

Trade, Informality and Enforcement: Evidence from Brazil

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Globalization and Labor Market Outcomes in Developing Countries
ILO

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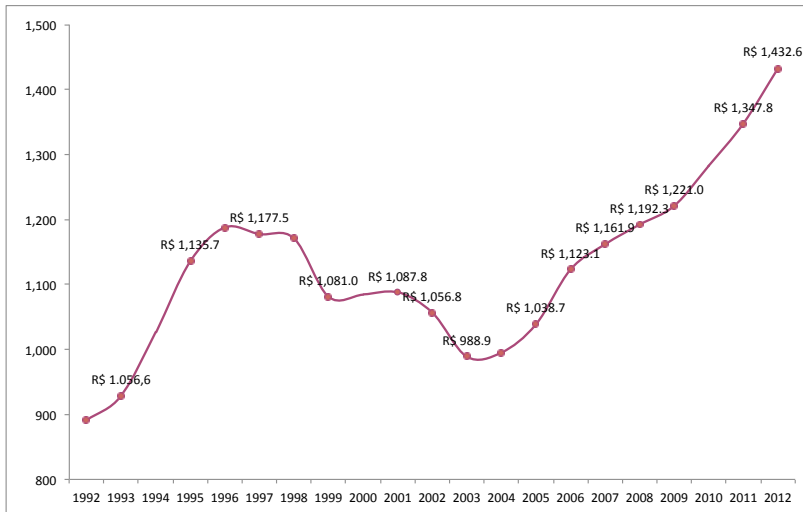
Outline

- 1 Overview of the Basic Facts
- 2 Informality
- 3 Trade Liberalization, Informality and Enforcement
 - The Paper in a Nutshell
 - The Brazilian Trade Liberalization
 - Results

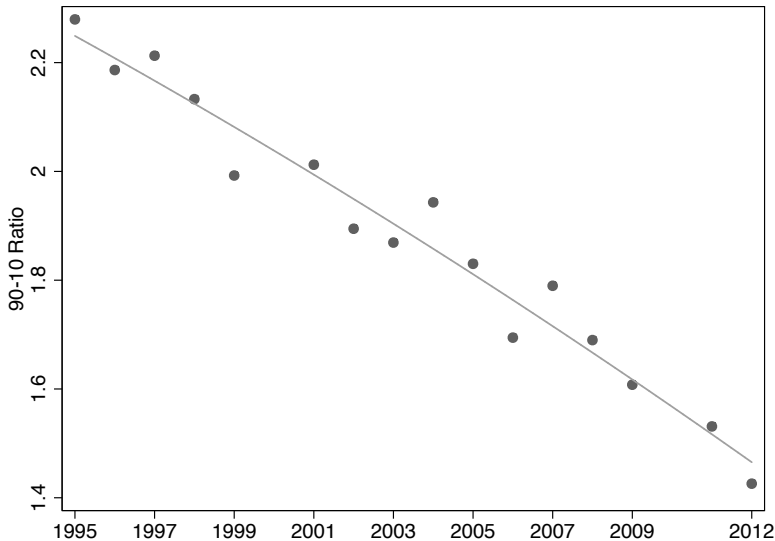
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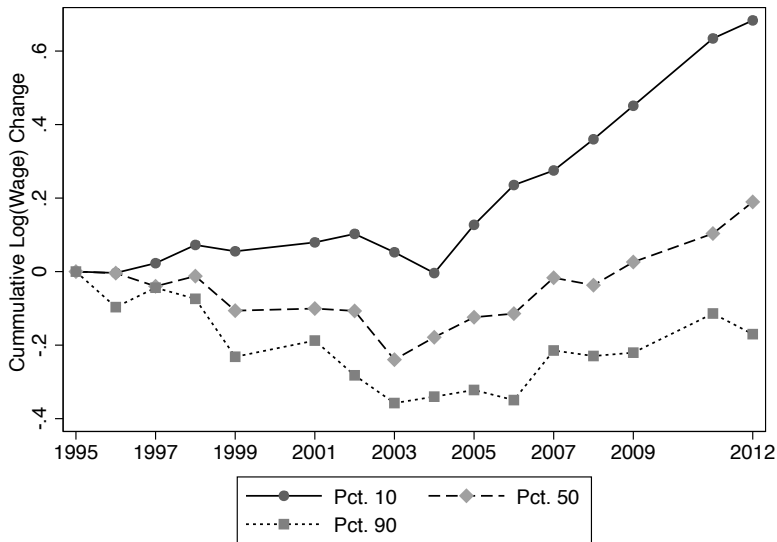
Real Wages: 44.8% increase in the past 10 years



