differentiated impact of RTR on labor reallocation is non-negligible. In local markets with shut-down of public banks, after a one standard deviation higher increase in RTR, there is a higher proportional decline in job creation rates and growth in average establishment size of 22 percentage points and 12 percentage points, respectively.

The estimated coefficients do not show a statistically significant differentiated relationship between RTR and total job destruction, exit rates, and growth in the number of establishments in the short-run (θ_3 are not statistically significant in Tables 15, column (4) and 16, columns (2) and (4)).

In the medium-run (Tables 17 and 18), local labor markets are impacted by trade liberalization through proportionally lower entry rates and growth in number of plants. Again, the differentiated impact of demand shocks with the shut-down of public banks in non-negligible. In regions that experienced the privatization, an one-standard deviation higher increase in RTR is followed by relatively higher declines in entry rates and growth in number of plants of 8 percentage points and 13 percentage points, respectively.

The privatization event compounds the relative declines in entry rate and growth in the number of plants coming from trade liberalization in approximately 5 percentage points and 7 percentage points, respectively. Hence, results point to a short and medium-run counter-cyclical role of the presence of regional state-owned banks. These effects become more evident in Figure 11a to Figure 12. On the left side, the figures show the evolution of the coefficient of RTR (θ_1) year-by-

Table 15—: Regional Tariff Reduction, State-owned Banks' Presence and Changes in Labor Market Outcomes and Establishment Dynamics - 1996 to 2000 - Short-run Impact

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	$LogJC$	$LogJCNew$	$LogJCExp.$	$LogJD$	$LogJDExit$	$LogJDShr$
RTR	-0.367	0.556	-0.443	2.878***	4.059***	3.053***
	(0.588)	(0.739)	(0.737)	(0.719)	(0.960)	(1.090)
$\Delta Dummy_{95-00}$	-0.284**	0.198	-0.194	-0.164*	-0.343	0.618
	(0.141)	(0.510)	(0.216)	(0.087)	(0.353)	(0.460)
$\Delta Dummy_{95-00}$XRTR	5.124**	0.245	3.568	-0.944	3.038	-11.600**
	(2.119)	(5.726)	(2.653)	(1.269)	(3.928)	(4.766)
Cons	-1.140***	-1.953***	-1.397***	-3.119***	-3.611***	-4.025***
	(0.143)	(0.318)	(0.218)	(0.239)	(0.389)	(0.448)
N. Obs.	411	411	411	411	411	411
R2	0.362	0.504	0.186	0.412	0.524	0.257

Note Each column corresponds to a different regression. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). $\Delta Dummy_{95-00}$ corresponds to the change in the presence of privatized state-owned banks. Dummy variables for the 26 states in Brazil and control variables that capture the 1991 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 16—: Regional Tariff Reduction, State-owned Banks' Presence and Changes in Labor Market Outcomes and Establishment Dynamics - 1996 to 2000 - Short-run Impact

	(1)	(2)	(3)	(4)
Dep. Variable	LogEntry	LogExit	ΔLogAvg.Size	ΔLogN.Plants
RTR	-0.206	1.688***	-0.875*	-1.008***
	(0.296)	(0.335)	(0.496)	(0.370)
$\Delta Dummy_{95-00}$	-0.074	-0.066	-0.069	-0.017
	(0.050)	(0.154)	(0.077)	(0.050)
$\Delta Dummy_{95-00}$XRTR	1.386*	0.253	2.065**	0.993
	(0.818)	(1.350)	(1.009)	(0.724)
Cons	-0.684***	-1.591***	0.380**	0.478***
	(0.081)	(0.152)	(0.165)	(0.156)
N. Obs.	411	411	411	411
R2	0.429	0.368	0.225	0.465

Note Each column corresponds to a different regression. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). $\Delta Dummy_{95-00}$ corresponds to the change in the presence of privatized state-owned banks. Dummy variables for the 26 states in Brazil and control variables that capture the 1991 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

year for the corresponding outcome variable. On the right side, the figures show the evolution of the coefficient on RTR in regions that lost regional public banks ($\theta_1 + \theta_3 \Delta SB_t$), hence under privatization.

Adding to the described effects on entry rate and average size, proportionally higher job destruction rates and exit rates are observed in regions that lost regional public banks, as shown in Figure 11a to Figure 12.

Labor reallocation is accelerated in local markets with privatization of regional

Table 17—: Regional Tariff Reduction, State-owned Banks' Presence and Changes in Labor Market Outcomes and Establishment Dynamics - 1996 to 2005 - Medium-run Impact

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	$LogJC$	$LogJCNew$	$LogJCExp.$	$LogJD$	$LogJDExit$	$LogJDShr$
RTR	-0.765	0.674	-3.469***	5.317***	5.045***	6.088***
	(0.475)	(0.770)	(0.749)	(1.003)	(1.013)	(1.821)
$\Delta Dummy_{95-05}$	-0.004	-0.035	0.090	-0.167	-0.205	0.116
	(0.054)	(0.149)	(0.108)	(0.137)	(0.136)	(0.292)
$\Delta Dummy_{95-05}$XRTR	0.772	0.999	0.797	-0.271	0.370	-3.662
	(0.847)	(1.515)	(1.255)	(1.372)	(1.356)	(2.790)
Cons	-0.545***	-1.201***	-0.852***	-3.180***	-3.196***	-4.832***
	(0.103)	(0.233)	(0.258)	(0.223)	(0.332)	(0.441)
N.Obs.	411	411	411	411	411	411
R^2	0.373	0.515	0.328	0.537	0.555	0.383

Note Each column corresponds to a different regression. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). $\Delta Dummy_{95-05}$ corresponds to the change in the presence of privatized state-owned banks. Dummy variables for the 26 states in Brazil and control variables that capture the 1991 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 18—: Regional Tariff Reduction, State-owned Banks' Presence and Changes in Labor Market Outcomes and Establishment Dynamics - 1995 to 2005 - Medium-run Impact

	(1)	(2)	(3)	(4)
Dep. Variable	LogEntry	LogExit	ΔLogAvg.Size	ΔLogN.Plants
RTR	-0.721***	2.070***	-0.629	-1.382***
	(0.268)	(0.444)	(0.498)	(0.389)
$\Delta Dummy_{95-05}$	-0.044	-0.074	0.028	-0.028
	(0.031)	(0.060)	(0.067)	(0.053)
$\Delta Dummy_{95-05}$XRTR	1.326***	-0.476	-0.174	1.827***
	(0.396)	(0.653)	(0.858)	(0.600)
Constant	-0.163**	-1.356***	-0.007	0.686***
	(0.065)	(0.129)	(0.126)	(0.192)
N.Obs.	411	411	411	411
R^2	0.569	0.522	0.276	0.577

Note Each column corresponds to a different regression. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). $\Delta Dummy_{95-05}$ corresponds to the change in the presence of privatized state-owned banks. Dummy variables for the 26 states in Brazil and control variables that capture the 1991 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

banks: after the 90s trade liberalization, these markets display faster proportional declines in job creation and entry rates, and increases in job destruction and exit rates already in the early and mid-2000s.

Table 19 to Table 20 show estimates for the long-run horizon. Stronger negative demand shocks are still related to higher relative declines in establishment entry and growth in the number of plants, and increases in job destruction and establishment exit. No differentiated response to trade liberalization is observed

Table 19—: Regional Tariff Reduction, State-owned Banks' Presence and Changes in Labor Market Outcomes and Establishment Dynamics - 1996 to 2010 - Long-run Impact

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	$LogJC$	$LogJCNew$	$LogJCExp.$	$LogJD$	$LogJDExit$	$LogJDShr$
RTR	-0.607	-0.667	-1.275	5.161***	4.154**	10.639***
	(0.613)	(0.906)	(1.100)	(1.467)	(1.728)	(2.903)
$\Delta Dummy_{95-10}$	0.030	0.031	0.047	-0.405***	-0.319**	-0.471
	(0.072)	(0.082)	(0.126)	(0.123)	(0.137)	(0.309)
$\Delta Dummy_{95-10}$XRTR	-0.353	-1.195	1.513	2.579*	2.152	3.428
	(0.709)	(0.902)	(1.872)	(1.379)	(1.644)	(3.226)
Cons	-0.194*	-0.664***	-0.500	-2.882***	-2.891***	-5.285***
	(0.113)	(0.175)	(0.342)	(0.246)	(0.360)	(0.493)
N.Obs.	411	411	411	411	411	411
R^2	0.458	0.556	0.407	0.655	0.611	0.402

Note Each column corresponds to a different regression. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). $\Delta Dummy_{95-05}$ corresponds to the change in the presence of privatized state-owned banks. Dummy variables for the 26 states in Brazil and control variables that capture the 1991 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 20—: Regional Tariff Reduction, State-owned Banks' Presence and Changes in Labor Market Outcomes and Establishment Dynamics - 1995 to 2010 - Long-run Impact

	(1)	(2)	(3)	(4)
Dep. Variable	LogEntry	LogExit	ΔLogAvg.Size	ΔLogN.Plants
RTR	-0.915***	4.048***	0.390	-2.651***
	(0.324)	(0.852)	(0.753)	(0.718)
$\Delta Dummy_{95-05}$	0.034	-0.238***	0.030	0.154**
	(0.024)	(0.077)	(0.066)	(0.063)
$\Delta Dummy_{95-05}$XRTR	-0.090	2.233**	-0.214	-0.838
	(0.358)	(0.877)	(0.774)	(0.762)
Constant	0.163***	-1.728***	-0.259*	1.087***
	(0.049)	(0.149)	(0.140)	(0.213)
N.Obs.	411	411	411	411
R^2	0.622	0.605	0.563	0.617

Note Each column corresponds to a different regression. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). $\Delta Dummy_{95-05}$ corresponds to the change in the presence of privatized state-owned banks. Dummy variables for the 26 states in Brazil and control variables that capture the 1991 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

in regions that experienced privatization, except for the case of job destruction and exit rates. In effect, if facing the same tariff-reduction, after 15 years local markets which lost regional public banks display relatively smaller increases in job destruction rates and exit rates, having already reallocated jobs in the mid-2000s. The lack of differentiated impact of demand shocks on job creation and entry rates under privatization suggests that private and federal banks may have taken up the role of local public financial institutions.

