Employment Protection and Business Cycles in Emerging Economies

Ruy Lama Carlos Urrutia
IMF ITAM

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- Higher countercyclicality of trade balance.

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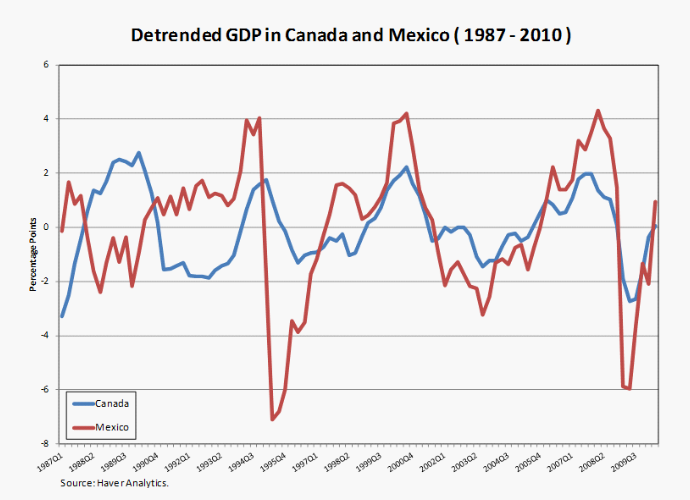

Detrended GDP in Canada and Mexico (1987 - 2010)
Percentage Points
6
4
2
0
-2
-4
-6
-8
Canada
Mexico
1987Q1
1988Q2
1989Q3
1990Q4
1992Q1
1993Q2
1994Q3
1995Q4
1997Q1
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1999Q3
2000Q4
2002Q1
2003Q2
2004Q3
2005Q4
2007Q1
2008Q2
2009Q3
Source: Haver Analytics.

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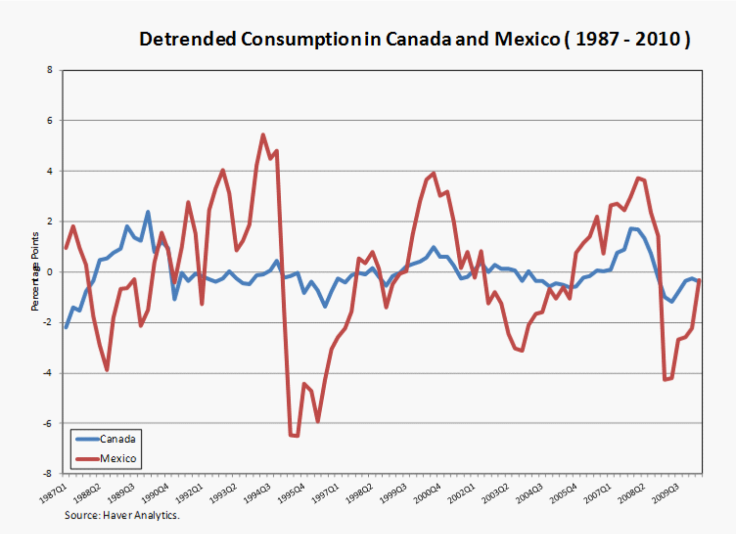

Detrended Consumption in Canada and Mexico (1987 - 2010)
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0
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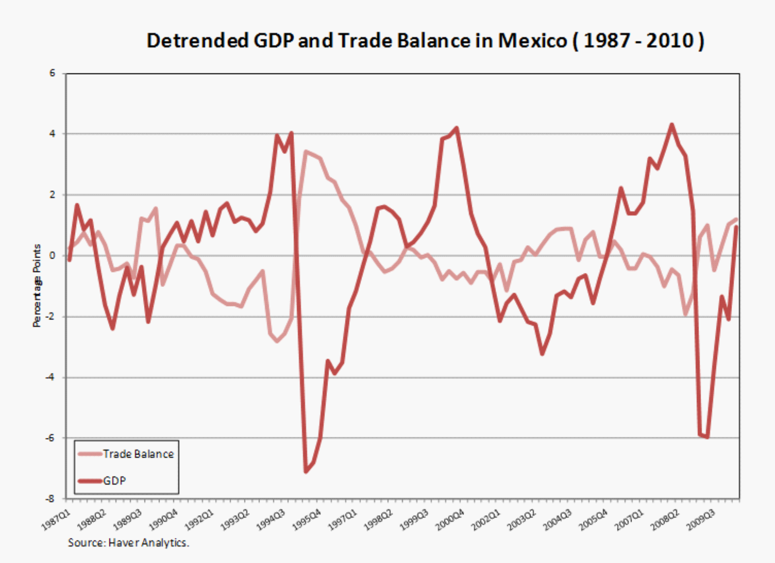