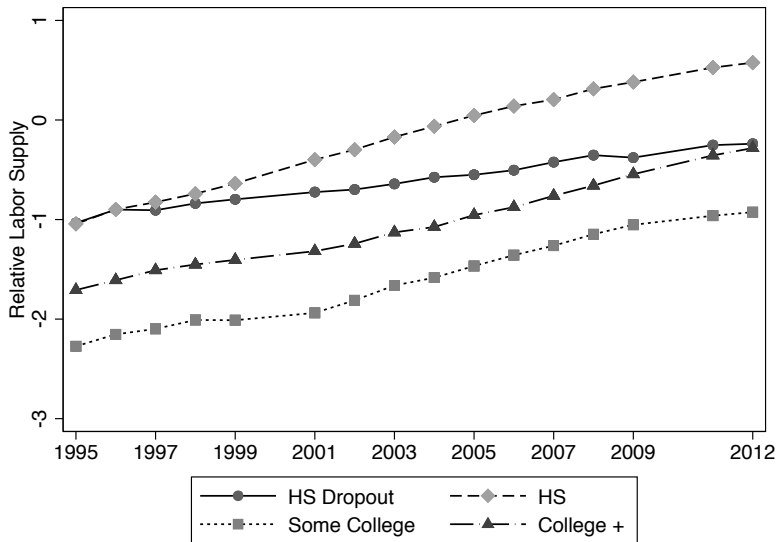
Wage Inequality



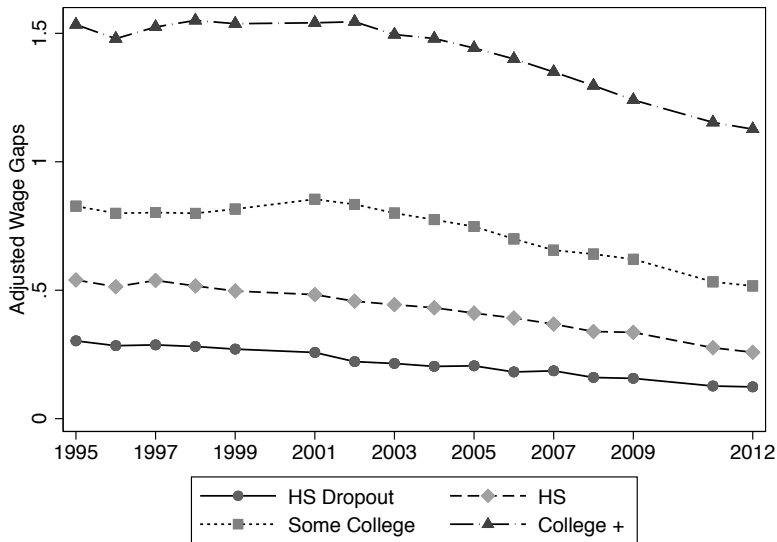
Cumulative Log Changes in Wages at the 90th, 50th and 10th Percentiles