C. Establishment Heterogeneity: Average Plant Size

As presented previously, job flows are on average higher in establishments with fewer employees. Figure 13a to Figure 18 in the Appendix present the differentiated impact of demand shocks under privatization according to average establishment size. Establishments were divided in three groups: small, with 1 to 19 employees; medium, with 20 to 99 employees; and large, with 100 or more employees.

Smaller establishments seem to be more affected by the demand shock with the exit of regional public banks. This is consistent with the evidence (Petersen and Rajan (2002)) that small businesses are more likely to be credit-constrained, and might be favoured by the differentiated access to public credit. Hence, their adjustment dynamics to negative shocks could respond more if compared to other establishments in the same local market. In fact, smaller establishments respond proportionally more, in the short-term, in regions that lost local public banks, by adjusting the entry and job creation margins, while in the medium-run, exit and job destruction become more responsive. In the long-run the results are mixed. Overall, the estimates follow more closely the patterns in the general sample (Figures 13a to 16).

Medium-size establishments do not present a statistically significant differentiated response to trade liberalization under bank privatization with respect to establishment entry and job creation, but respond in the medium-run with proportionally higher establishment exit and job destruction rates (Figures 14a to 17).

Lastly, large establishments present relative responses to demand shocks that are more pronounced in the short-term, particularly through job creation and establishment entry. Nevertheless, for large establishments the evidence on medium and long-term responses are mixed, including no statistically significant differentiated impacts on exit and job destruction margins (Figures 15a to 18 in the Appendix). The results are consistent with large establishments being also able to access financial services from federal and private institutions.

D. Establishment Heterogeneity: Bank Competition

An additional source of heterogeneity explored in the paper is the initial level of competition in the banking sector in the micro-region before $PROES$. Joaquim and Doornik (2019) in a study on MA's of private banks in Brazil show that the initial level of competition in the local market is relevant for credit outcomes. In particular, the authors find that, in markets with lower levels of competition, MA's are followed by decreases in loans and increases in credit spreads. Hence, the exit of a bank in a more competitive market may have a less pronounced impact on labor reallocation than the exit in a less competitive market.

In the case of privatization of banks, one would observe that the exit of regional state-owned banks in more competitive areas should impact less the transmission

of demand shocks to job flows and establishment dynamics. To evaluate local market responses, the main regressions are re-estimated for a sub-sample of regions considered to have a more competitive local banking sector. Higher competition is defined as areas that had at least 5 different financial institutions operating in 1995, before the privatization program started.

Table 21 presents the results for the short, medium and log-runs. If compared to estimates from Table 15 to Table 20, the response of regions with more bank competition seems to be higher than the responses for the overall sample. Interestingly, areas that had initially more competition and lost regional public banks, relative to those that did not lose, are not less responsive to negative demand shocks than areas with less competitive markets. The results suggest that public banks, in particular the regional ones, had a different role in local economies than federal and private banks, and the services offered could not be immediately replaced by competitors.

Table 21—: Regional Tariff Reduction, State-owned Banks' Presence, and Changes in Labor Market Outcomes and Establishment Dynamics in areas with higher bank competition

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dep. Variables	LogJC	LogJCnew	LogJCexp.	LogJD	LogJDexit	LogJDshr	LogEntry	LogExit	ΔLogSize	ΔLogN.Plants
RTR	0.825	1.023	0.115	0.640	1.091	0.237	-0.481	0.797***	0.425	-0.596*
	(0.630)	(0.943)	(0.800)	(0.581)	(0.717)	(0.703)	(0.422)	(0.265)	(0.300)	(0.312)
$\Delta Dummy_{95-00}$	-0.869***	-1.090***	-0.520	-0.074	-0.244***	0.316*	-0.375***	-0.213*	-0.434***	-0.224***
	(0.268)	(0.135)	(0.411)	(0.081)	(0.078)	(0.160)	(0.059)	(0.124)	(0.069)	(0.046)
$\Delta Dummy_{95-00}$XRTR	10.868***	12.049***	6.942*	-1.193	0.941	-7.174***	4.265***	1.463	5.277***	2.822***
	(2.851)	(2.291)	(4.143)	(1.113)	(1.272)	(2.461)	(0.928)	(1.169)	(0.716)	(0.679)
Constant	-0.711*	-0.913**	-1.019**	-2.610***	-2.422***	-3.457***	-0.439***	-1.299***	0.271	0.552***
	(0.357)	(0.413)	(0.435)	(0.240)	(0.329)	(0.418)	(0.125)	(0.113)	(0.183)	(0.166)
N. Obs.	238	238	238	238	238	238	238	238	238	238
R^2	0.387	0.469	0.384	0.588	0.589	0.498	0.651	0.678	0.576	0.777
Dep. Variables	LogJC	LogJCnew	LogJCexp.	LogJD	LogJDexit	LogJDshr	LogEntry	LogExit	ΔLogSize	ΔLogN.Plants
RTR	0.176	0.874	-0.662	2.237*	2.085	0.140	-0.584	0.978*	-0.041	-0.956
	(0.626)	(0.872)	(0.955)	(1.289)	(1.421)	(1.867)	(0.449)	(0.563)	(0.736)	(0.696)
$\Delta Dummy_{95-05}$	0.002	-0.037	0.073	-0.058	-0.019	0.582	-0.025	0.011	0.026	-0.031
	(0.091)	(0.115)	(0.107)	(0.171)	(0.183)	(0.404)	(0.053)	(0.091)	(0.077)	(0.094)
$\Delta Dummy_{95-05}$XRTR	0.323	-0.131	1.326	-1.047	-0.621	-8.634**	0.784	-0.900	-0.190	1.354
	(1.079)	(1.376)	(1.415)	(1.698)	(1.806)	(3.785)	(0.653)	(0.869)	(1.042)	(1.016)
Constant	-0.661**	-0.583	-1.748***	-2.287***	-2.344***	-2.886***	-0.159	-1.035***	-0.261	0.521
	(0.292)	(0.360)	(0.408)	(0.346)	(0.384)	(0.695)	(0.140)	(0.194)	(0.252)	(0.386)
N.Obs.	238	238	238	238	238	238	238	238	238	238
R2	0.415	0.472	0.463	0.584	0.488	0.480	0.644	0.672	0.402	0.674
Dep. Variables	LogJC	LogJCnew	LogJCexp.	LogJD	LogJDexit	LogJDshr	LogEntry	LogExit	ΔLogSize	ΔLogN.Plants
RTR	-0.262	0.501	-0.867	6.559**	5.719*	7.925*	-1.230***	3.850***	0.366	-3.337***
	(1.087)	(1.364)	(1.479)	(2.992)	(3.010)	(4.495)	(0.454)	(1.415)	(1.037)	(1.194)
$\Delta Dummy_{95-10}$	0.029	-0.047	0.159	-0.536*	-0.433	-0.527	0.058	-0.289**	0.009	0.205*
	(0.124)	(0.132)	(0.144)	(0.295)	(0.297)	(0.432)	(0.036)	(0.143)	(0.107)	(0.109)
$\Delta Dummy_{95-10}$XRTR	-0.567	-0.245	-0.505	4.935*	3.788	6.170	-0.598	3.037**	-0.069	-2.119*
	(1.113)	(1.242)	(1.535)	(2.927)	(3.016)	(4.198)	(0.392)	(1.428)	(1.055)	(1.083)
Constant	-0.179	-0.364	-1.002***	-3.105***	-3.122***	-4.298***	0.209**	-1.523***	-0.231	1.121**
	(0.229)	(0.287)	(0.321)	(0.490)	(0.476)	(1.068)	(0.099)	(0.268)	(0.237)	(0.453)
N.Obs.	238	238	238	238	238	238	238	238	238	238
R^2	0.496	0.476	0.683	0.689	0.654	0.529	0.665	0.676	0.667	0.687

Note Each column corresponds to a different regression. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). $\Delta Dummy_{95-t}$ corresponds to the change in the presence of privatized state-owned banks from 1995 to time t. Dummy variables for the 26 states in Brazil and control variables that capture the 1990 demographic and economic conditions are included as controls in all regressions (columns). Areas with initial level of bank competition corresponding to at least 5 financial institutions. All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E. Timing of privatization: Heterogeneity in responses

The privatization of regional public banks occurred from 1997 to 2007. To better understand the dynamic adjustment of local markets to trade liberalization, one can evaluate how the propagation of the shock depended on each cohort of the banking sector restructuring program. Although there were no clear or formal waves of privatization, it is possible to identify some periods during which local markets faced a more pronounced loss of regional public banks. In the empirical specification micro-regions are separated into three groups indicated by dummies: areas with lost regional branches from privatized banks from 1997 to 2002, from 2002 to 2005, and from 2005 to 2007.[17]

Table 22 and Table 23 show coefficient estimates using ordinary least square. Results indicate that areas where the privatization happened first fair consistently are worse over time in terms of job flows and establishment dynamics. Given a similar negative demand shock, local markets included in the first wave of privatization have a proportionally higher decline in entry rates and growth in number of plants, and a proportionally higher increase in job destruction and exit rates.

The difference in the relative response of labor market outcomes to demand shocks is statistically significant seven years after the first wave of shutdown of regional public banks from 1997 to 2002. The results are consistent with the history of $PROES$, when more fragile banks suffered early intervention. Local markets that depended on fragile public banks became comparatively more exposed to demand shocks after privatization. In line with this argument, the regions that lost regional state banks during the 2005-2007 period - at least ten years after the end of trade liberalization - suffered a relatively smaller impact from the negative demand shock. The magnitude of these differences are non-negligible, in some cases either completely offsetting the relative impact of the trade shock or by partially offsetting the effect.

All in all, having access to public credit just after the trade shock hit the economy might be of special relevance. This difference may prevent establishments from closing down as well as from adjusting in the intensive margin, i.e., through job creation and job destruction. The results indicate that not being credit-constrained during hard times can have long-term effects.

