

# Adjusting to Trade Liberalization: Reallocation and Labor Market Policies 2010

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# Outline

Motivation

The Model

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# Labor market responses to trade liberalization

## Post-liberalization patterns

1. simultaneous job creation and destructions within industries and low net labor force reallocation across industries
  - Wacziarg and Wallack (2004): (US) increase of yearly inter-sectoral job reallocation from 1.1% to 1.5% within 5 years after reforms;
  - Haltiwanger et al. (2004): (panel of Latin America) intra-sectoral reallocation 11%, ranging from 8.9% in Argentina to 16.4% in Brazil
2. high costs for sector switchers: initial unemployment and earning losses upon reemployment
  - Krishna & Senses (2009): (US) higher import penetration in the original industry drives larger income shocks to industry switchers
3. life cycle effect: older workers are more likely to drop out of the labor force or take up self-employment
  - Menezes-Filho and Muendler (2007): fraction of displaced workers unemployed after a year of separation (1990 vs. 1992)  $\Rightarrow$  total: 32% - 41%, 10+ years of experience: 30% 35%

## Literature & Contribution

1. interactions between imperfect labor markets and international trade
  - two-sector models small open economy models with search frictions to study conventional trade thms (Davidson et al. (1988), Hosios (1990))
  - two-sector model of trade to study flexibility of labor market as a source of comparative advantage (Helpman and Itskhoki (2010))
2. sectoral job reallocation in OLG framework with HC specificity
  - sectoral adjustments occur through demographic change rather than reallocation of existing factors (Rogerson (2005), Matsuyama (1992))
3. policies targeting displaced workers
  - unemployment insurance as highly distortionary policy (Ljungqvist and Sargent (1998), Rogerson and Schindler (2002))
  - trade context (Davidson and Matusz (2006))

## General description of the Model

Two-sector small open economy model with three main features:

1. finite-lived agents, OLG: young & old workers
2. search & matching
3. sector-specific human capital accumulated on-the-job

The key model elements above are supposed to capture key stylized facts of post-liberalization adjustment (respect.), *i.e.*:

1. worker mobility and adjustment costs are age dependent (older workers will suffer more)
2. endogenous unemployment spells & job-specific rents
3. earning losses when switching sectors

## QUESTIONS

- Analyse Brazilian trade reform: 1988-1991 and evaluate adopted labour market policies
- Given search frictions and HC sector-specificity are simultaneous barriers to adjustment which one is **quantitatively dominant**?
- What are the distributional and aggregate effects of labour market policies (actually adopted and counterfactual)?

## Production

- final good produced competitively using 2 tradable intermediate goods
- sector 1: comparative advantage; sector 2: protected, import tariff  $\tau \geq 0$
- domestic prices: good 2  $\Rightarrow p_{2d} = (\tau + 1)p_2$ ; good 1  $\Rightarrow p_{1d} = p_1$
- production function of final good is Cobb-Douglas; price of final good  $\Rightarrow p_Y = \frac{p_{1d}^\gamma p_{2d}^{1-\gamma}}{\gamma^\gamma (1-\gamma)^{1-\gamma}}$
- sector  $i$  firm and worker match produces output according to:  $q_i(z, h) = A_i z h_i$   
 $A_i$  sectoral productivity level,  $z$  idiosyncratic to the match

# Labor Markets

- workers: undirected search, match probability,  $\phi_w$  given
- firms: some already matched, some idle

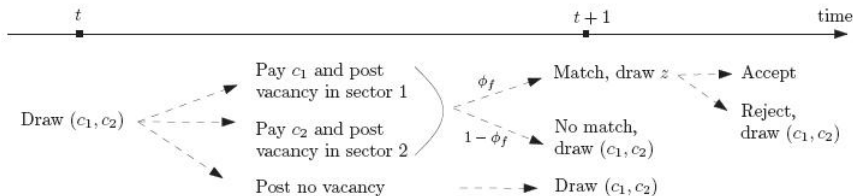


Figure 1 – Timing of Events for Idle Firms

Some matches do not result in production (due to match specific productivity level,  $z < F_z(z)$ ). Moreover, firm-worker pairs are exogenously destroyed with probability  $\delta_{JD}^y$ ,  $\delta_{JD}^o$  or endogenously terminated.