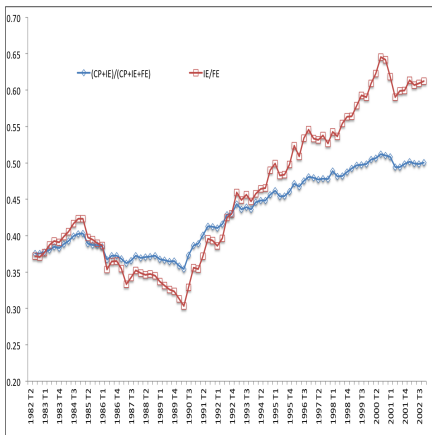
Relative Labor Supply



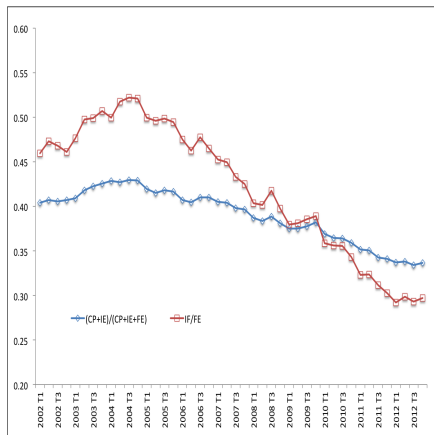
Composition Adjusted Skill Premia



Labor market informality over Three Decades

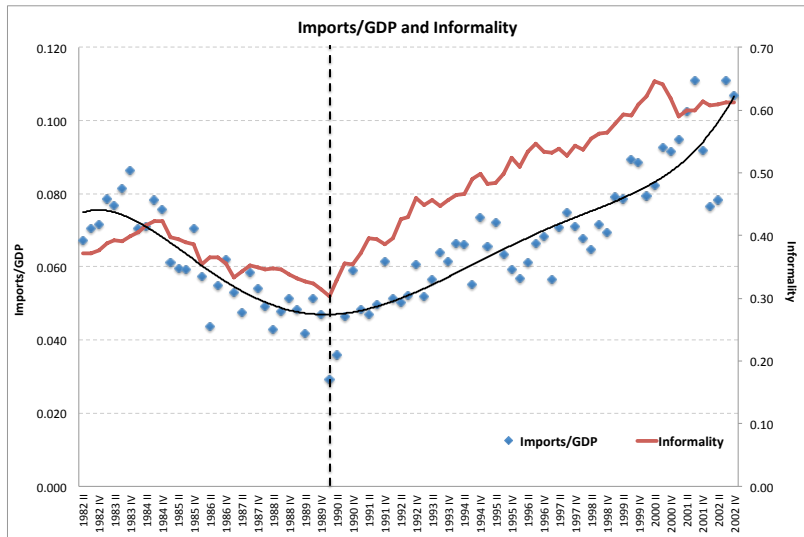


(a) The 1980's and 1990's

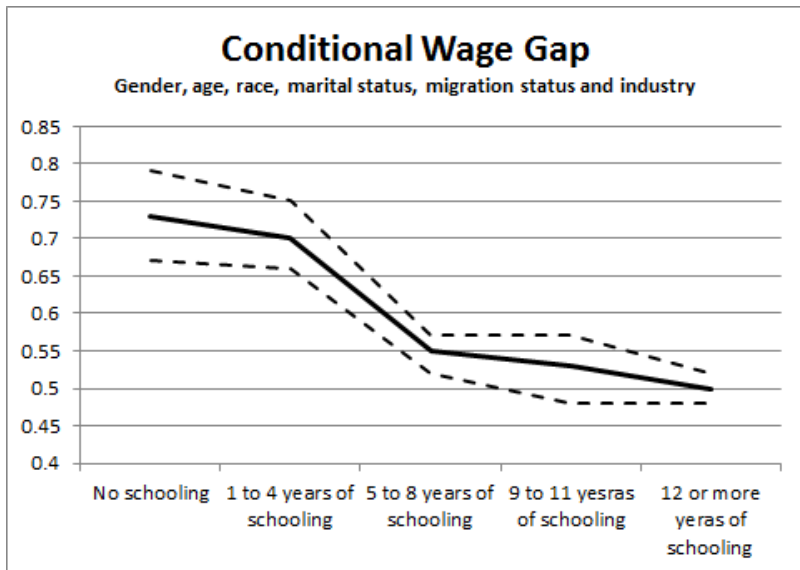


(b) The 2000's

Informality and Trade: 1980's and 90's



Formal-Informal Wage Gap in Brazil – Cross-Section



Wage Gap by Skill Level – Panel of Workers

	(1)	(2)	(3)	(4)
Formal	0.068*** (0.008)		0.113*** (0.025)	
Formal x Schooling 1		0.074*** (0.019)		
Formal x Schooling 2		0.056*** (0.021)		
Formal x Schooling 3		0.015 (0.024)		
Formal x Age			-0.002** (0.001)	
Formal x Wage $\in Q_1$				0.171*** (0.014)
Formal x Wage $\in Q_2$				0.057*** (0.017)
Formal x Wage $\in Q_3$				0.037** (0.018)
Formal x Wage $\in Q_4$				-0.065*** (0.019)
Number of observations	48,263	48,263	48,263	48,263

Sample: PME 2007- 2008 - Employed indiv. aged b/t 16 - 65 years old

Dependent Variable: Log of net wages

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Different margins of informality

Two fundamental dimensions of informality:

① Firm Informality

- (i) Extensive Margin: firms not registered with the tax authorities \Rightarrow 61.4% of all entrepreneurs in Brazil (2011).
- (ii) Intensive margin: Formal firms that hire informal workers.

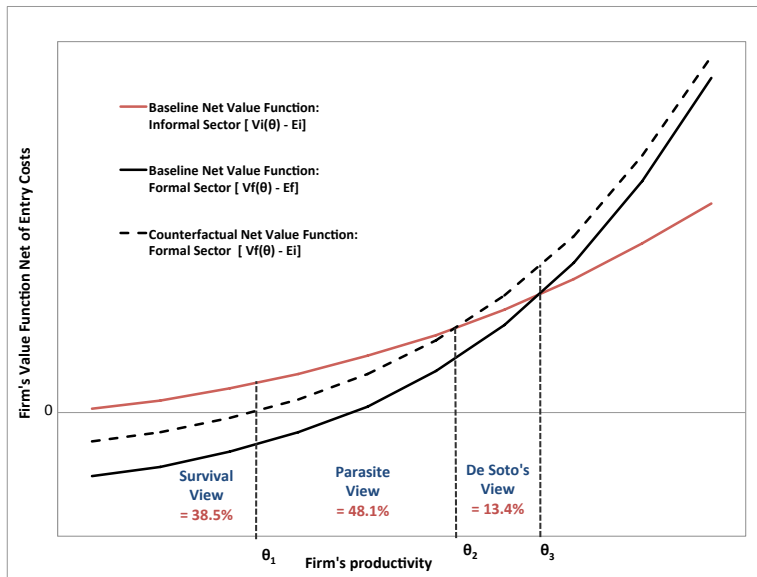
② Labor informality: Employees from (i) + (ii).