It is important to note that the estimates presented in Table 22 and Table 22 have to be interpreted with caution. There was a substantial growth in the provision of credit from federal public banks following the 2008 financial crisis (Coleman and Feler (2015)). If the regions involved in the last wave of privatization received larger amounts of federal credit, estimations could be reflecting this

[17] After 2007, there are only three micro-regions which lost regional public branches from privatized banks. These regions are not included in the analysis for two reasons. First, the financial crisis in 2008 might be a counfounder to the event of exit of regional branches. Second, the shutdown of regional public branches during the 2008-2010 period does not pass the exogeneity test with respect to RTR at a 10 percent level of statistical significance.

Table 22—: Heterogeneity in Job Flows Responses: Three waves of Privatization

Panel A: Job Creation and Job Destruction								
	2003	2005	2007	2010	2003	2005	2007	2010
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Variables	Log JC	Log JC	Log JC	Log JC	Log JD	*LogJD*	*LogJD*	Log JD
RTR	-0.109	-0.641	-0.970	-0.384	3.120***	2.838***	4.106**	3.232**
	(0.421)	(0.522)	(1.004)	(0.948)	(0.733)	(0.985)	(1.582)	(1.394)
Lost (Public Branch) 1997 to 2002	0.123	-0.007	0.101	0.135	0.088	0.150	-0.090	-0.236*
	(0.099)	(0.141)	(0.107)	(0.098)	(0.086)	(0.151)	(0.149)	(0.129)
Lost (Public Branch) 2002 to 2005		-0.122	-0.142	-0.100		-0.126	0.028	-0.004
		(0.090)	(0.099)	(0.089)		(0.126)	(0.145)	(0.135)
Lost (Public Branch) 2005 to 2007			-0.080	-0.045			0.227	0.149
			(0.090)	(0.084)			(0.150)	(0.127)
Lost 1997 to 2002*RTR	-2.676	-0.951	-2.109	-2.483	0.654	0.574	3.073	4.726**
	(1.883)	(2.209)	(1.772)	(1.715)	(1.187)	(1.723)	(2.152)	(1.957)
Lost 2002 to 2005*RTR		1.537	1.660	1.233		0.670	-0.405	-0.177
		(1.042)	(1.288)	(1.157)		(1.363)	(2.045)	(1.874)
Lost 2005 to 2007*RTR			0.787	0.414			-1.932	-1.586
			(1.072)	(0.983)			(1.625)	(1.465)
Constant	-1.043***	-0.601***	-0.506***	-0.281**	-2.165***	-1.864***	-1.857***	-1.844***
	(0.129)	(0.147)	(0.119)	(0.110)	(0.238)	(0.318)	(0.273)	(0.291)
N.Obs.	408	408	408	408	408	408	408	408
R-squared	0.668	0.611	0.652	0.653	0.614	0.610	0.653	0.722

Note Each column corresponds to a different regression. *RTR* corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). The specification uses three dummies representing each wave of privatization and the interactions of dummies with *RTR*. Dummy variables for the 26 states in Brazil and control variables that capture the 1990 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

difference.

Moreover, the fact that the presence of public banks may reduce relative establishment turnover and employment reallocation in a local market should not be perceived *per se* as a positive outcome. It could also be the case that the misallocation of funds from public banks support low productivity and smaller establishments, and prevent resources from being redirected to higher productivity sectors or establishments.

F. Mechanism: Regional public-bank credit availability

This section explores one of the mechanisms through which local public banks can affect job flows and establishment dynamics. In the empirical exercises, the change in the dummy for bank presence is replaced by the change in the share of bank credit provided by the privatized regional banks. As indicated previously (Figure 4), there is substantial cross-sectional variation in the decline of regional public bank credit share.

Table 27 and Table 28 show estimates of θ_{1t} and θ_{3t} using ordinary least squares. Each column in Tables 27 and 28 corresponds to a different regression considering the variation in the share of regional public credit and in the outcome variable between the respective year and 1996. The results reinforce the evidence reported in the previous sections suggesting that regional public-bank credit availability

Table 23—: Heterogeneity in Establishment Dynamics Responses: Three waves of Privatization

Panel A: Entry and Exit								
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Dep. Variables	LogEntry	LogEntry	LogEntry	LogEntry	LogExit	LogExit	LogExit	LogExit
RTR	-0.680**	-0.924***	-0.994*	-0.896*	0.995***	1.161***	2.243***	2.321***
	(0.333)	(0.327)	(0.551)	(0.519)	(0.262)	(0.305)	(0.704)	(0.795)
Lost (Public Branch) 1997 to 2002	0.117**	0.126**	0.084	0.068	-0.062*	-0.118**	-0.035	-0.051
	(0.057)	(0.058)	(0.058)	(0.054)	(0.032)	(0.053)	(0.079)	(0.095)
Lost (Public Branch) 2002 to 2005		-0.006	-0.029	-0.041		-0.016	0.068	0.073
		(0.051)	(0.058)	(0.055)		(0.049)	(0.068)	(0.081)
Lost (Public Branch) 2005 to 2007			-0.055	-0.079			0.138**	0.177**
			(0.054)	(0.053)			(0.064)	(0.074)
Lost 1997 to 2002*RTR	-1.930**	-2.091**	-1.734*	-1.574*	1.620***	2.597***	1.582	2.024
	(0.892)	(0.919)	(0.961)	(0.856)	(0.538)	(0.930)	(1.277)	(1.475)
Lost 2002 to 2005*RTR		0.081	0.083	-0.043		0.323	-0.609	-0.396
		(0.534)	(0.715)	(0.683)		(0.541)	(0.851)	(1.017)
Lost 2005 to 2007*RTR			0.204	0.293			-1.400*	-1.662*
			(0.578)	(0.561)			(0.742)	(0.854)
Constant	-0.213**	-0.055	0.105	0.267**	-1.145***	-1.003***	-1.124***	-1.214***
	(0.104)	(0.101)	(0.111)	(0.104)	(0.091)	(0.111)	(0.129)	(0.151)
N. Observations	408	408	408	408	408	408	408	408
R-squared	0.830	0.836	0.835	0.828	0.675	0.750	0.752	0.765
Panel B: Size and Number of Establishments								
	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Dep. Variables	$\Delta LogSize$	$\Delta LogSize$	$\Delta LogSize$	$\Delta LogSize$	$\Delta LogPlant$	$\Delta LogPlant$	$\Delta LogPlant$	$\Delta LogPlant$
RTR	-0.378	-0.240	-0.253	0.460	-0.880***	-1.242***	-1.949**	-2.142**
	(0.247)	(0.511)	(0.738)	(0.795)	(0.294)	(0.398)	(0.889)	(1.046)
Lost (Public Branch) 1997 to 2002	-0.026	-0.249*	0.049	0.155*	0.123**	0.177**	0.116	0.117
	(0.044)	(0.133)	(0.078)	(0.089)	(0.049)	(0.075)	(0.096)	(0.112)
Lost (Public Branch) 2003 to 2005		-0.029	-0.091	-0.067		0.029	-0.029	-0.051
		(0.066)	(0.061)	(0.066)		(0.067)	(0.092)	(0.107)
Lost (Public Branch) 2005 to 2007			-0.092	0.002			-0.109	-0.173*
			(0.072)	(0.069)			(0.080)	(0.097)
Lost 1997 to 2002*RTR	-0.253	2.374	-1.196	-2.276*	-2.323***	-3.502**	-2.976*	-3.351*
	(0.778)	(1.733)	(1.064)	(1.177)	(0.863)	(1.381)	(1.713)	(1.918)
Lost 2002 to 2005*RTR		0.823	0.905	1.083		-0.461	-0.032	-0.264
		(0.859)	(0.968)	(0.951)		(0.714)	(1.142)	(1.358)
Lost 2005 to 2007*RTR			0.611	0.084			0.859	1.196
			(0.882)	(0.839)			(0.927)	(1.128)
Constant	-0.134	-0.234	-0.431***	-0.476***	0.769***	0.877***	1.051***	1.327***
	(0.081)	(0.174)	(0.144)	(0.114)	(0.196)	(0.257)	(0.305)	(0.357)
N. Observations	408	408	408	408	408	408	408	408
R-squared	0.505	0.276	0.506	0.600	0.813	0.821	0.813	0.809

Note Each column corresponds to a different regression. *RTR* corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). The specification uses three dummies representing each wave of privatization and the interactions of dummies with *RTR*. Dummy variables for the 26 states in Brazil and control variables that capture the 1990 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

had a counter-cyclical role on the reaction of job flows and establishment dynamics to the demand shock. Furthermore, the effects of privatization are more prevalent until 2005 (short and medium-run), when very likely private banks and federal public banks had not effectively replaced the privatized regional banks. After 2005, the estimated coefficients do not show a statistically significant dif-

ferentiated relationship between RTR and job flows and establishment dynamics variables (θ_3 is not statistically significant).

According to Tables 27 to Table 28, local labor markets are impacted by trade liberalization through proportionally higher job destruction and exit rates, and lower entry rates and growth in number of plants. Again, the differentiated impact of trade liberalization shocks with the lower presence of local public banks is non-negligible.

Using the estimates for the variations between 2001 and 1996, in regions that experienced the privatization, an one-standard deviation higher reduction in the share of credit granted by the local public banks (0.10), and an one-standard deviation higher decline in RTR is followed by relatively higher declines in job creation rate, entry rates, and growth in number of plants of 4 percentage points, 5 percentage points, and 5 percentage points, respectively.

The reduction in the credit provided by the privatized local state-owned banks compounds the relative increases in job destruction rate and exit rate coming from trade liberalization in approximately 10 percentage points and 5 percentage points, respectively. Hence, results point to a short and medium-run counter-cyclical role of the availability of regional publicly-provided credit. Moreover, the reduction in the availability of credit granted by these institutions seems to be relevant to the transmission of demand shocks to job flows and establishment dynamics in local labor markets.

