Enforcement of Labour Regulation and the Labour Market Effects of Trade: Evidence from Brazil

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Workshop on Informality in LAC

June 12-13, 2023

Motivation

Many developing countries underwent major trade liberalisation episodes in the 1980s and early 1990s (Goldberg and Pavcnik, 2007).

Many expected gains from trade, but also concerns about negative labour market consequences.

Major concern: trade opening could induce a reallocation to informal jobs, especially among less skilled workers (Goldberg and Pavcnik, 2003).

Informal jobs are typically of lower quality and are not covered by labour regulations nor social security → ↑ informality = welfare loss from trade?

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Questions

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What we do

We exploit Brazil's large scale, unilateral trade liberalisation episode of the early 1990's. Unique empirical setting:

(i) Trade opening had substantial and heterogeneous effects across local labour markets.

(ii) Prior to the trade opening, Brazil underwent a major Constitutional reform that substantially increased the regulatory costs associated to formal jobs.

(iii) Enforcement of labour regulation varies greatly across regions in Brazil (Almeida & Carneiro, 2012).

We explore regional variation in exposure to trade and enforcement to identify heterogeneous effects of trade across different levels of enforcement.

The Brazilian Trade Liberalization

Major unilateral reduction in trade tariffs: average tariff fell from 30.5% to 12.8% and SD across industries fell from 14.9 to 7.4 p.p.

Changes in $\log(1 + \text{tariff})$, 1990-1995
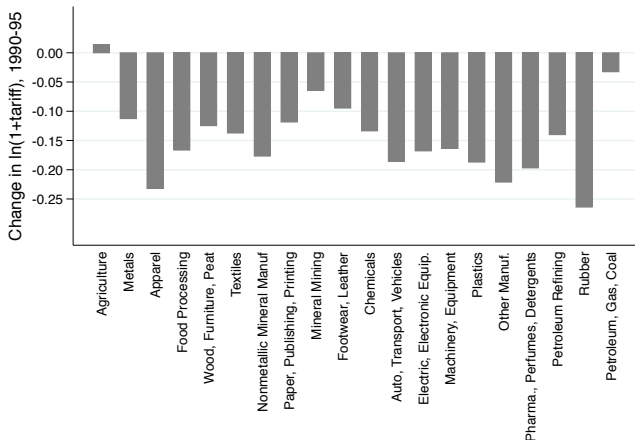
Local Trade Shocks and Enforcement

Local Trade Shock

- Measure of "Regional Tariff Changes":

$$RTC_r = \sum_{i \in T} \underbrace{\pi_{ri}}_{\text{emp. shares}} \Delta \log \left(1 + \text{tariff}_i\right), \text{ with}$$

- We also construct skill-specific measures of RTC_r for low- and high-skill workers using skill-specific weights.

Enforcement Technology

- Inspectors directly visit *formal firms only*; no attempt to inspect informal firms.

- Inspections are carried out by car and inspectors are allocated to firms based on distance $\rightarrow$ enforcement intensity depends on driving distance.

Data

Local economies:

- Micro-regions: Collection of contiguous municipalities that are economically integrated, similar to CZ in the US.

- Mapping between municipalities and micro-regions that results in 411 consistent micro-regions between 1980 and 2000.

Datasets:

1. Decennial Census: socioeconomic charact. and labour market outcomes.

2. Admin. data on enforcement: # of firms inspected, and location of labour offices + date of creation of each labour office.

3. Driving distance to the nearest labour office, distance to the state's capital and number of inspectors at the state level (Almeida & Carneiro, 2012).

4. Universe of formal firms and workers (RAIS): # formal establishments and total formal employment in each micro-region.

Regional Variation: Trade Shock and Enforcement

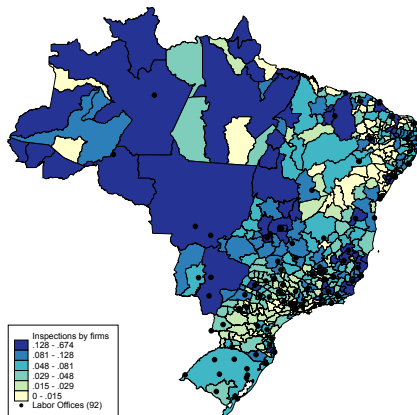## Regional Tariff Change
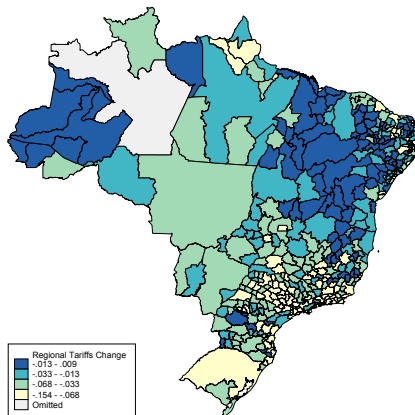
Source: Dix-Carneiro, Soares and Ulyssea (2018)