Detrended GDP and Trade Balance in Mexico (1987 - 2010)
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GDP
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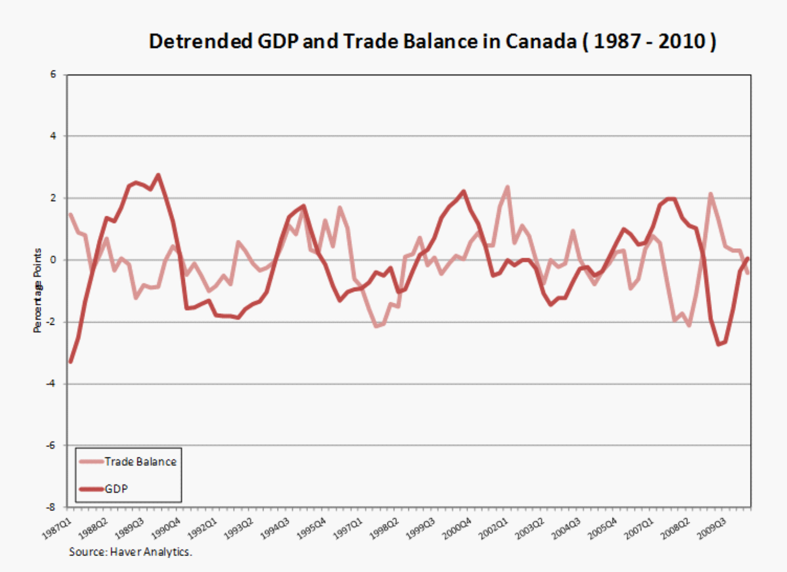

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Possible Explanations

1. Different stochastic processes of TFP for emerging economies. Aguiar and Gopinath (2007).

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2. Different shocks to external financing conditions. Neumeyer and Perri (2005).

This Paper

- We evaluate the role of **employment protection** in shaping business cycles in emerging economies.

This Paper

Table 1: Business cycles Properties and Employment Protection Across Countries

	s.d.(y) (percent)	s.d.(l) /s.d.(y)	Employment Protection (weeks) DBI	H&P
Argentina	4.19	0.59	23	12
Brazil	1.76	0.62	9	7
Chile	1.79	0.62	12	14
Colombia	1.74	0.88	19	14
Mexico	2.17	0.53	22	13
Average Emerging	2.33	0.65	17	12
Australia	1.10	1.08	8	2
Canada	1.28	0.67	5	2
Norway	1.35	0.66	0	4
New Zealand	1.39	0.92	0	1
United Kingdom	1.15	0.89	3	6
Average Developed	1.25	0.84	3	3

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- We evaluate the role of employment protection in exacerbating business cycles in emerging economies.
- What would happen if firing costs in Mexico are reduced to level observed in Canada?

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2. Lower output decline of 1.3 percentage points during the Great Recession.
   - Decline of 7.6 percent instead of the actual 8.9 percent.
3. Search and endogenous separation explains 30 percent of total labor frictions (Labor Wedge).

Outline

1. Related Literature

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- Social Planner Solution: Abstract from the wage setting process.
- Shocks: Technology and Interest Rates.

Households

$$E_0 \sum_{t=0}^{\infty} \beta^t \frac{\left[C_t - \varphi \frac{L_t^{1+\nu}}{1+\nu} \right]^{1-\sigma}}{1-\sigma}$$

- Non-separability between consumption and leisure.

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- No wealth effects on labor supply.
- Interpretation: home production.

Production

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2. **Final Good:** Produced with Capital and Intermediate Goods with a Technology A_t.