Unlike previous regression results - with ΔSB - there was no statistically significant differentiated response to the trade shock ten to fifteen years after the liberalization. Estimates suggest that in the long-run the credit role of privatized local banks may be replaced by federal and private bank services.

G. Wages and employment: formal versus informal sector

Not unlike other developing countries, Brazilian businesses rely heavily on informal jobs. Informal jobs are not subjected to mandatory benefits and might constitute a less costly margin of adjustment in the face of negative demand shocks. Following Dix-Carneiro and Kovak (2017) we evaluate the response of informal jobs to trade liberalization using Demographic Census waves from 1991 to 2010. Table 24 shows ordinary least square regressions of the change in the log of average earning and the change in employment rates at the micro-region level from 1991 to 2010 on RTR. Results are separated into all jobs, informal jobs, and formal jobs. To capture the role of state-owned regional banks in the transmission of demand shocks, the change in the share of credit from privatized local banks from 1995 to 2010 is interacted with regional tariff cuts. As expected, tariff cuts are correlated with relative declines in the growth of wages and increases in informal employment. Interestingly, the loss of facilitated public credit is related to proportionally higher declines in wages in all sectors (columns 1 to 3) and increases in informal employment (column 4). Hence, the diminishing role of regional public banks compounds the effect of trade liberalization on local labor

markets.

Table 24—: Response of formal and informal jobs to trade liberalization: Census 1991 and 2010

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	$\Delta Log(w_{all})$	$\Delta Log(w_{informal})$	$\Delta Log(w_{formal})$	ΔEmp_{all}	$\Delta Emp_{informal}$	ΔEmp_{formal}
RTR	-1.960***	-1.627***	-1.464***	0.064	0.389***	-0.776***
	(0.448)	(0.494)	(0.405)	(0.104)	(0.130)	(0.111)
$\Delta ShareCredit_{95-10}$	-0.155	-0.125	-0.172*	0.019	0.035	-0.028
	(0.096)	(0.104)	(0.088)	(0.024)	(0.026)	(0.024)
$\Delta ShareCredit_{95-10} XRTR$	3.121***	2.174*	2.507*	-0.278	-0.731**	0.127
	(1.124)	(1.166)	(1.486)	(0.256)	(0.295)	(0.329)
Obs	411	411	411	411	411	411
R2	0.795	0.807	0.853	0.624	0.483	0.750

Note Each column corresponds to a different regression. *RTR* corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). $\Delta ShareCredit_{95-10}$ corresponds to the change in the share of credit in privatized state-owned banks from 1995 to 2010 using Estban data. Dummy variables for the 26 states in Brazil and variables that capture the 1991 demographic and economic conditions (the share of unskilled, urban, young, and male young workers in the micro-region) are included as controls in all regressions (columns). In the first three columns the dependent variable is the change in the log of average employment earnings at the micro-region from 1991 to 2010. The log of earning at Census year t and micro-region j corresponds to the coefficient of the dummy representing the micro-region j in the ordinary least square regression of log of individual earnings on worker's education, age, age squared, and gender. The coefficient estimates for the 411 micro-regions are recouped from the auxiliary regressions with each Census wave. The auxiliary regressions are used to purge results from demographic changes in the labor force. Analogously, in the last three columns the change in employment is calculated using auxiliary regressions where the dependent variable is a dummy equal to one if the person is employed. The employment rate at Census year t and micro-region j corresponds to the coefficient of the dummy representing the micro-region j in the ordinary least square regression of a dummy for employment status on worker's education, age, age squared, and gender. All regressions (columns) are population-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

IV. Conclusion

This paper sheds new light on the relationship between the privatization of state-owned banks and labor reallocation in Brazil. The work reassesses the privatization of the state-owned regional banks by evaluating whether local markets which lost bank presence faced a higher relative decline in formal labor market outcomes after trade liberalization. State-owned banks may be inefficient compared to private ones, but public-sector presence in far-reach areas and the supply of subsidized credit are often related to local development.

The contribution of the paper is three-fold. First, it focuses on the allocative consequences of public financing in local labor markets by looking at job flows and establishment dynamics. Second, the well-known quasi-exogenous shock of trade liberalization in Brazil is used to propel the estimation, bypassing some concerns on endogeneity of bank responses. The privatization of state-owned banks was also a top-down and widespread policy, initially spurred by the end of hyperinflation. Hence, the institutional designs of both tariff-cuts and *PROES* help in identifying the relevance of regional public banks. Third, the paper evaluates the consequences of a large bank privatization program beyond the established literature on bank efficiency and competition.

The findings suggest that the shutdown of regional public banks accelerates the short and medium-run reallocation of resources due to demand shocks: local

markets facing the loss of regional banks also experienced initially higher proportional decreases in job creation and entry rates, followed by higher increases in job destruction and establishments exit rates. Nevertheless, results do not show a significant differentiated long-run response of job creation and entry rates to demand shocks in the presence of privatization, indicating that financial intermediation from regional public banks was eventually replaced by services offered by federal and private institutions.

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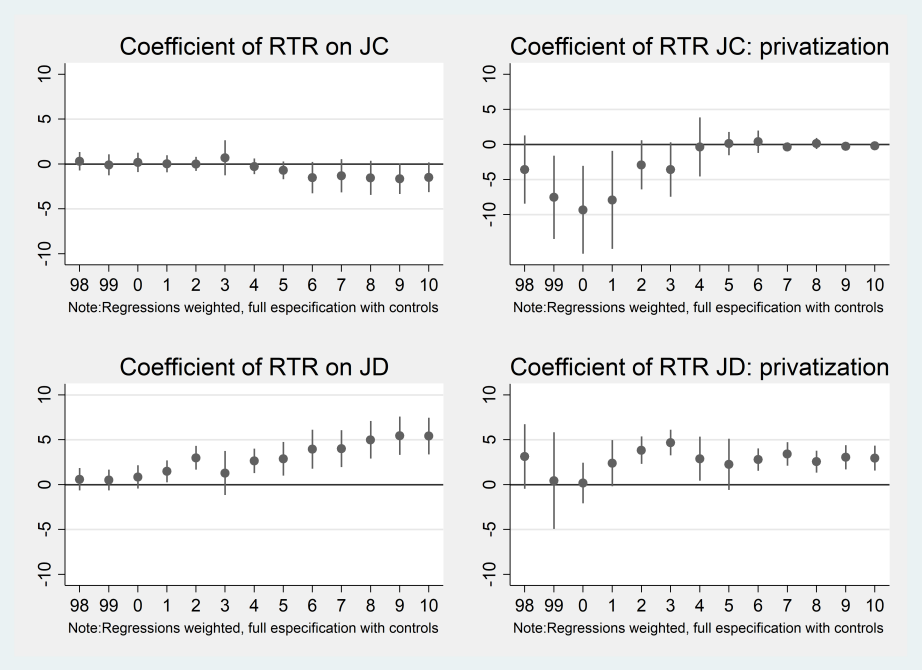
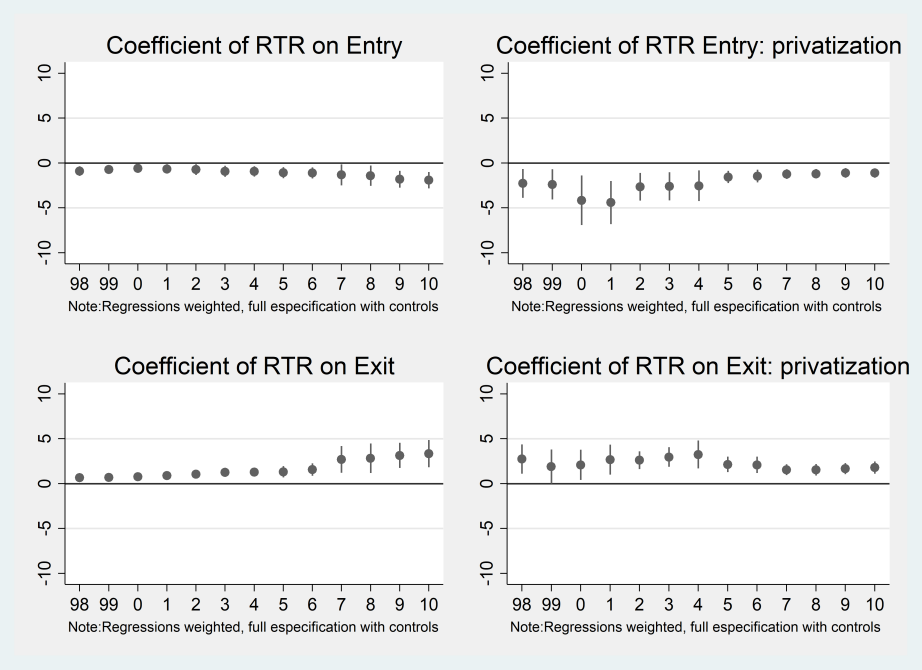


(a) Differentiated impact of RTR on job flows under privatization



(b) Differentiated impact of RTR on establishment dynamics under privatization

Figure 11. : Differentiated impact of RTR on job flows under privatization

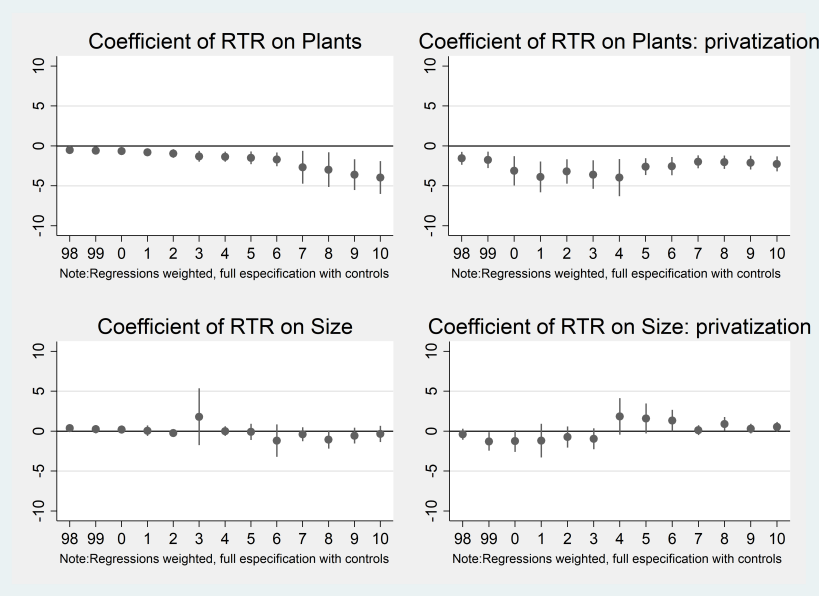


Figure 12. : Differentiated impact of RTR on the change in average size and the change in the number of plants

Note: Each point in the figure corresponds to a different regression coefficient estimate with confidence interval.

