

LOCAL IMPACTS OF GLOBAL MARKETS

Trade Reform and Worker Flows in Brazil

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Trade, Employment and Earnings

- The real wage is

$$\frac{W_i}{P_i}$$

for income group i

- Most of the literature is concerned with W_i conditional on employment
- But there are spells of unemployment with $W_i = 0$ after trade reform
- Trade reform also alters P_i , expectedly lowering it to different degrees for different income groups

Reform and Growth

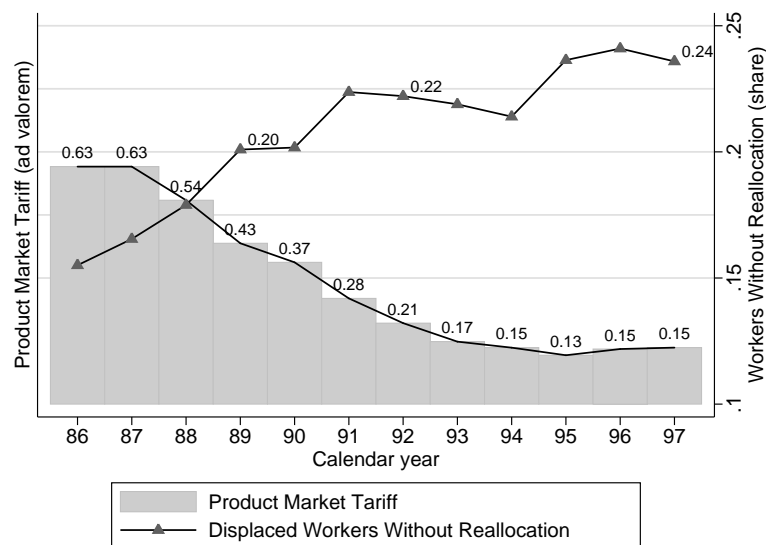
- Despite vigorous pro-competitive and trade reforms, growth in Latin America throughout the 1990s remained relatively slow
- Lacking resource reallocation following pro-competitive reform may be a cause of sluggish performance
- Brazil's trade reform triggers worker displacements particularly from protected industries, as trade theory predicts and welcomes
- But neither comparative-advantage industries nor exporters absorb trade-displaced workers for years

Empirical Objective and Findings

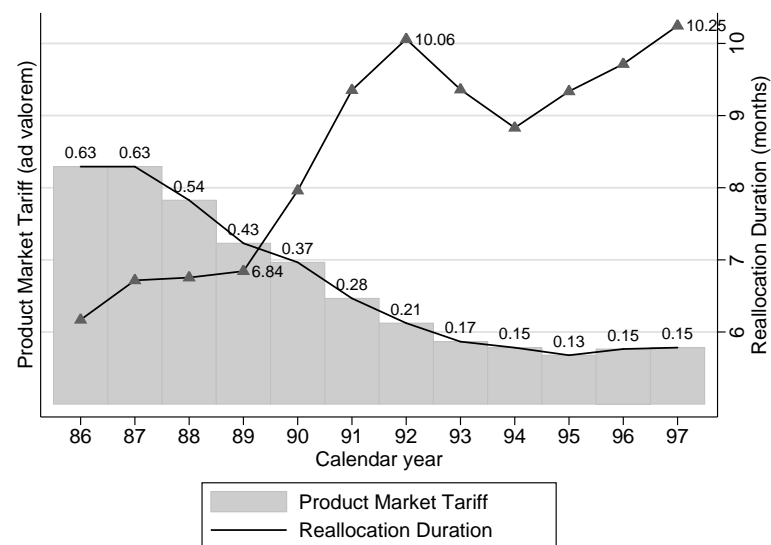
- Assess labor reallocation after Brazil's large-scale trade reform
- Linked employer-employee data permit tracking of individuals between identified establishments over 1986-2001 period
- Shifts in product-market shares to more advanced firms and exporters commonly interpreted as evidence for successful resource reallocation
- But labor flows away from export sectors and exporters because labor productivity increases faster than production so that output shifts to more productive firms but labor does not

Tariffs and Reallocations at Four-year Horizon

Failed reallocations



Reallocation durations



Sources: RAIS 1986-2001 (1% random sample), workers nationwide of any age and gender, displaced from a formal-sector job; rehired into a formal-sector job within 48 months. Product tariffs from Kume et al. (2000), employment weighted at *Nível 50* sector level.