Regional Variation: Trade Shock and Enforcement

Regional Enforcement Capacity and Inspections

Inspections by firms
.128 - .674
.081 - .128
.048 - .081
.029 - .048
.015 - .029
0 - .015
• Labor Offices (92)

Empirical Strategy

First Step: regressions at the individual level

$$Y_{it} = \sum_r \gamma_{rt} D_r + \mathbf{x}'_{i,t}\beta_t + \epsilon_{i,t}$$

where $i =$ individuals, $t = 1991, 2000$, $D_r =$ micro-region dummies

Second Step: regressions at micro-region level, where $\Delta \hat{y}_r \equiv \hat{\gamma}_{r,2000} - \hat{\gamma}_{r,1991}$

Basic regression: $\Delta \hat{y}_r = \zeta_0 + \zeta_1 RTC_r + \alpha_4 Z_r + \delta_s + u_r$

Main specification:

$$\begin{aligned} \Delta \hat{y}_r &= \alpha_0 + \alpha_1 RTC_r + \alpha_2 RTC_r \times Dist_r + \alpha_3 Dist_r + \alpha_4 Z_r \\ &\quad + \alpha_5 Dist_r \times Inspectors_s + \delta_s + \varepsilon_r \end{aligned}$$

where $Dist_r =$ max. distance to the nearest labour office.

Identification: Discussion

Challenge: No random variation in enforcement capacity levels.

Main specification: labour offices created up until 1990 + first-differenced regressions + differential trends by different initial demographics and population.

Additional confounders:

1. Mean reversion across regions with lower and higher levels of informality and non-employment ✓

2. Differential trends across more and less remote regions (further away from large urban centres)✓

3. local supply of public goods, proxied by local government spending ✓

4. Initial level of inequality in the micro-region ✓

Basic effects on informality, non-employment and wages

Sample (by workers' skill level):	Informality			Non-employment			Wages		
	All	Low	High	All	Low	High	All	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RTC_r	0.451***			0.206**			-1.062***		
	(0.130)			(0.082)			(0.221)		
RTC-Unskilled$_r$		0.520***			0.267***			-0.930***	
		(0.131)			(0.091)			(0.231)	
RTC-Skilled$_r$			-0.093			0.119*			-0.408
			(0.191)			(0.066)			(0.295)
Observations	411	411	411	411	411	411	411	411	411
R-squared	0.375	0.409	0.315	0.395	0.402	0.319	0.608	0.558	0.588

Notes: Robust standard errors reported. Significant at the *** 1 percent, ** 5 percent, and * 10 percent level. All regressions include state fixed effects and the following demographic controls: share of women, high-skill individuals, urban population and log-population in 1991.

Low-skill workers ($RTC_r = 0.1$):

- Informality: 5.2 p.p. $= 60\%$ of a SD in decadal changes.

- Non-employment: 2.7 p.p. $= 67\%$ percent of a SD in decadal changes.

Effects on Informality and Non-Employment by Enforcement Capacity

|	Informality			Non-Employment		
Sample (by workers' skill level):	All	Low	High	All	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
RTC_r	0.211			0.348***		
	(0.155)			(0.106)		
$RTC_r \times$ Dist. L.O.$_r$	0.208**			-0.083		
	(0.097)			(0.066)		
RTC-Unskilled$_r$		0.162			0.453***	
		(0.158)			(0.113)	
RTC-Unsk.$_r \times$ Dist. L.O.$_r$		0.326***			-0.148**	
		(0.106)			(0.073)	
RTC-Skilled$_r$			-0.205			0.121
			(0.323)			(0.127)
RTC-Skill.$_r \times$ Dist. L.O.$_r$			0.148			0.004
			(0.199)			(0.089)
Observations	411	411	411	411	411	411
R-squared	0.394	0.434	0.327	0.418	0.428	0.328

Low-enforcement region: $\uparrow$ 10 p.p. in informality, but ≈ 0 effects on non-employment.