Table 25—: Regression of Regional Tariff Reductions on the Change in the Privatization Dummy and the Change in the Share of Regional State-owned Bank Credit, by year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ΔDummy	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
RTR	-0.500	-0.490	-0.254	-0.238	2.0510	1.775	1.714	1.675	1.754	0.463	0.519	-0.245	-1.640
	(0.410)	(0.409)	(0.491)	(0.506)	(1.515)	(1.519)	(1.600)	(1.152)	(1.152)	(1.034)	(1.049)	(1.739)	(1.585)
Obs	411	411	411	411	411	411	411	411	411	411	411	411	411
R2	0.702	0.699	0.577	0.561	0.595	0.569	0.557	0.647	0.646	0.385	0.392	0.329	0.334
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ΔShareCredit	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
RTR	-0.033	-0.047	-0.082	-0.018	0.054	-0.103	-0.044	-0.200	-0.199	0.028	0.024	0.017	0.015
	(0.287)	(0.274)	(0.231)	(0.276)	(0.269)	(0.253)	(0.263)	(0.238)	(0.229)	(0.200)	(0.202)	(0.198)	(0.198)
Obs	411	411	411	411	411	411	411	411	411	411	411	411	411
R2	0.415	0.393	0.408	0.393	0.410	0.471	0.489	0.576	0.584	0.645	0.647	0.644	0.641

Note Each column corresponds to a different regression. In the first panel the dependent variable is the change in the dummy for privatization of regional state-owned banks between 1995 and t. In the second panel the dependent variable is the change in the share of regional state-owned bank credit between 1995 and t. RTR corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). Statistically insignificant results suggest exogeneity of tariff reduction at the local market. Dummy variables for the 26 states in Brazil and control variables that capture the 1990 demographic and economic conditions are included as controls in all regressions (columns). All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 26—: Regional Tariff Reductions, Change in Regional State-owned Share of Bank Credit, and Job Flows

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
VARIABLES	Log JC1998	Log JC1999	Log JC2000	Log JC2001	Log JC2002	Log JC2003	Log JC2004	Log JC2005	Log JC2006	Log JC2007	Log JC2008	Log JC2009	Log JC2010
RTR	-0.105	-0.288	0.083	-0.166	-0.182	0.200	-0.104	-0.277	-0.660	-0.612	-0.163	-0.484	-0.290
	(0.508)	(0.564)	(0.521)	(0.516)	(0.425)	(0.929)	(0.562)	(0.588)	(0.578)	(0.468)	(0.531)	(0.456)	(0.458)
$\Delta ShareCredit_{95-t}$	-0.665*	-0.629*	-0.918**	-0.813**	-0.474*	-0.364	0.117	0.063	0.163	0.292	0.280	0.216	0.197
	(0.365)	(0.362)	(0.354)	(0.328)	(0.242)	(0.485)	(0.272)	(0.222)	(0.213)	(0.215)	(0.228)	(0.201)	(0.198)
$\Delta ShareCredit_{95-t}$XRTR	8.057**	9.305**	11.936***	8.330**	4.976*	4.795	1.185	-0.752	-0.754	-1.560	-0.359	-1.227	-0.623
	(3.342)	(4.101)	(4.095)	(3.497)	(2.805)	(5.395)	(3.331)	(2.804)	(3.408)	(2.879)	(2.790)	(2.732)	(2.711)
Constant	-1.678***	-1.343***	-1.183***	-1.001***	-0.970***	-0.757***	-0.701***	-0.676***	-0.742***	-0.477***	-0.338***	-0.269***	-0.229**
	(0.189)	(0.214)	(0.184)	(0.187)	(0.123)	(0.257)	(0.156)	(0.175)	(0.197)	(0.102)	(0.103)	(0.093)	(0.087)
N.Obs.	411	411	411	411	411	411	411	411	411	411	411	411	411
R^2	0.593	0.583	0.583	0.600	0.664	0.458	0.633	0.603	0.444	0.635	0.576	0.643	0.631
VARIABLES	Log JD1998	Log JD1999	Log JD2000	Log JD2001	Log JD2002	Log JD2003	Log JD2004	Log JD2005	Log JD2006	Log JD2007	Log JD2008	Log JD2009	Log JD2010
RTR	0.668	0.524	0.877	1.564**	2.745***	1.221	2.163**	2.306**	3.120***	3.149***	2.393***	3.018***	2.744***
	(0.634)	(0.592)	(0.647)	(0.611)	(0.581)	(1.147)	(0.917)	(1.105)	(0.762)	(0.686)	(0.721)	(0.737)	(0.742)
$\Delta ShareCredit_{95-t}$	0.474	-0.045	-0.006	0.632	0.495	0.876*	0.503	0.712**	0.473	0.251	0.188	0.166	0.177
	(0.467)	(0.365)	(0.344)	(0.417)	(0.362)	(0.478)	(0.385)	(0.329)	(0.360)	(0.328)	(0.313)	(0.340)	(0.370)
$\Delta ShareCredit_{95-t}$XRTR	-4.341	-2.445	-2.619	-9.138**	-7.152**	-10.037**	-5.350	-5.754*	-4.864	-3.675	-7.566**	-3.928	-4.278
	(3.574)	(2.878)	(2.925)	(3.541)	(3.340)	(4.448)	(3.356)	(3.026)	(3.859)	(3.344)	(3.004)	(3.681)	(4.119)
Constant	-2.848***	-2.540***	-2.386***	-2.072***	-2.282***	-1.687***	-1.717***	-1.810***	-1.970***	-1.892***	-2.117***	-2.139***	-2.037***
	(0.217)	(0.193)	(0.194)	(0.256)	(0.201)	(0.333)	(0.262)	(0.357)	(0.289)	(0.237)	(0.209)	(0.217)	(0.221)
Obs	411	411	411	411	411	411	411	411	411	411	411	411	411
R2	0.553	0.529	0.564	0.505	0.618	0.562	0.618	0.592	0.613	0.626	0.672	0.696	0.697

Note Each column corresponds to a different regression. *RTR* corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). There are four panels representing the response of job creation, job destruction, entry rate, and exit rate. Dummy variables for the 26 states in Brazil and control variables that capture the 1990 demographic and economic conditions are included as controls in all regressions (columns). The independent variables include the change in the regional share of credit of state-owned privatized banks. All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. All regressions have 411 observations. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 27—: Regional Tariff Reductions, Change in Regional State-owned Share of Bank Credit, and Establishment Entry and Exit