A Literature View

- Haltiwanger, Kugler, Kugler, Micco & Pagés (2004): Sectors in six Latin American countries; tariff reductions and appreciations raise churning, reduce employment (also Wacziarg & Wallack 2004)
- Goldberg & Pavcnik (2003): Industry-level two-step approach; tariff declines associated with informality in Colombia, not in Brazil
- Saint-Paul (1997), Cunat & Melitz (2006): Countries with flexible factor markets export products from industries with high factor turnover
- Melitz (2003), Bernard, Redding & Schott (2007): Exporting firms within sectors; Raith (2003): Competition and performance

Labor Market Performance and Economic Outcomes

	1986	1990	1992	1994	1998
FAILED REALLOCATIONS WITHIN A YEAR					
Mean failure rate (share of displaced)	.285	.354	.441	.391	.474
female workers	.387	.427	.500	.451	.517
young workers	.297	.361	.445	.384	.446
high-school or college educ. workers	.305	.350	.416	.366	.435
Idle labor (foregone share of GDP)		.000	.024	.009	.037
DURATIONS OF SUCCESSFUL REALLOCATIONS WITHIN A YEAR					
Mean duration (in months)	2.918	3.927	4.280	4.125	4.253
female workers	3.157	3.965	4.097	4.017	4.097
young workers	2.896	3.909	4.184	3.969	4.105
high-school or college educ. workers	2.558	3.397	3.622	3.458	3.633
Idle labor (foregone share of GDP)		.000	.008	.004	.008

Sources: *RAIS* 1986-1999 (1% random sample), workers nationwide of any age and gender, displaced from a formal-sector job; not rehired into a formal-sector job within 12 months (*upper panel*) or rehired into a formal-sector job within 12 months (*lower panel*). *PME* 1986-1999, share of idle workers (unemployed or withdrawn from labor force), and *Banco Central do Brasil*, GDP.

Productivity Change and Market Shares, Olley & Pakes (1996)

	TFP and Output shares				Labor Prod. and Employment shares			
	Cross section			Ann. chg. raw cov.*	Cross section			Ann. chg. raw cov. ^a
	wgtd. (1)	unwgtd. (2)	cov. (3)		wgtd. (5)	unwgtd. (6)	cov. (7)	
1986	1.018	.924	.095		1.011	1.019	-.008	
1990	1.000	.899	.101	.065	1.000	.997	.003	-.029
1994	1.013	.918	.096	.067	1.023	1.019	.005	-.043
1998	1.035	.910	.125	.047	1.073	1.043	.030	-.039

^aFour-year average of the raw covariance between annual share changes and outcome changes.

Source: PIA firms 1986-98 (1991 missing); log total factor productivity based on Olley & Pakes (1996) estimation (at *Nível 50*), inferring labor productivity at changing capital stocks.