Labor informality decreased substantially in the past decade but firm informality remains high, $\approx 2/3$ of all firms (PNAD 2012).

Adding some structure

- In another paper I develop an equilibrium entry model where firms can exploit both the intensive and extensive margins of informality.
- Firm heterogeneity, selection, and burdensome regulations that are imperfectly enforced are the driving forces of both margins.
- I use the two-stage simulated method of moments estimator and data from formal and informal firms in Brazil to estimate the model.
- I use the estimated model to back out the distribution of informal firms in the data.
- I assess the micro and macro impacts of: (i) ↓↓ costs of formality (entry costs and payroll tax); and (ii) ↑↑ the costs of both margins of informality (enforcement).

What is the distribution of firm types in the informal sector?



What are the potential consequences of higher enforcement? Aggregate policies impacts

	Baseline	Entry Costs	Payroll Tax	Extensive Mg.	Intensive Mg.
Informal workers (share)	0.350	0.341	0.228	0.126	0.310
Informal firms (share)	0.691	0.475	0.606	0.129	0.724
GDP	1.000	1.034	0.999	0.996	0.980
TFP	1.000	0.950	1.072	1.130	1.005
Olley & Pakes	0.557	0.649	0.597	0.681	0.540
Wages	1.000	1.029	1.134	0.978	0.999
Tax Revenues	1.000	1.096	0.891	1.214	0.984
Mass of active firms	1.000	1.207	0.861	0.711	0.974
Welfare	1.000	1.029	0.987	1.009	0.991

What are the potential consequences of higher enforcement? Aggregate policies impacts

	Baseline	Entry Costs	Payroll Tax	Extensive Mg.	Intensive Mg.
Informal workers (share)	0.352	0.351	0.228	0.138	0.301
Informal firms (share)	0.695	0.477	0.613	0.039	0.728
Informal GDP (share)	0.260	0.198	0.191	0.005	0.271
GDP	1.000	1.035	0.991	0.994	0.984
TFP	1.000	0.951	1.076	1.133	1.005
Olley & Pakes	0.559	0.657	0.597	0.684	0.536
Wages	1.000	1.029	1.141	0.981	0.999
Tax Revenues	1.000	1.094	0.881	1.216	0.986
Mass of active firms	1.000	1.210	0.851	0.651	0.975
Welfare	1.000	1.199	0.973	1.012	0.987

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The Paper in a Nutshell

Questions:

- What was the impact of Brazilian trade liberalization on local labor markets? Were there heterogeneous impacts across workers' skill level?
- Was the informal sector a buffer for harder-hit regions?

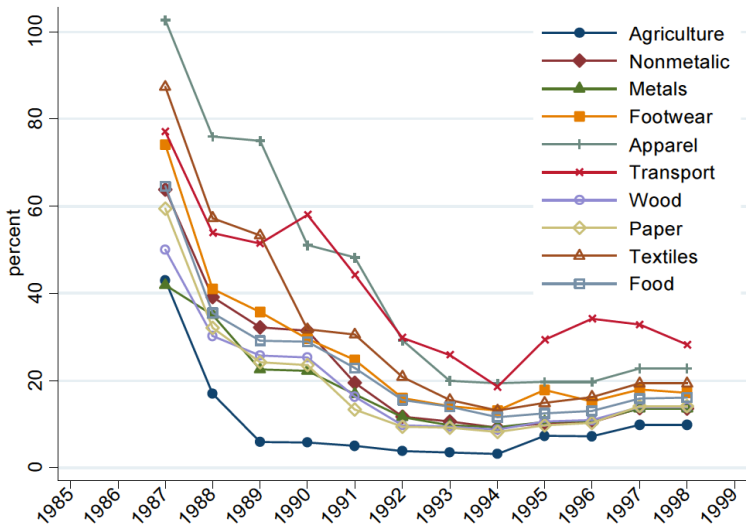
Empirical Strategy:

- Local labor markets approach (e.g. Topalova, 2010; Kovak, 2013; Autor et al., 2013; Dix-Carneiro and Kovak, 2015).
- We exploit cross-industry variation in tariff changes + regional variation in employment composition + regional variation in enforcement. ▶ RTC
- Data: Demographic Census (1980, 1991, 2000); import tariffs (from Kume, 1993); enforcement data from Ministry of Labor and Almeida and Carneiro (2011).