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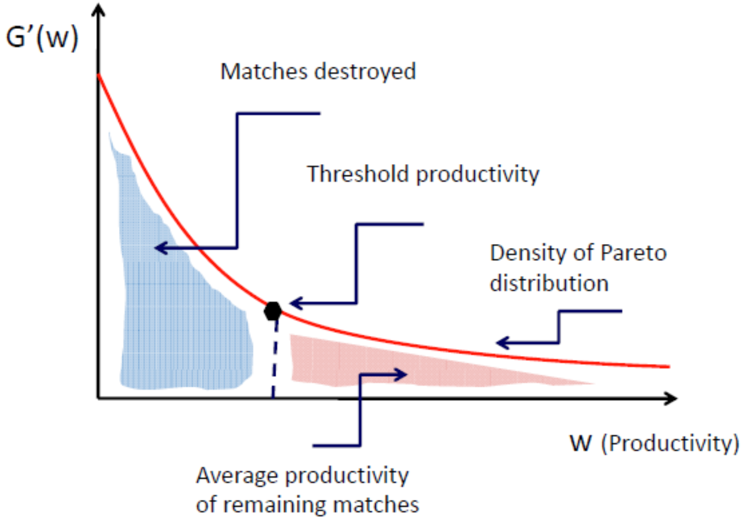
3. After observing the shocks at the beginning of the period, the planner can decide to destroy a job if the labor efficiency is *too low.*
   - 3.a. Endogenous threshold level $\hat{\omega}_t$ depending on the aggregate state of the economy.

Intermediate Goods



Intermediate Goods

$$M_t = L_t \int_{\hat{\omega}_t}^{\infty} \frac{dG(\omega_t)}{1 - G(\hat{\omega}_t)} d\omega_t = \left[\frac{\Gamma(\hat{\omega}_t)}{1 - G(\hat{\omega}_t)} \right] L_t$$

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  - the higher the level of job destruction.
  - the higher the average productivity in the production of intermediate inputs.
- This will typically occur in a recession.

Final Goods

- Combines capital and intermediate good with a technology level A_t

$$Y_t = A_t \left(K_t\right)^{\alpha} \left(M_t\right)^{1-\alpha}$$

- Aggregate production function can be rewritten

$$\underbrace{Y_t}_{GDP} = \underbrace{\left[A_t \left(\frac{\Gamma\left(\hat{\omega}_t\right)}{1 - G\left(\hat{\omega}_t\right)}\right)^{1-\alpha}\right]}_{TFP} \left(K_t\right)^{\alpha} \left(L_t\right)^{1-\alpha}$$

- Higher job destruction is associated with higher measured TFP.

Labor Markets

- Labor flows:

$$L_t = L_{t-1} + H_t - S_t$$

- Matching function (Hirings):

$$H_t = D\left(U_t\right)^{\theta}\left(V_t\right)^{1-\theta}$$

- Separations:

$$S_t = G\left(\hat{\omega}_t\right)\left[L_{t-1} + H_t\right]$$

Closing the Model

- Feasibility:

$$Y_t = C_t + I_t + NX_t + \eta V_t + \kappa S_t$$
$$B_{t+1} = \left(1 + r_t^*\right) B_t - NX_t$$

- Posting a Vacancy (V_t) entails a cost η, while a separation (S_t) a cost κ.
- Law of motion of capital:

$$K_{t+1} = (1-\delta) K_t + I_t - \frac{\vartheta}{2}\left(\frac{I_t}{K_t} - \delta\right)^2 K_t$$

- Labor endowment allocation:

$$L_t + U_t = 1$$

Shocks

$$
\begin{aligned}
\log\left(A_t\right) &= \rho_A \log\left(A_{t-1}\right) + \varepsilon_t^A, \\
\log\left(1+i_t^*\right) &= \rho_i \log\left(1+i_{t-1}^*\right) + \left(1-\rho_i\right)\log\left(1+i^*\right) + \varepsilon_t^i.
\end{aligned}
$$

Social Planner Solution: Selection Effect.

$$\begin{aligned}\pi_t(\omega) &= p_t^M \omega - \varphi L_t^{\nu} - \lambda_t^U / \lambda_t^C \\ &\quad + \beta E_t \left(\lambda_{t+1}^C / \lambda_t^C \right) \int \max \left\{ \pi_{t+1}(\omega'), -\kappa \right\} dG(\omega').\end{aligned}$$