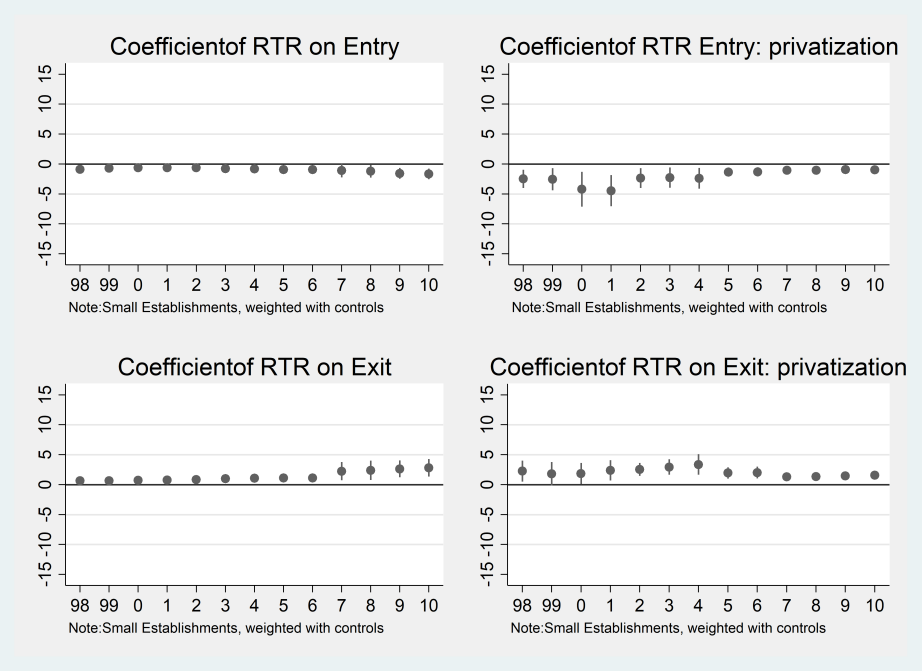
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
VARIABLES	Log Entry 1998	Log Entry 1999	Log Entry 2000	Log Entry 2001	Log Entry 2002	Log Entry 2003	Log Entry 2004	Log Entry 2005	Log Entry 2006	Log Entry 2007	Log Entry 2008	Log Entry 2009	Log Entry 2010
RTR	-1.082***	-0.779***	-0.666**	-0.770**	-0.909***	-1.074***	-1.068***	-1.170***	-1.160***	-1.202***	-1.226***	-1.188***	-1.185***
	(0.310)	(0.281)	(0.283)	(0.302)	(0.292)	(0.295)	(0.297)	(0.290)	(0.295)	(0.315)	(0.303)	(0.297)	(0.292)
$\Delta ShareCredit_{95-t}$	-0.551***	-0.476***	-0.368**	-0.377**	-0.374**	-0.284*	-0.225	-0.192	-0.178	-0.035	-0.003	0.013	0.022
	(0.144)	(0.158)	(0.172)	(0.166)	(0.161)	(0.165)	(0.156)	(0.127)	(0.124)	(0.140)	(0.136)	(0.136)	(0.132)
$\Delta ShareCredit_{95-t}$ XRTR	5.138***	4.701***	3.795**	4.140**	4.341**	3.241	2.641	1.765	1.141	0.568	-0.001	-0.085	-0.175
	(1.326)	(1.354)	(1.696)	(1.698)	(1.771)	(2.081)	(1.999)	(1.965)	(1.998)	(1.943)	(1.848)	(1.805)	(1.777)
Constant	-0.779***	-0.575***	-0.393***	-0.276**	-0.161	-0.094	-0.049	-0.003	0.025	0.090	0.151	0.200**	0.242***
	(0.107)	(0.104)	(0.107)	(0.107)	(0.104)	(0.102)	(0.101)	(0.099)	(0.097)	(0.095)	(0.091)	(0.089)	(0.089)
N.Obs.	411	411	411	411	411	411	411	411	411	411	411	411	411
R^2	0.843	0.839	0.826	0.823	0.829	0.834	0.832	0.827	0.822	0.821	0.819	0.819	0.811
VARIABLES	Log Exit 1998	Log Exit 1999	Log Exit 2000	Log Exit 2001	Log Exit 2002	Log Exit 2003	Log Exit 2004	Log Exit 2005	Log Exit 2006	Log Exit 2007	Log Exit 2008	Log Exit 2009	Log Exit 2010
RTR	0.693***	0.710***	0.810***	0.968***	1.138***	1.347***	1.426***	1.479***	1.582***	1.680***	1.714***	1.820***	1.895***
	(0.192)	(0.187)	(0.200)	(0.204)	(0.242)	(0.263)	(0.299)	(0.334)	(0.381)	(0.430)	(0.465)	(0.471)	(0.525)
$\Delta ShareCredit_{95-t}$	0.056	0.070	0.169	0.237*	0.261**	0.214	0.199	0.244*	0.198	-0.052	-0.075	-0.093	-0.092
	(0.121)	(0.137)	(0.145)	(0.135)	(0.127)	(0.132)	(0.136)	(0.128)	(0.132)	(0.160)	(0.175)	(0.185)	(0.198)
$\Delta ShareCredit_{95-t}$XRTR	0.310	-1.000	-1.951	-2.549**	-3.093**	-3.265**	-2.977*	-3.201*	-2.644	-0.778	-0.435	-0.052	-0.275
	(1.136)	(1.224)	(1.334)	(1.267)	(1.230)	(1.378)	(1.563)	(1.718)	(2.044)	(2.070)	(2.284)	(2.334)	(2.588)
Constant	-1.624***	-1.474***	-1.331***	-1.270***	-1.241***	-1.220***	-1.193***	-1.159***	-1.185***	-1.228***	-1.243***	-1.283***	-1.353***
	(0.083)	(0.083)	(0.070)	(0.074)	(0.075)	(0.072)	(0.076)	(0.086)	(0.100)	(0.098)	(0.105)	(0.107)	(0.116)
N.Obs.	411	411	411	411	411	411	411	411	411	411	411	411	411
R^2	0.442	0.493	0.565	0.630	0.680	0.723	0.742	0.741	0.727	0.729	0.731	0.735	0.733

Note Each column corresponds to a different regression. *RTR* corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). There are four panels representing the response of job creation, job destruction, entry rate, and exit rate. Dummy variables for the 26 states in Brazil and control variables that capture the 1990 demographic and economic conditions are included as controls in all regressions (columns). The independent variables include the change in the regional share of credit of state-owned privatized banks. All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. All regressions have 411 observations. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

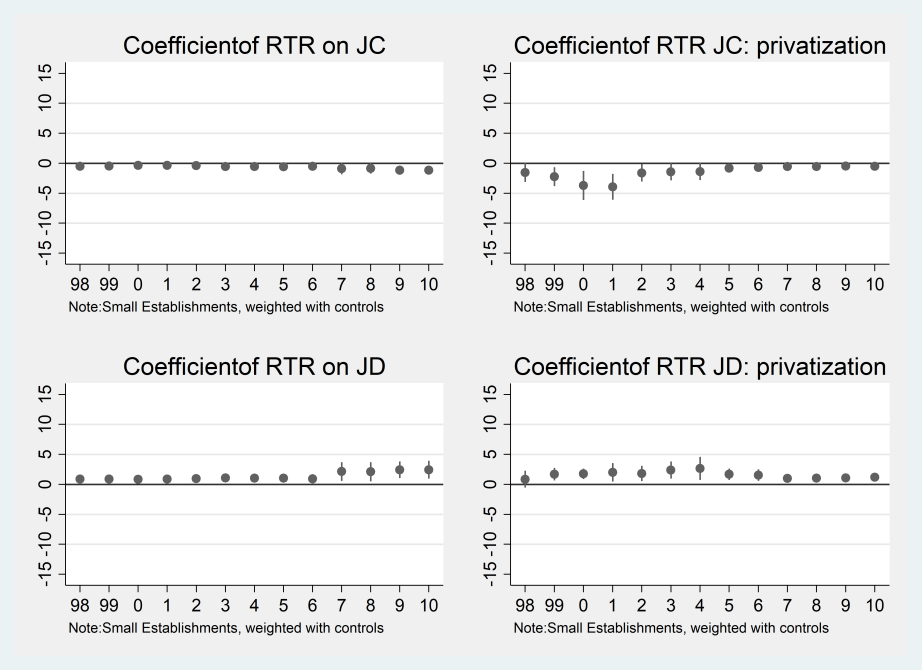
Table 28—: Regional Tariff Reductions, Change in Regional State-owned Share of Bank Credit, and Establishment Dynamics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
VARIABLES	Δlogplant1998	Δlogplant1999	Δlogplant2000	Δlogplant2001	Δlogplant2002	Δlogplant2003	Δlogplant2004	Δlogplant2005	Δlogplant2006	Δlogplant2007	Δlogplant2008	Δlogplant2009	Δlogplant2010
RTR	-0.603***	-0.622***	-0.700***	-0.900***	-1.136***	-1.463***	-1.560***	-1.762***	-1.842***	-2.012***	-2.144***	-2.242***	-2.369***
	(0.110)	(0.134)	(0.191)	(0.237)	(0.273)	(0.339)	(0.372)	(0.419)	(0.468)	(0.540)	(0.569)	(0.586)	(0.633)
$\Delta ShareCredit_{95-t}$	-0.207***	-0.233***	-0.264**	-0.305**	-0.367**	-0.292*	-0.255	-0.261	-0.240	-0.016	0.027	0.050	0.065
	(0.054)	(0.076)	(0.108)	(0.120)	(0.144)	(0.166)	(0.183)	(0.163)	(0.178)	(0.223)	(0.235)	(0.251)	(0.265)
$\Delta ShareCredit_{95-t}$XRTR	1.983***	2.668***	3.093***	3.560***	4.447***	3.977*	3.453	2.970	2.339	1.132	0.457	0.184	0.171
	(0.519)	(0.692)	(1.132)	(1.251)	(1.605)	(2.034)	(2.309)	(2.546)	(2.883)	(2.968)	(3.123)	(3.218)	(3.461)
Constant	0.284***	0.411***	0.548***	0.635***	0.684***	0.741***	0.782***	0.857***	0.841***	0.883***	0.962***	1.050***	1.113***
	(0.079)	(0.103)	(0.135)	(0.150)	(0.172)	(0.197)	(0.222)	(0.238)	(0.253)	(0.266)	(0.277)	(0.285)	(0.305)
Observations	411	411	411	411	411	411	411	411	411	411	411	411	411
R-squared	0.798	0.812	0.800	0.804	0.810	0.813	0.812	0.804	0.792	0.790	0.787	0.789	0.782
VARIABLES	Δlogsize1998	Δlogsize1999	Δlogsize2000	Δlogsize2001	Δlogsize2002	Δlogsize2003	Δlogsize2004	Δlogsize2005	Δlogsize2006	Δlogsize2007	Δlogsize2008	Δlogsize2009	Δlogsize2010
RTR	0.350*	0.220	0.187	0.032	-0.222	1.481	0.414	0.478	-0.238	-0.096	0.703	0.134	0.438
	(0.197)	(0.257)	(0.247)	(0.330)	(0.226)	(1.622)	(0.589)	(0.820)	(0.532)	(0.296)	(0.440)	(0.326)	(0.346)
$\Delta ShareCredit_{95-t}$	-0.064	-0.011	-0.074	-0.317	-0.002	-0.345	0.211	0.073	0.172	0.278**	0.261*	0.202	0.211
	(0.137)	(0.134)	(0.149)	(0.246)	(0.175)	(0.593)	(0.198)	(0.151)	(0.194)	(0.127)	(0.156)	(0.144)	(0.178)
$\Delta ShareCredit_{95-t}$XRTR	0.451	1.188	1.743	3.155	-0.372	2.863	-1.891	-2.845	-2.337	-2.356*	1.292	-1.239	-0.736
	(1.119)	(1.336)	(1.542)	(2.001)	(1.758)	(5.097)	(1.537)	(1.795)	(1.981)	(1.337)	(1.788)	(1.600)	(1.967)
Constant	0.049	0.083	0.060	-0.150	-0.181**	-0.405	-0.401***	-0.461*	-0.479***	-0.488***	-0.384***	-0.355***	-0.444***
	(0.063)	(0.098)	(0.092)	(0.150)	(0.079)	(0.270)	(0.141)	(0.245)	(0.143)	(0.153)	(0.105)	(0.111)	(0.110)
N.Obs.	411	411	411	411	411	411	411	411	411	411	411	411	411
R^2	0.480	0.398	0.471	0.341	0.492	0.183	0.376	0.247	0.227	0.501	0.391	0.574	0.587

Note Each column corresponds to a different regression. *RTR* corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). There are two panels representing the response of the change in the log of average size and number of plants. Dummy variables for the 26 states in Brazil and control variables that capture the 1990 demographic and economic conditions are included as controls in all regressions (columns). The independent variables include the change in the regional share of credit of state-owned privatized banks. All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. All regressions have 411 observations. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.