Outline

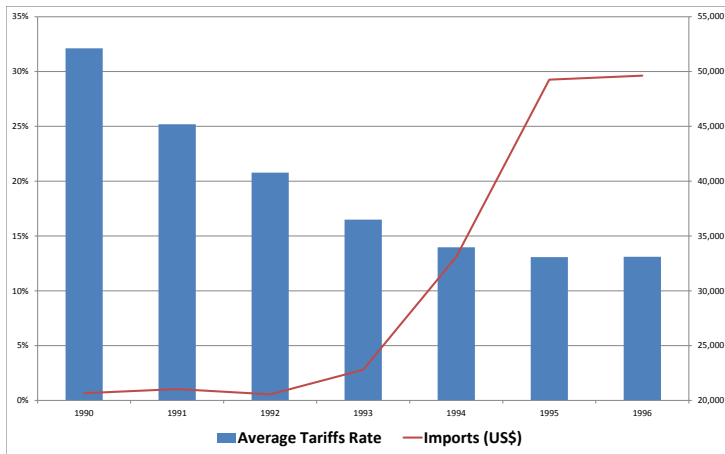
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Nominal tariffs changes across industries



Source: Hirata and Soares (2015).

Trade opening in Brazil



Source: Baumann (1997)

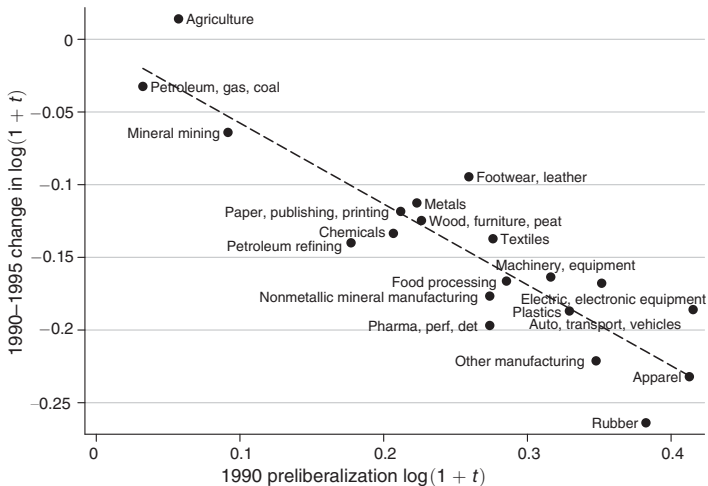
Changes in $\log(1 + \text{tariff})$, 1990-1995

FIGURE 1. RELATIONSHIP BETWEEN TARIFF CHANGES AND PRELIBERALIZATION TARIFF LEVELS

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Results across skill levels (1/2)

Table 1: Effects of Regional Tariff Changes on: Informality and Non-Employment

	Dep. Var.: Informality			Dep. Var.: Non-employment		
	All Workers	Unskilled	Skilled	All Workers	Unskilled	Skilled
RTC	-0.359*** (0.128)			-0.214*** (0.038)		
RTC-Unskilled		-0.792*** (0.116)			-0.341*** (0.031)	
RTC-Skilled			0.169 (0.354)			0.004 (0.152)
Observations	413	413	413	413	413	413
R-squared	0.812	0.898	0.714	0.826	0.862	0.840

Notes: Robust standard errors in parentheses. Significant at the *** 1 percent, ** 5 percent, and * 10 percent level.

Results across skill levels (2/2)

Table 2: Regional Tariff Changes on: Wages by Skill Level and Formal-Informal Wage Gap

	Dep. Var.: Formal-Informal Wage Gap			Dep. Var.: Wages	
	All Workers	Unskilled	Skilled	Unskilled	Skilled
RTC	0.105 (0.245)				
RTC-Unskilled		0.002 (0.259)		1.193*** (0.328)	
RTC-Skilled			-0.117 (0.226)		0.825 (0.631)
Observations	413	413	413	413	413
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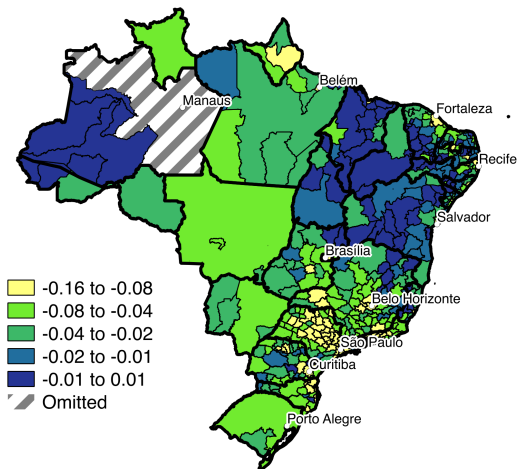
How large are these effects?

Moving from 10th to 90th percentiles of tariff reduction (RTC=-0.1):

- Informality: 3.6% increase (average of 7.7%).
- Non-Employment: 2.1% increase (average of 2%).