# HC Accumulation

- newborns' endowment  $\underline{h} \in \{\underline{h}_1, \underline{h}_2\}$
- LOM:

$$h'_i = \begin{cases} h_i^\alpha H^{1-\alpha} & \text{if employed in sector } i \\ \max\{1, (1 - \delta_h)h_i\} & o/w \end{cases}$$

- $\delta_h$  HC depreciation rate

# Job Acceptance Problem

## Values of the Job

Old worker:

$$\pi_{it}(z, h_t, o) = p_{idt} q_i(z, h_t) + \beta(1 - \delta_{JD}^o)(1 - \delta_m)\pi_{it+1}(z, h_{t+1}, o)$$

Young worker:

$$\pi_{it}(z, h_t, y) = p_{idt} q_i(z, h_t) + \beta(1 - \delta_{JD}^y)(\delta_a \pi_{it+1}(z, h_{t+1}, o) + (1 - \delta_a)\pi_{it+1}(z, h_{t+1}, y))$$

- different life-cycle shocks faced by generations
- old workers have higher effective discounting rate  $\Rightarrow$  cross-generational differences in unemployment rates and inter-sectoral mobility wrt HC level

# Job Acceptance Problem

## Cutoff property

Outside options:  $W_t$  (unemployed worker) and  $J_t$  (idle firm). Surplus over both sides outside options is:

$$\Delta_{it}(z, h, g) = \pi_{it}(z, g, h) - [W_t + J_t]$$

Nash bargaining  $\Rightarrow$  solution: matches accepted if  $\Delta_{it} \geq 0$   
 $\frac{\partial \pi_{it}}{\partial z} \geq 0 \Rightarrow$  **cutoff** property in sectoral acceptance policy

## Comments:

- endogenous separations are possible: productivity  $z$  and HC  $h_i$  are complementary in production function
- cutoff productivity for a sector is increasing in HC stock of the worker in the other sector: the higher my experience in sector 1, the more productive must be the job in sector 2 to make me quit searching in my sector

# Vacancy Creation Problem

Firms create new vacancies in sector  $i$  when (2 conditions):

- discounted expected net gain is greater than the value of staying idle
- AND it dominates entry to the other sector

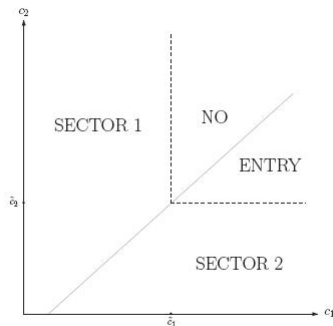


Figure 2 – Sectoral Entry Decision of an Idle Firm

# Calibration

Parameter	Definition	Value	Source/Target
$\delta_m$	death probability	1/80	20 years of youth
$\delta_a$	aging probability	1/80	20 years of old-age
$f_z(z)$	productivity	uniform [0, 1]	-
$\gamma$	Cobb-Douglas share of good 1	0.50	-
$\sigma$	worker's bargaining share	0.50	-
$h_i$	Initial HC level	1	normalization
$A_2$	sector 2 productivity	1	normalization
$\tau$	import tariff	0.63	Pavcnik et al. (2004)
$\beta$	discounting rate	0.97	real interest rate, IPEA
$\delta_{JD}^y$	job destruction for young	0.018	Bosch and Maloney (2007)
$\delta_{JD}^o$	job destruction for old	0.012	Bosch and Maloney (2007)
$\delta_h$	depreciation of HC	0	Browning et al. (1999)