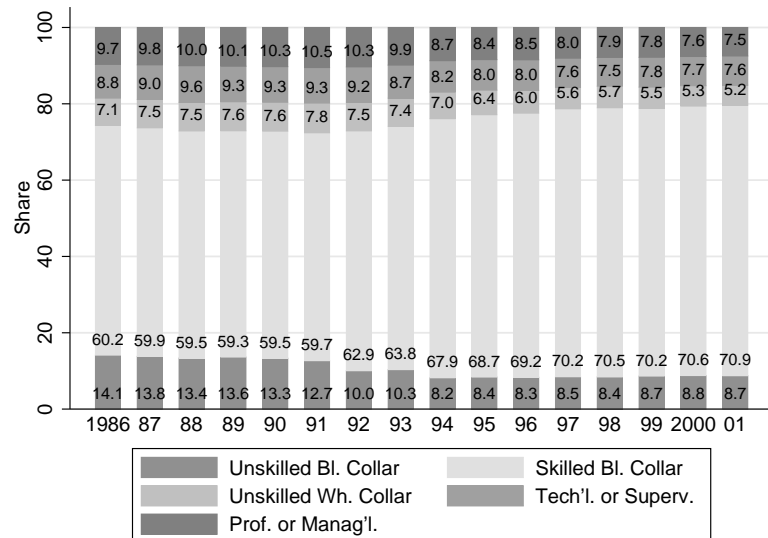
Note: Cross-sectional productivity decomposition as in Olley & Pakes (1996): $y_t = \bar{y}_t + \sum_i \bar{\Delta}\theta_{it}\bar{\Delta}y_{it}$, where y_t is weighted and \bar{y}_t is unweighted mean log productivity and $\bar{\Delta}$ denotes deviations from cross-section means (rebased to unity in 1990). Annual productivity change correlation $\sum_{i \in C} \Delta\theta_{i,t}\Delta y_{i,t}$ (raw covariance) from Haltiwanger (1997) decomposition, where Δ denotes annual change (not rebased).

Workforce Changeover

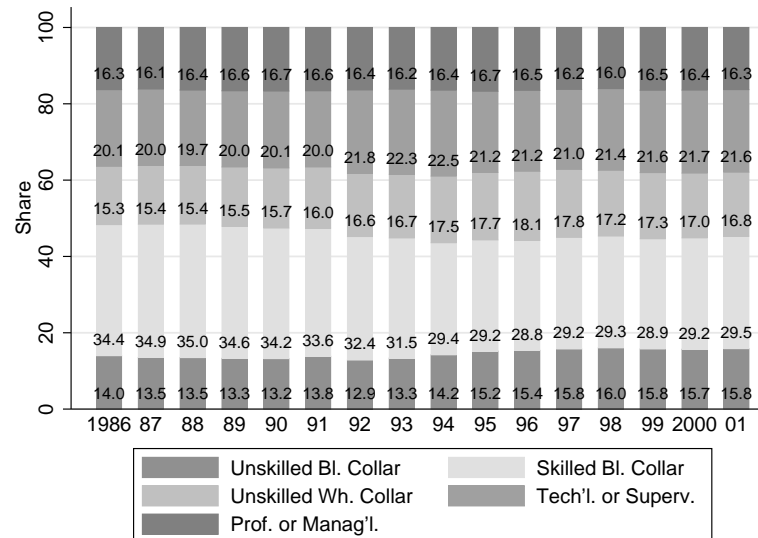
- Two salient workforce changeovers evident from labor-demand decomposition based on Katz-Murphy (1992) framework
 - Within traded-goods sector, marked occupation downgrading and simultaneous education upgrading
 - Between sectors, labor demand shift towards least and most skilled (traceable to weaker declines of low-skill intensive traded-goods industries and stronger expansions of high-skill intensive nontraded-output industries)
- Observations broadly consistent with predictions of Heckscher-Ohlin trade theory for low-skill abundant economy