How large are these effects?

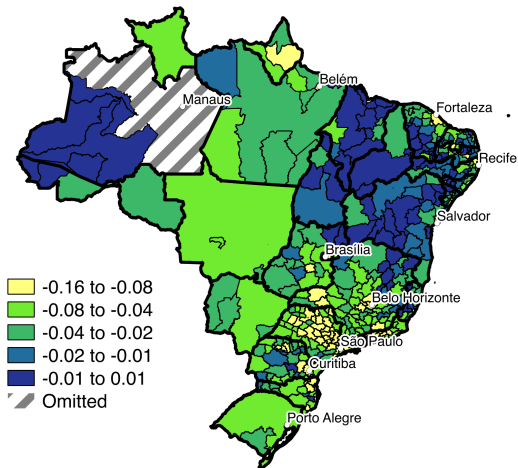
São Paulo (avg. of 62 micro-regions): Δ Tariffs ≈ -0.08 ; Δ Informality = 7.6% and Δ Non-Employment = 3.6%.



How large are these effects?

Maranhão (avg. of 14 micro-regions):

Δ Tariffs ≈ -0.01 ; Δ Informality = 10.3% and Δ Non-Employment $\approx 0\%$.



Heterogeneous effects across regions with different enforcement levels

- We estimate the following IV regressions:

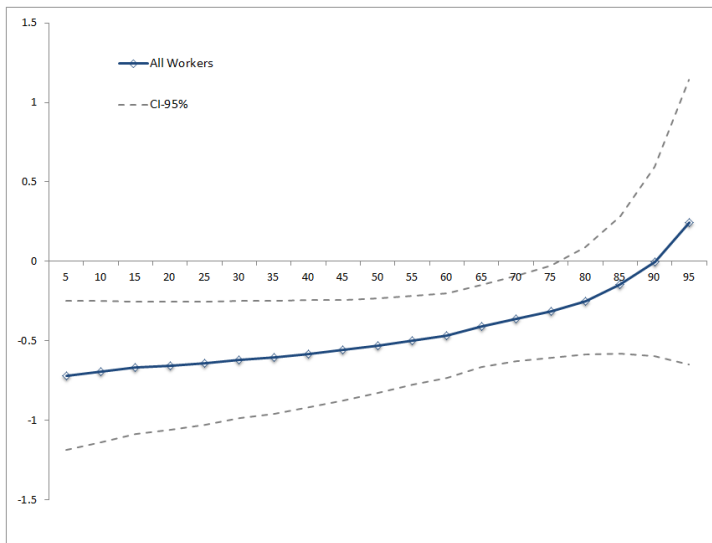
$$\Delta_{91-00} Y_r = \beta_0 + \beta_1 \text{Tariff Change}_r + \beta_2 \text{Tariff Change}_r \times \text{Enforcement}_r + \gamma' D_r + u_r$$

- Y_r = informality, non-employment, formal-informal wage gaps, and wages in region r .
- Enforcement = Total inspections (1995–2000) per firms in region r .
- We plot graphs of the marginal effect of tariff changes evaluated at the 10th, ..., 90th percentiles of the enforcement distribution:

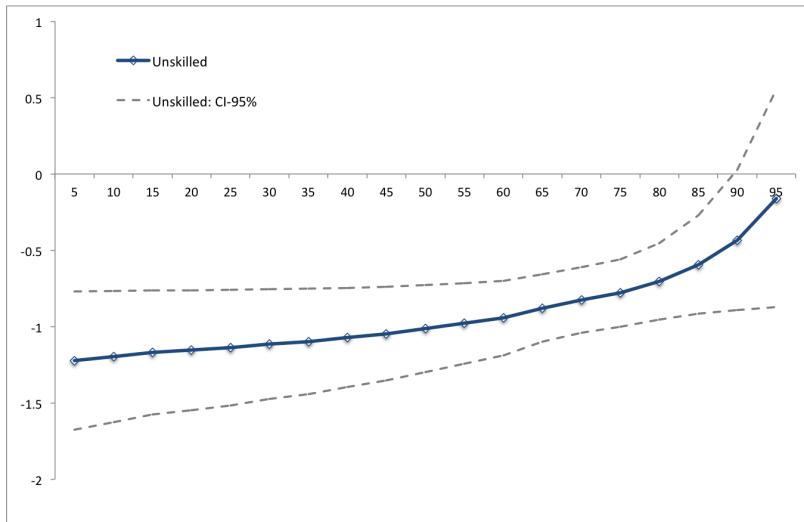
$$\text{Mg. Effect} = \beta_1 + \beta_2 \times \text{Enforcement}_q$$

where $q = 10, \dots, 90$.