Table 1 – Parameters Set Without Solving the Model

# Calibration

Parameter	Value	Target	Source
$\alpha$	0.98	$\frac{\text{ave. earnings at 5 years of experience}}{\text{ave. beginning of the career earnings}} = 1.41$	Menezes-Filho et al. (2008)
$H$	2.60	$\frac{\text{ave. earnings at 40 years of experience}}{\text{ave. beginning of the career earnings}} = 2.43$	Menezes-Filho et al. (2008)
$A_1$	1.71	Export / (Value Added) = 0.26	Pavcnik et al. (2004), OECD (2006)
$\lambda$	2.16	elasticity of hiring to unemployment = 0.25	Hook (2007)
$C_{sd}$	1.49	transition probability from U to E = 0.38	Domeland and Fliess (2006)

Table 2 – Parameters Obtained by Solving the Model

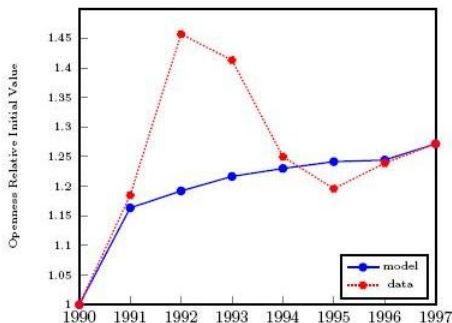
## Steady State Results

Moment	Model	Data	Source
Share of youth unemployment	0.71	0.71	IDB (2004), ILO KILM Database
annual excess job reallocation	0.34	0.32	IDB (2004)
earning losses of old switchers	0.12	0.22	Hoek (2006)
90th/10th wage percentile	2.37	10.59	Sotomayor (2004)
hiring costs / wage bill	0.09	0.09	Abowd and Kramarz (2003) - blue-collar workers in France

Table 3 – Steady State Outcomes

- declining inter-sectoral mobility over life-cycle
- higher unemployment among young workers
- post-separation wage changes

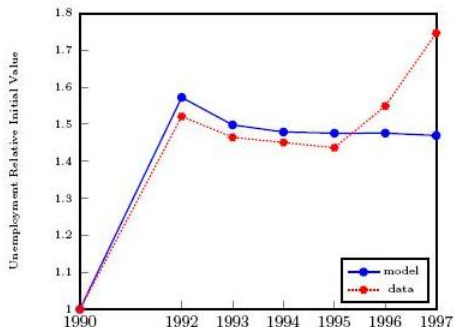
## Model (calibrated to adopted policy) vs Data (1)



### Openness during the Transition

Source: Openness in the data is measured as  $\frac{\text{Exports}}{\text{Output}} \cdot \frac{\text{Output}}{\text{Value Added}}$  for manufacturing. Data on export share of manufacturing output is from Pavcnik et al. (2004). The value added share of manufacturing output is from OECD (2006). The model unemployment rate is the yearly average over quarters.

## Model (calibrated to adopted policy) vs Data (2)

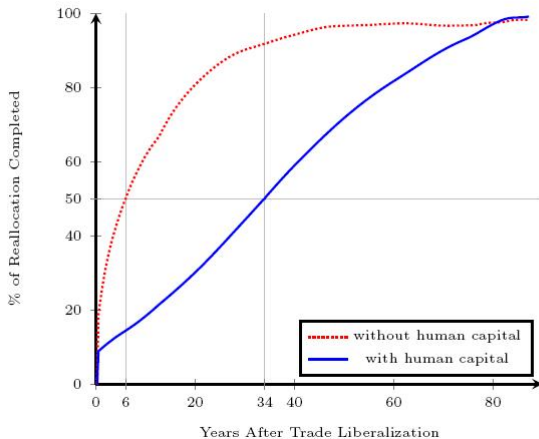


### Unemployment During the Transition

*Source: ILO-KILM 2009, male unemployment rate. The values for 1991 and 1994 are missing in the original data. The initial level of unemployment in 1990 is set as the average for 1981-1990 which is equal to 3.6%. For 1994, I report the average of 1993-1995 values. The model unemployment rate is the yearly average over quarters.*

# Counterfactual

What does hamper job reallocation?



# Conclusion

- HC sector-specificity is much bigger barrier to job mobility than search frictions
- suboptimally low level of job mobility can occur even in the absence of institutional barriers
- employment subsidies and active labour market policies can speed up adjustment, compensate losers from trade and improve welfare

THE END

Thank you for attention!