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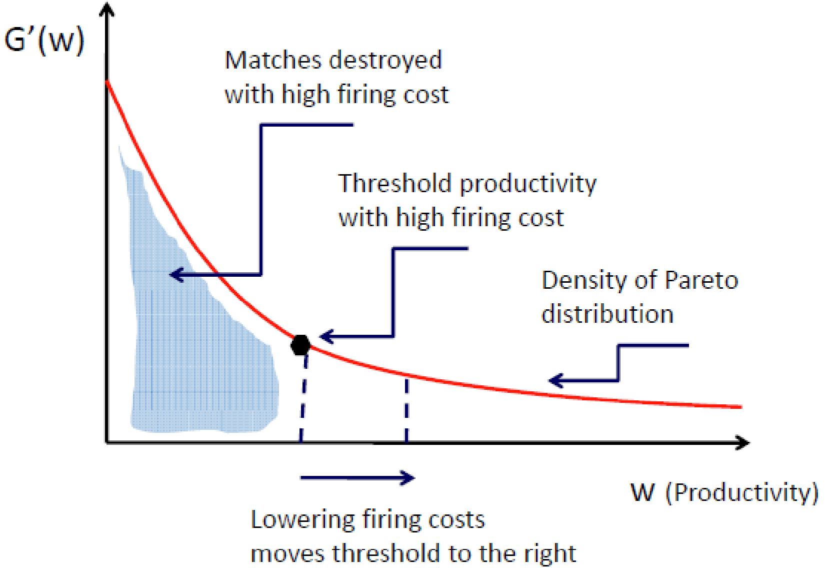
- Monotonicity of π_t in ω implies that the optimal rule is to shred jobs with $\omega < \hat{\omega}_t$, where $\hat{\omega}_t$ satisfies $\pi_t(\hat{\omega}_t) = -\kappa$.
- A higher firing cost will imply a lower cut-off $\hat{\omega}_t$, hence less job destruction and lower measured TFP.

Social Planner Solution: Selection Effect.



Selection Effect: Labor Flows in Mexico.

Table 2: Transitions between Occupational Status and Selection Effect in Mexico

	Employed ⟶ Unemployed		Self-Employed ⟶ Unemployed	
	percent	selection	percent	selection
1988-99	1.67	0.74	0.90	0.93
1995	2.76	0.68	1.68	0.88

	Employed ⟶ Out Labor Force		Self-Employed ⟶ Out Labor Force	
	percent	selection	percent	selection
1988-99	7.06	0.32	10.31	0.41
1995	7.48	0.30	9.91	0.41

Source: Own elaboration using Encuesta Nacional de Empleo Urbano (ENEU), sample from 1988:Q1 to 1999:Q4.

Diagnostic of Labor Market Frictions

- TFP or productivity wedge:

$$TFP = \frac{Y_t}{F\left(K_t, L_t\right)}$$

- Can be interpreted as the level of technological efficiency in the use of inputs (Solow residual).
- Labor wedge:

$$Labor\ \ Wedge \equiv \frac{-U_l\left(C_t, L_t\right)/U_c\left(C_t, L_t\right)}{A_t F_L\left(K_t, L_t\right)}$$

- Can be interpreted as the size of the distortion in the labor market required for the optimality condition (consumption/leisure choice) to hold.

3. Quantitative Analysis: Calibration

Table 3: Parameters for the Baseline Economy

Parameter	Symbol	Value
From Outside the Model		
Discount Factor	β	0.99
World average Interest Rate	i^*	$1/\beta - 1$
Depreciation Rate	δ	1.25%
Capital Share	α	0.3
Curvature Pareto Distribution	σ_ω	1.5
Persistence of Exogenous Productivity Shock	ρ_A	0.95
Frisch Elasticity of Labor Supply	$1/\nu$	2.65
Elasticity of Matching Function	θ	0.40
Hiring Cost	η	0.1

3. Quantitative Analysis: Calibration

Table 3: Parameters for the Baseline Economy

Parameter	Symbol	Value
Calibrated to Steady State Statistics		
Disutility of Labor	φ	6.39
Efficiency of Matching Function	D	0.67
Scale of Pareto Distribution	$\overline{\omega}$	0.99
Estimated from EMBI Data for Mexico		
S.D. of World Interest Rate	σ_i	1.37%
Persistence of World Interest Rate	ρ_i	0.96
Calibrated to Business Cycle Volatilities		
S.D. of Exogenous Productivity Shock	σ_A	1.14%
Covariance Interest Rate and Productivity Shocks	$\sigma_{A,i}$	-0.038
Firing Cost	κ	3.90
Adjustment Cost of Capital	ϑ	65