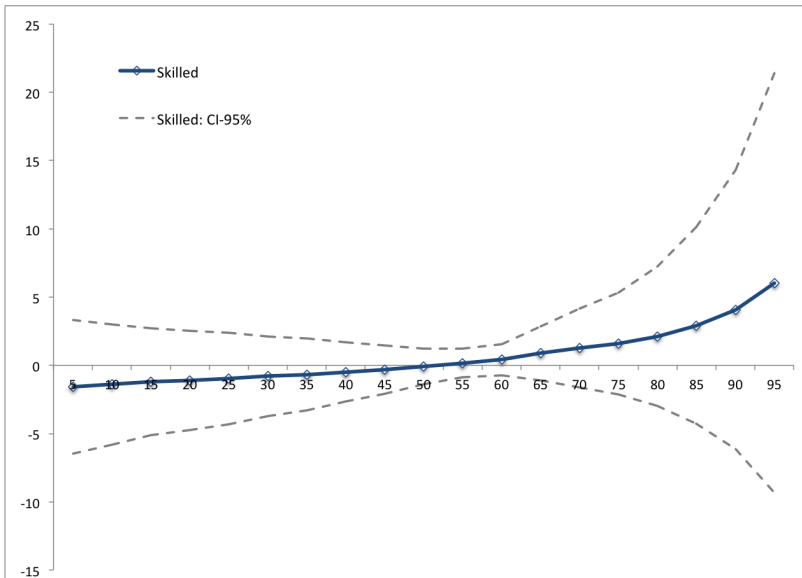
Tariff Changes and Informality by Enforcement Deciles – All Workers



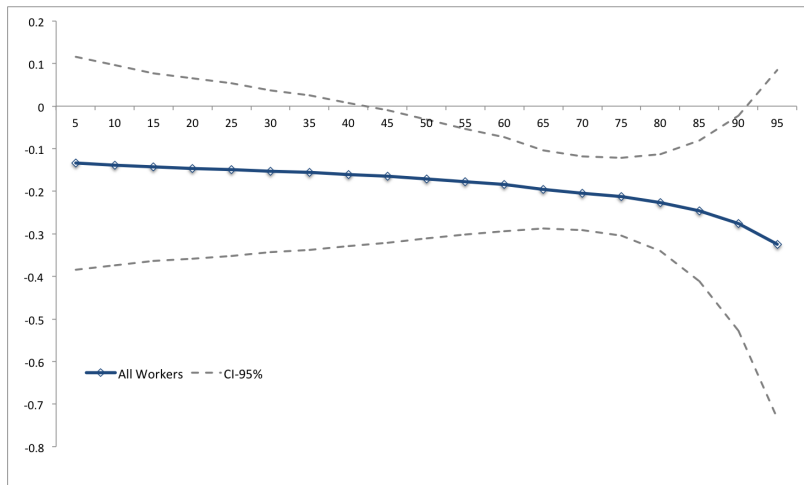
Tariff Changes and Informality by Enforcement Deciles – Unskilled



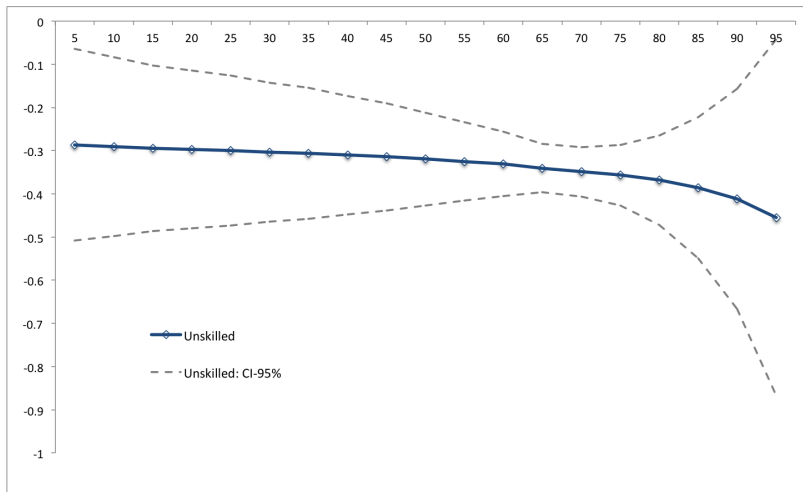
Tariff Changes and Informality by Enforcement Deciles – Skilled