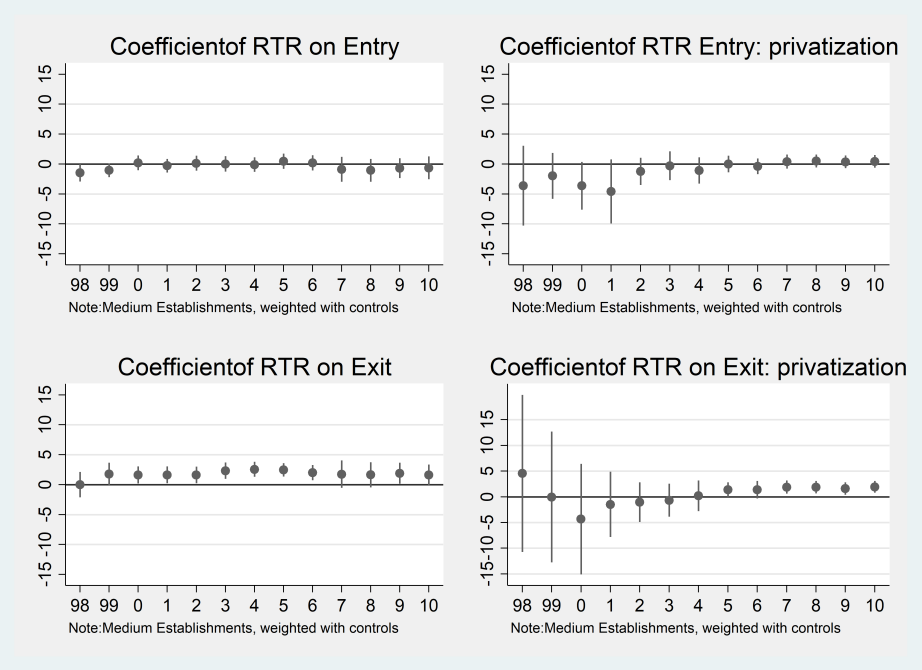
(a) Differentiated impact of RTR on small establishments: entry and exit rates



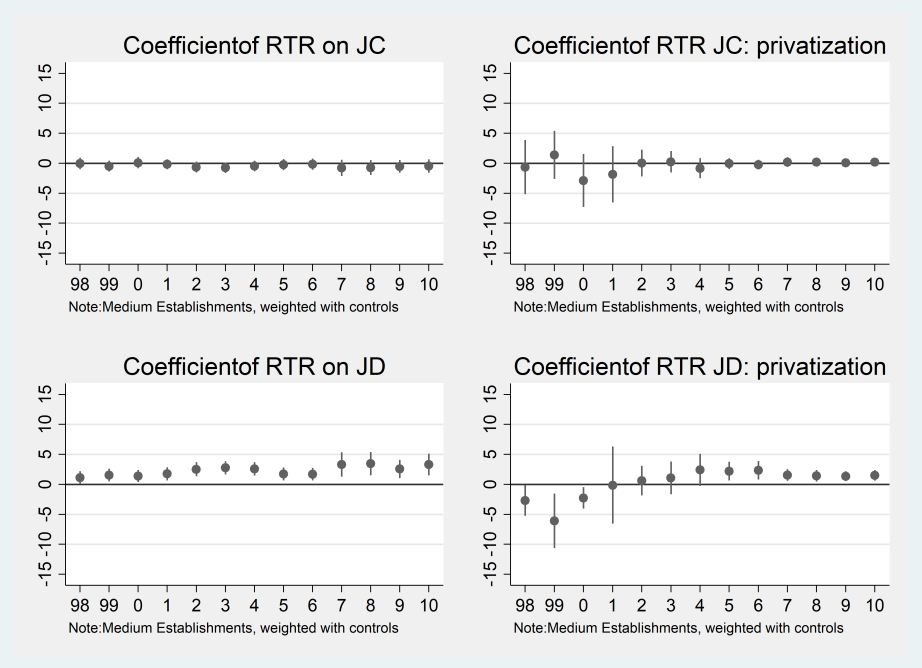
(b) Differentiated impact of RTR on small establishments: job creation and destruction

Figure 13. : Differentiated impact on job flows in small establishments

Note: Each point in the figure corresponds to a different regression coefficient estimate with confidence interval.



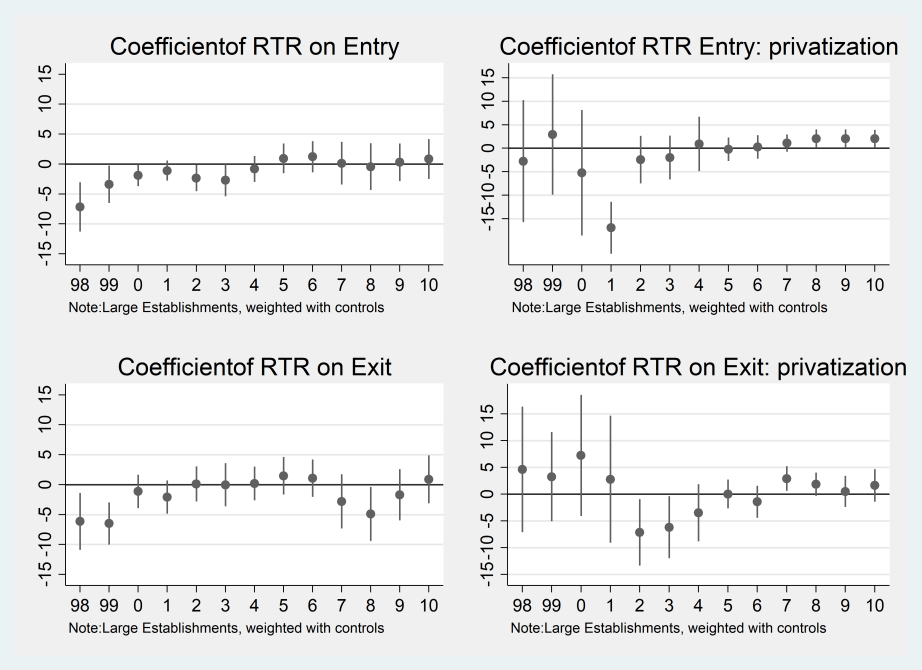
(a) Differentiated impact on job flows in medium-sized establishments: entry and exit



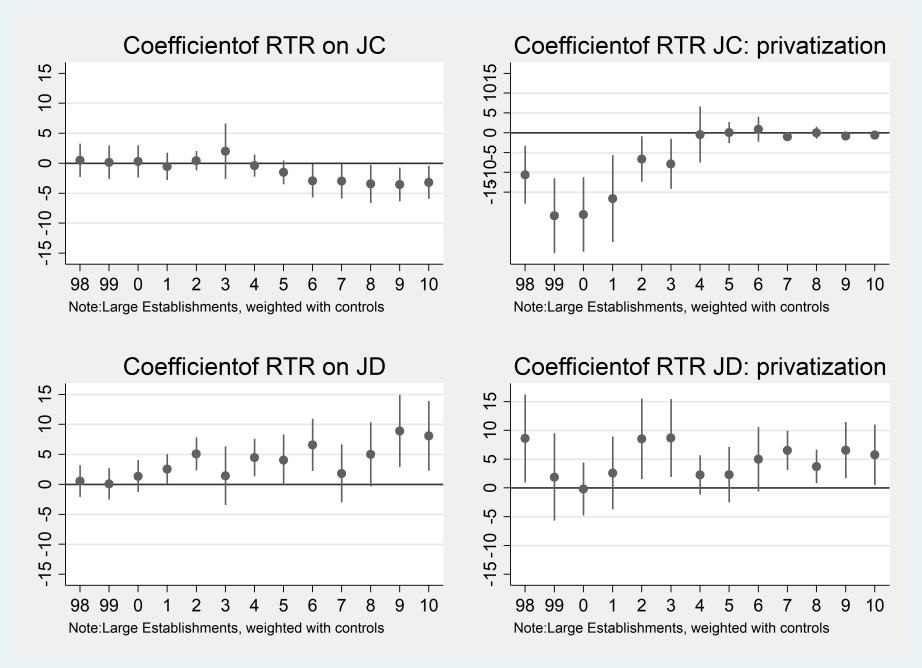
(b) Differentiated impact on job flows on medium size establishments: job creation and destruction

Figure 14. : Differentiated impact on job flows in medium size establishments

Note: Each point in the figure corresponds to a different regression coefficient estimate with confidence interval.



(a) Differentiated impact on job flows in large size establishments: entry and exit rate



(b) Differentiated impact on job flows in large size establishments: job creation and destruction

Figure 15. : Differentiated impact on job flows in large size establishments

Note: Each point in the figure corresponds to a different regression coefficient estimate with confidence interval.

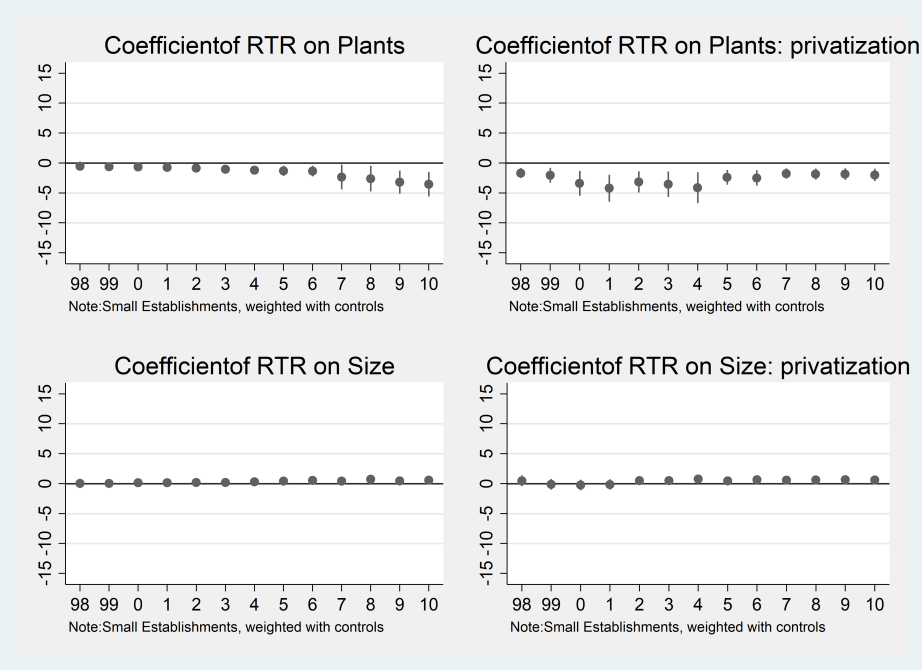


Figure 16. : Differentiated impact of RTR on small establishments: change in the average size and change in the number of plants

Note: Each point in the figure corresponds to a different regression coefficient estimate with confidence interval.