3. Quantitative Analysis: Business Cycle Properties

Table 4: Business Cycle Statistics: Data and Model

	Data Mexico	Baseline Model	No i^* shock
$\sigma(y)$	2.17	2.17	2.21
$\sigma(l)/\sigma(y)$	0.53	0.54	0.52
$\sigma(i)/\sigma(y)$	3.34	3.37	1.29
$Corr(1+i^*, y)$	-0.16	-0.17	–
$\sigma(c)/\sigma(y)$	1.15	1.46	0.89
$Corr(nx/y, y)$	-0.78	-0.14	0.80
$\sigma(tfp)$	1.98	1.36	1.41
$Corr(tfp, y)$	0.93	0.99	0.99
$Corr(l, y)$	0.40	0.99	0.99
$\sigma(lwedge)$	2.11	0.59	0.62
$Corr(lwedge, y)$	-0.73	-0.96	-0.98

3. Quantitative Analysis: Firing Costs and Business Cycles

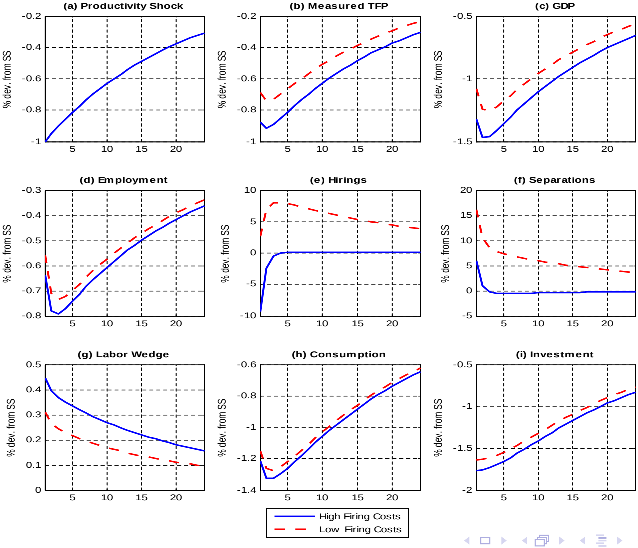


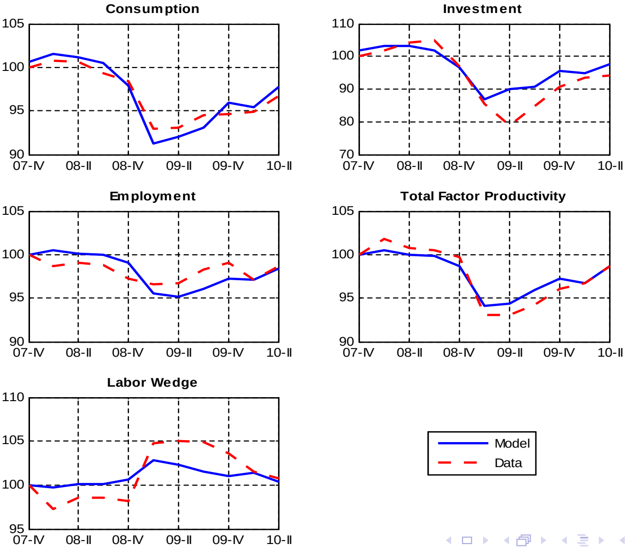
Table 5: Separation Costs and Business Cycle Statistics