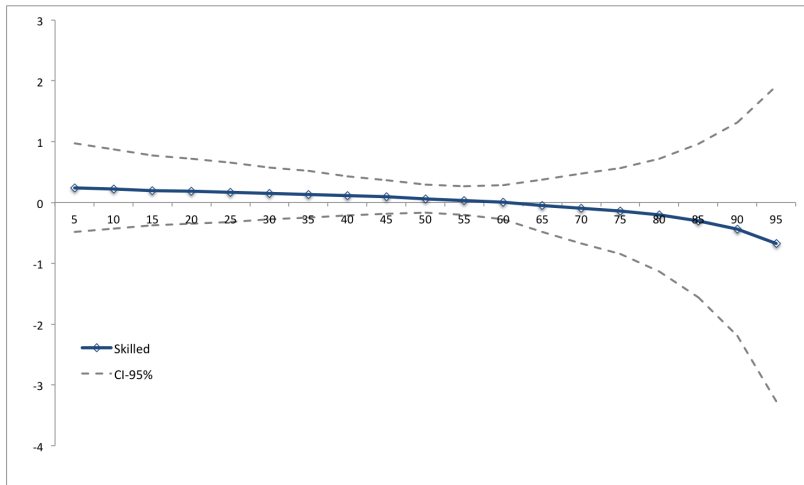
Tariff Changes and Non-Employment by Enforcement Deciles –All Workers



Tariff Changes and Non-Employment by Enforcement Deciles – Unskilled



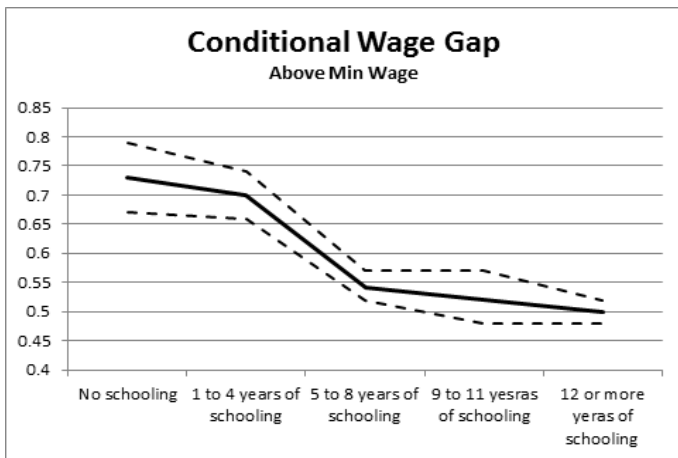
Tariff Changes and Non-Employment by Enforcement Deciles – Skilled



Final Remarks

- Regions hit harder by the trade liberalization experienced higher informality and non-employment relatively to regions less affected.
- These adverse impacts were heterogeneous:
 - Overall effects largely come from unskilled workers.
 - Stricter enforcement: (i) reduces effects on informality in harder-hit regions; **but** (ii) amplifies the increases in non-employment.
- The results suggest that informality might have acted as a buffer; non-employment effects would have been larger if enforcement was stricter.
- All effects are relative, we cannot say anything at the aggregate level. Overall welfare might have increased.

Is it only the minimum wage



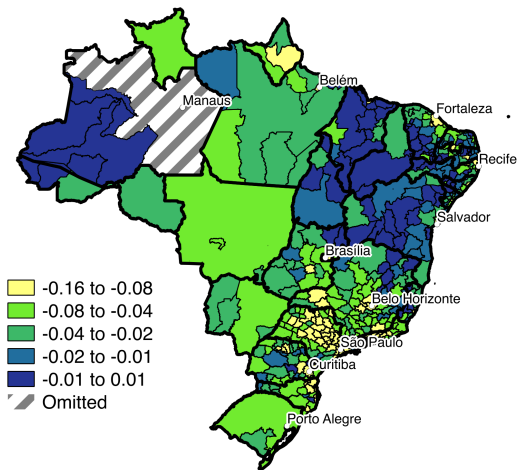
source: PNAD 2013

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Heterogeneous Wage Gap and Labor Courts in Brazil

- Labor regulations are pervasive and cumbersome in Brazil. Even for Latin American Countries
- Labor Courts are part of a special branch of the judiciary system responsible for judging labor disputes
- Labor Courts has a pro-worker approach (hyposufficient thesis)
- In 2014 around 4 millions workers filed labor lawsuits against their employers
 - Compared to 3,000 in Japan and 100,000 in the US
- On average plaintiffs are less schooled and earn less than an average Brazilian worker
 - Reputational concerns may disincentive more skilled worker to sue their employers
 - It is possible to build SPNE where skilled workers do not sue (or sue less often than unskilled worker).

Regional Trade Shock



Region Tariff Changes – Kovak (2013)

$$RTC_r = \sum_i \beta_{ri} d \ln(1 + \tau_i)$$

where

$$\beta_{ri} = \frac{\frac{\lambda_{ri}}{\theta_i}}{\sum_i \frac{\lambda_{ri}}{\theta_i}}$$

$\lambda_{ri} = \frac{L_{ri}}{L_r}$ is the fraction of regional labor allocated to industry i at region r ; and θ_i is equal to one minus wagebill share of industry i .

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Regressions

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Regressions

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