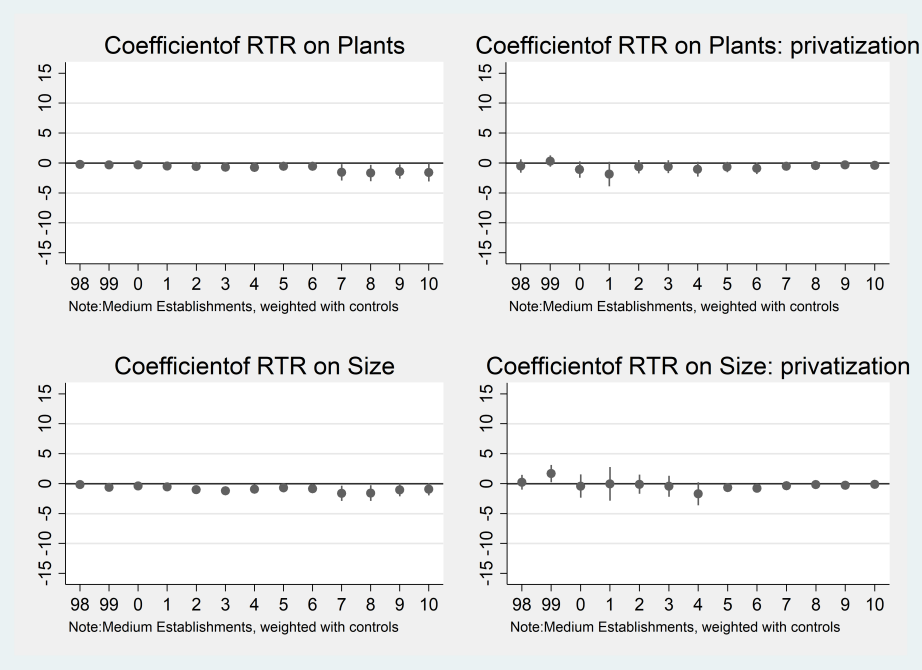


Figure 17. : Differentiated impact of RTR on medium size establishments: change in the average size and change in the number of plants

Note: Each point in the figure corresponds to a different regression coefficient estimate with confidence interval.

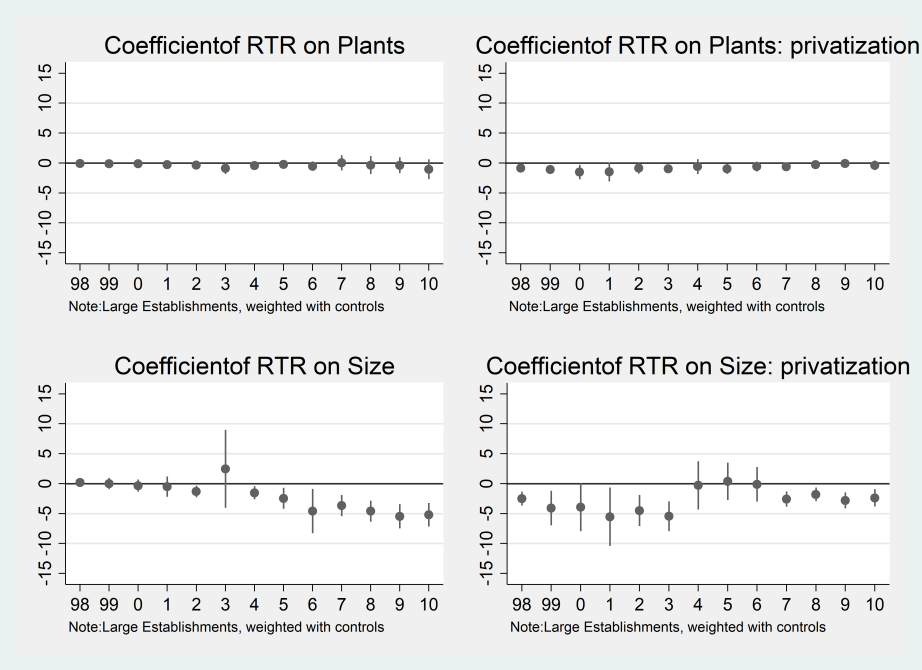


Figure 18. : Differentiated impact of RTR on large size establishments: change in the average size and change in the number of plants

Note: Each point in the figure corresponds to a different regression coefficient estimate with confidence interval.

Table 29—: Regional Tariff Reductions, Labor Market Outcomes, and Establishment Dynamics: baseline results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Dep. Var.	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
LogJC	0.12563	-0.30332	-0.05557	-0.18856	-0.29317	0.07079	-0.13545	-0.24646	-0.63879	-0.48958	-0.12374	-0.38800	-0.23632
	(0.553)	(0.642)	(0.592)	(0.523)	(0.400)	(0.848)	(0.553)	(0.565)	(0.485)	(0.347)	(0.421)	(0.333)	(0.326)
Log JC New	-0.46916	-1.16752*	-0.57768	0.06208	0.04334	0.54572	0.50231	0.51338	0.16901	0.52391	0.85137	0.64452	0.50886
	(0.661)	(0.635)	(0.683)	(0.702)	(0.530)	(0.896)	(0.737)	(0.812)	(0.648)	(0.519)	(0.599)	(0.493)	(0.484)
Log JC Exp	0.89553	1.05846	1.04745	-0.53071	-0.65394	-0.36721	-1.05435*	-1.32680***	-1.73323***	-2.14746***	-1.94589***	-2.33300***	-1.76032**
	(0.800)	(0.885)	(0.798)	(0.718)	(0.602)	(1.074)	(0.579)	(0.502)	(0.590)	(0.634)	(0.628)	(0.718)	(0.779)
Log JD	0.54565	0.54070	0.92465	1.59291**	2.90236***	1.52469	2.34650***	2.51745**	3.35488***	3.42286***	2.97046***	3.32029***	3.07760***
	(0.616)	(0.584)	(0.644)	(0.619)	(0.578)	(1.077)	(0.888)	(1.051)	(0.717)	(0.637)	(0.604)	(0.657)	(0.670)
Log JD Exit	1.19276*	0.61156	1.64202**	1.90677**	3.47323***	1.53300	2.40770**	2.66823**	3.82018***	3.84176***	3.00764***	3.54515***	3.23780***
	(0.693)	(0.761)	(0.765)	(0.775)	(0.586)	(1.359)	(1.064)	(1.251)	(0.784)	(0.661)	(0.572)	(0.679)	(0.706)
Log JD Shrink	0.33179	1.12575	0.87081	1.97301***	2.51624***	3.88681**	3.30936***	3.44286***	2.74821**	3.04448***	3.54107***	3.42650***	3.22321***
	(0.786)	(0.711)	(0.682)	(0.731)	(0.910)	(1.677)	(0.994)	(1.089)	(1.083)	(1.079)	(1.103)	(0.979)	(1.067)
Log Entry	-0.94053***	-0.79008***	-0.70130**	-0.77129***	-0.99370***	-1.15448***	-1.14297***	-1.23429***	-1.20228***	-1.24027***	-1.22591***	-1.18208***	-1.17224***
	(0.275)	(0.263)	(0.274)	(0.285)	(0.277)	(0.282)	(0.283)	(0.281)	(0.280)	(0.283)	(0.273)	(0.269)	(0.266)
Log Exit	0.70652***	0.70912***	0.82611***	0.96583***	1.19573***	1.42900***	1.50608***	1.60367***	1.70418***	1.72641***	1.73853***	1.81930***	1.90953***
	(0.182)	(0.196)	(0.206)	(0.212)	(0.238)	(0.256)	(0.281)	(0.301)	(0.322)	(0.340)	(0.364)	(0.369)	(0.409)
ΔLog Av. Size	0.36294*	0.20634	0.15607	0.02106	-0.21376	1.40820	0.47396	0.63980	-0.11723	0.07974	0.60777	0.22799	0.49427*
	(0.206)	(0.265)	(0.258)	(0.331)	(0.211)	(1.519)	(0.609)	(0.839)	(0.482)	(0.279)	(0.400)	(0.285)	(0.297)
ΔLogN. Plants	-0.55068***	-0.63010***	-0.73320***	-0.90621***	-1.22872***	-1.57099***	-1.66374***	-1.87987***	-1.94543***	-2.08822***	-2.17351***	-2.25222***	-2.37809***
	(0.102)	(0.133)	(0.188)	(0.230)	(0.263)	(0.320)	(0.345)	(0.380)	(0.403)	(0.435)	(0.454)	(0.473)	(0.509)

Note Each column corresponds to a different regression of tariff-reduction on labor market outcomes. *RTR* corresponds to the "regional tariff reduction" constructed following Dix-Carneiro and Kovak (2018) and Dix-Carneiro, Soares and Ulyssea (2018). Dummy variables for the 26 states in Brazil, control variables that capture the 1990 demographic and economic conditions, and pre-trends are included as controls in all regressions (columns). Regressions show the baseline results. The variable indicating privatization of regional public banks and the interaction term are not included in the specification. All regressions are employment-weighted. Robust standard errors in parentheses are clustered at meso-regions. All regressions have 411 observations. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.