Occupational Workforce Recomposition

Traded-goods sectors



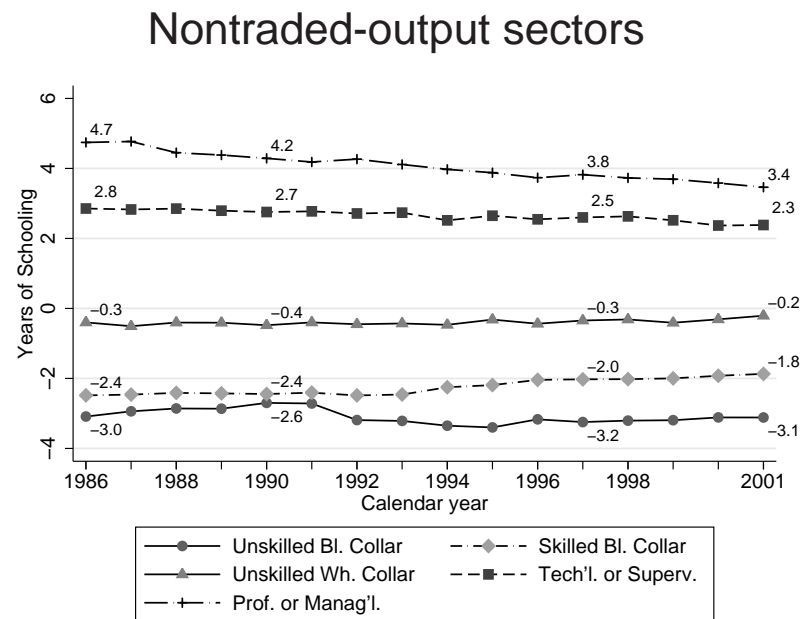
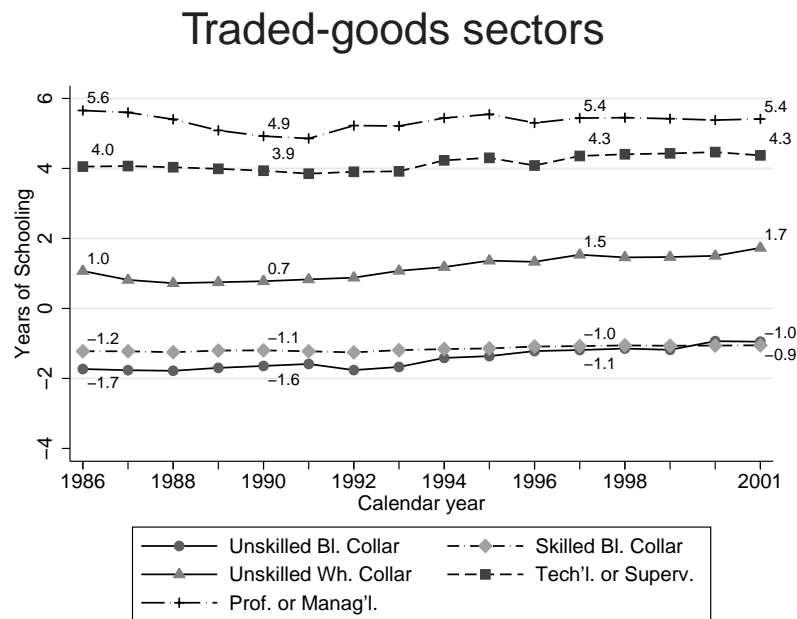
Nontraded-output sectors



Source: RAIS 1986-2001 (1-percent random sample), male workers nationwide, 25 to 64 years old, with employment on December 31st.

Note: Traded-goods sectors are agriculture, mining and manufacturing (subsectors *IBGE* 1-13 and 25), nontraded-output industries are all other sectors. Shares based on worker numbers.

Difference between Schooling within Occupations and Mean Schooling



Source: RAIS 1986-2001 (1-percent random sample), male workers nationwide, 25 to 64 years old, with employment on December 31st.

Note: Traded-goods sectors are agriculture, mining and manufacturing (subsectors IBGE 1-13 and 25), nontraded-output industries are all other sectors. Mean years of schooling weighted by worker numbers within occupations, less mean years of schooling weighted by worker numbers across all occupations.