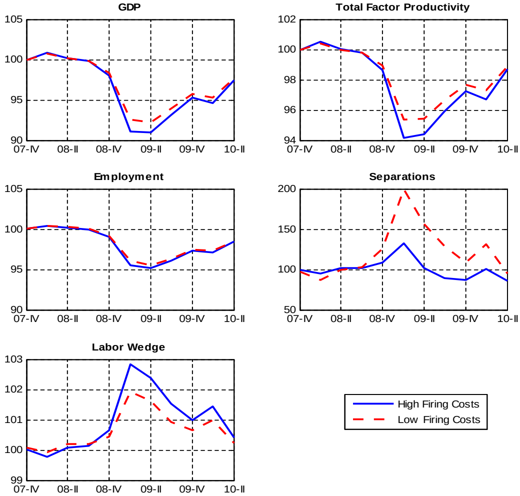
	Mexico	Model: $\kappa \approx 4$	Model: $\kappa \approx 1$
$\sigma(y)$	2.17	2.17	1.86
$\sigma(tfp)$	1.98	1.35	1.08
$\sigma(l)$	1.15	1.16	1.16
$\sigma(l)/\sigma(y)$	0.53	0.54	0.62
$\sigma(lwedge)$	2.11	0.59	0.47
$Corr(lwedge, y)$	-0.73	-0.96	-0.71
$\sigma(c)/\sigma(y)$	1.15	1.49	1.72
$Corr(nx/y, y)$	-0.78	-0.14	-0.12

Table 5: Separation Costs and Business Cycle Statistics

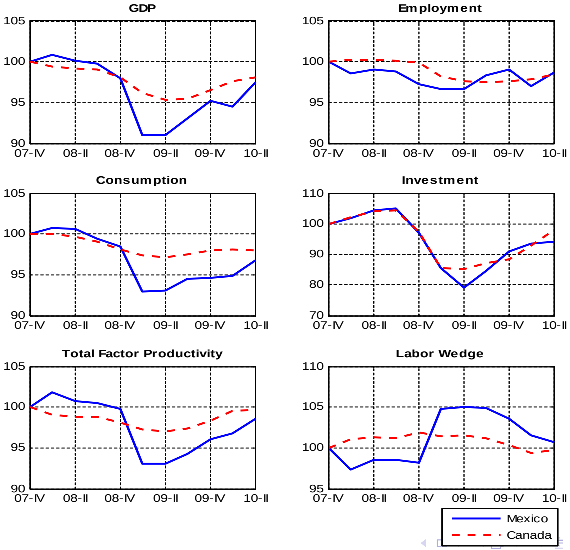
	Mexico	Model: $\kappa \approx 4$	Model: $\kappa \approx 1$	Canada
$\sigma(y)$	2.17	2.17	1.86	1.28
$\sigma(tfp)$	1.98	1.36	1.08	0.86
$\sigma(l)$	1.15	1.16	1.16	0.86
$\sigma(l)/\sigma(y)$	0.53	0.54	0.62	0.67
$\sigma(lwedge)$	2.11	0.59	0.47	0.76
$Corr(lwedge, y)$	-0.73	-0.96	-0.71	-0.42
$\sigma(c)/\sigma(y)$	1.15	1.46	1.72	0.86
$Corr(nx/y, y)$	-0.78	-0.14	-0.12	0.03

3. Quantitative Analysis: The Great Recession




GDP
105
100
95
90
07-IV
08-II
08-IV
09-II
09-IV
10-II
Total Factor Productivity
102
100
98
96
94
Employment
Separations
200
150
50
Labor Wedge
103
102
101
99
High Firing Costs
Low Firing Costs

The Great Recession: Canada vs. Mexico.



Sensitivity Analysis

Table 6: Sensitivity Analysis for the Mexican 2008 Great Recession Episode

	Baseline model	Frisch Elasticity		Curvature Pareto	
	$(1/\nu \approx 2.6,\ \sigma_\omega = 1.5)$	$1/\nu = 1$	$1/\nu = 0.1$	$\sigma_\omega = 1.1$	$\sigma_\omega = 2$
y	1.32	1.25	1.22	1.73	1.05
l	0.37	0.15	0.01	-0.09	0.44
tfp	1.06	1.14	1.21	1.78	0.74
	Baseline model	Matching Elasticity		Capital Share	
	$(\theta = 0.4, \alpha = 0.3)$	$\theta = 0.2$	$\theta = 0.6$	$\alpha = 0.25$	$\alpha = 0.4$
y	1.32	1.70	0.59	1.44	1.10
l	0.37	0.59	0.02	0.43	0.25
tfp	1.06	1.27	0.59	1.11	0.94

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- Extensions: Tradable vs. Non-tradable, Europe vs. U.S.