High-enforcement region: 3 p.p. increase in informality, 3.9 p.p. in non-employment

Effects on Formal Employment
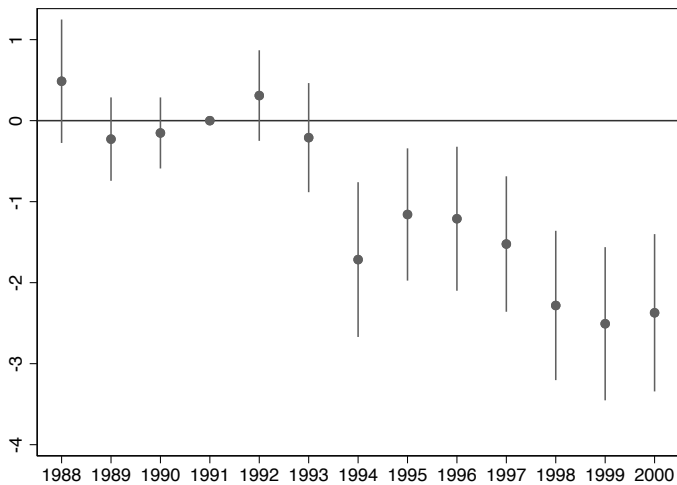
Effects on Formal Plants
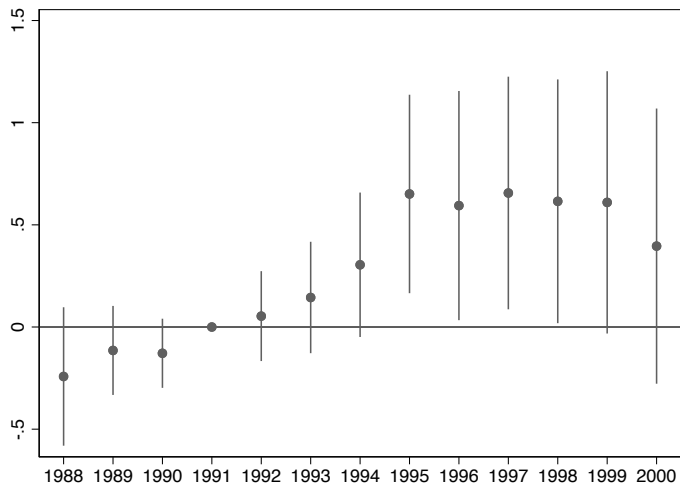
Additional Results

Wages:

- No statistically significant effects, but point estimates are large in magnitude: when enforcement is weaker there are greater wage losses.

Self-Employment:

- Same patterns: low-enforcement regions show stronger increases in self-employment and effects are concentrated on low-skill workers.

Extensive robustness analysis:

- Inference: clustering and bootstrapping
- Gradually including controls + expanded set of controls
- Specification at the industry-by-micro-region level
- Choice of enforcement capacity measure: mean vs. max distance
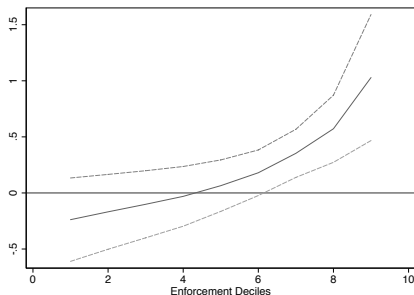- Alternative measures of local trade shock

Looking at inspections: IV results

$$\Delta \hat{y}_r = \alpha_0 + \alpha_1 RTC_r + \alpha_2 RTC_r \times Enforce_r + \alpha_3 Enforce_r$$
$$+ \alpha_4 Z_r + \delta_s + \nu_r$$
$$Enforce_r = \text{number of inspections per 100 firms}$$
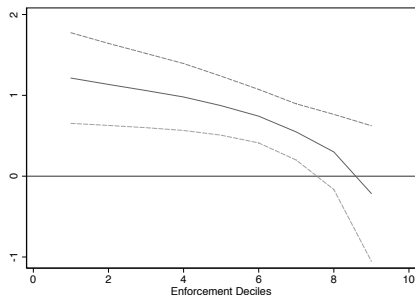
(a) Informality

(b) Non-employment

Final Remarks

Regions with stricter enforcement observed: (i)substantially lower informality effects; (ii) much larger disemployment effects; (iii) more "switching effects"; and (iv) greater reductions in the number of formal plants.

Regions with weaker enforcement observed symmetric effects. All the effects are concentrated on low-skill workers.

Greater *de facto* labour market flexibility introduced by informality seems to allow both formal firms and low-skill workers to cope better with adverse labour market shocks..

One cannot derive welfare implications from our results, but....

...results from Dix-Carneiro, Goldberg, Meghir and Ulyssea (2021) indicate that informality is an employment buffer but **not** a welfare buffer

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