Separations and Accessions

- Foreign competition significantly raises separation rates at formal-sector manufacturing firms
- Sectors with revealed comparative advantage and exporters exhibit significantly higher separation and significantly lower accession rates
- There is a significant monotonic increase in worker separations from manufacturing over time, and a significant (almost) monotonic drop in worker accessions

Worker-fixed Effect Estimation: Separations & Accessions 1990-98

	Separations			Accessions		
	cLogit	cLogit	OLS-FE	cLogit	cLogit	OLS-FE
Prod. Mkt. Tariff	-1.129 (.292)***	-1.845 (.333)***	-.269 (.034)***	1.767 (.261)***	2.232 (.324)***	.283 (.034)***
Intm. Input Tariff	3.237 (.452)***	3.378 (.508)***	.354 (.050)***	-3.217 (.395)***	-3.479 (.482)***	-.405 (.050)***
Exporter Status	.291 (.019)***	.285 (.019)***	.044 (.002)***	-.416 (.017)***	-.414 (.017)***	-.054 (.002)***
<i>BADV</i> 1990	.139 (.015)***			-.016 (.013)		
Tenure at plant	1.460 (.028)***	1.460 (.028)***	.080 (.001)***			
Year effects	yes	yes	yes	yes	yes	yes
Sector effects		yes	yes		yes	yes
Obs.	306,907	306,907	567,650	283,665	283,665	562,410
Pseudo R^2	.126	.127	.048	.062	.062	.030

Source: RAIS 1990-98 (one-percent random sample), workers nationwide of any gender or age, separated from or acceding into manufacturing job; and complementary data.

Note: Sector, plant and worker controls not reported. Separations exclude transfers, deaths, and retirements; accessions exclude transfers. Reference obs. are employments with no separation or accession. Robust standard errors in parentheses: * significance at ten, ** five, *** one percent.

Empirical Concerns

- Labor-market institutions: Severance pay increases with tenure
- Firms choose exporting status simultaneously with employment
/V: Imports from other countries into Brazil's export destinations
- Tariff reductions are targeted at low-efficiency sectors;
sector characteristics correlate with labor turnover
/V: Components of the sectoral real exchange rate
- Linear worker-FE IV regressions; higher-order interactions

Trade Exposure and Predicted Labor Market Outcomes

	1990	1992	1994	1998
<i>Trade Exposure</i>				
Product Market Tariff	.384	.210	.144	.170
Intermediate Input Tariff	.298	.159	.111	.133
<i>Change in Separation rates predicted by tariff drops</i>				
for all sectors and firms		-.011	-.011	-.007
for top comparative-advantage quintile		-.028	-.026	-.017
for exporters		.005	.012	.013
<i>Change in Accession rates predicted by tariff drops</i>				
for all sectors and firms		-.066	-.093	-.084
for top comparative-advantage quintile		-.140	-.200	-.182
for exporters		-.058	-.083	-.076

Sources: RAIS 1990-98, workers nationwide of any gender or age, with manufacturing job; and complementary data.

Note: Sector information at subsector IBGE level. Predicted changes in separation and accession rates based on marginal effects of product and intermediate-input tariff changes implied by column (2) and (4) estimates in trade-interaction table ($\hat{P}(1 - \hat{P})$ is .175 for separations and .179 for accessions; interaction terms evaluated at comparative advantage in 1990 and share of exporters in current year).

The Evidence So Far

- Trade reform triggers multiple changes to separations and accessions
- Comparative-advantage industries and exporters do not expand employment in the short term
- Falling tariffs depress accessions at manufacturers, especially in comparative-advantage industries and at exporters; falling tariffs markedly raise separations from exporters
- Failed reallocations and longer durations of reallocations result

What Is Amiss

- Distributional effects of trade for the employed are “established” within classic frameworks but little understood in novel settings (Helpman, Itskhoki & Redding 2009)
- Employment effects of trade are beginning to become understood but wage effects upon re-employment remain amiss (cf. Jacobson, LaLonde & Sullivan 1993)
- The incidence of real wage changes also depends on the consumption basket for different income groups (cf. Porta 2006; Broda & Romalis 2009)