

Labor Market Rigidities, Trade and Unemployment

ELHANAN HELPMAN
Harvard and CIFAR

OLEG ITSKHOKI
Harvard

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 - How is a country affected by a change in its trade partner's labor market frictions?
 - How do improvements in trading environments impact countries with different labor market frictions?
- We are primarily interested in the effects on:
 - welfare, unemployment, productivity and patterns of trade

Related Literature

- Institutions and Trade:
 - Legal institutions: Levchenko (2004), Nunn (2006), Costinot (2006)
 - Labor market: Cuñat and Melitz (2007)
- Long-run structural unemployment:
 - Blanchard and Wolfers (2000) and Nickell et al. (2002)
- Trade and Unemployment:
 - Minimum wages: Brecher (1974)
 - Implicit contracts: Matusz (1986)
 - Efficiency wages: Copland (1989)
 - Fair wages: Kreickemeier and Nelson (2006)
 - Search and matching: Davidson, Martin and Matusz (1999)
 - Trade and unemployment with heterogenous firms: Egger and Kreickemeier (2006), Davis and Harrigan (2007), Mitra and Ranjan (2007), Felbermayr et al. (2007)

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- Two sectors:
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 - Differentiated-good sector characterized by monopolistic competition with free entry, increasing returns, heterogeneous firms, search friction in the labor market and wage bargaining

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- Labor market frictions: hiring/firing costs, productivity of matching
- Two types of “shocks”: labor market frictions and trade impediments

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- Country with a more flexible labor market is both more productive and enjoys a lower price level
- Interactions of trade and labor market frictions generate rich patterns of unemployment

Outline

- ① Introduction
- ② Closed Economy
- ③ Open Economy
 - Welfare, Trade Patterns, and Productivity
 - Unemployment
- ④ Summary and Discussion

Preferences and Demand

- Utility:

$$\mathbb{U} = q_0 + \frac{1}{\zeta} Q^\zeta, \quad 0 < \zeta < 1$$

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- Indirect utility function:

$$\mathbb{V} = E + \frac{1-\zeta}{\zeta} P^{\frac{-\zeta}{1-\zeta}} = E + \frac{1-\zeta}{\zeta} Q^\zeta$$

Technology and Market Structure

- Labor is the only factor of production
- Homogenous good requires one unit of labor per unit output and the market for this product is competitive:

$$q_0 = h_0 = L - N \quad \text{and} \quad w_0 = p_0 = 1$$

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- Market for the brands of differentiated products is monopolistically competitive:
 - f_e is a fixed cost of entry with a variety ω
 - upon entry, a random productivity θ is drawn from $G(\theta)$ and the production function is $q(\omega) = \theta(\omega)h(\omega)$
 - revenue then is

$$R(\theta) \equiv p(\theta)q(\theta) = Q^{-(\beta-\zeta)} (\theta h(\theta))^\beta$$

- f_d is a fixed cost of production
- revenue should be sufficient to cover the fixed cost of production and labor costs

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 - Revenue $R(h, \theta)$ is divided according to Shapley values, so that the firm gets a fraction $1/(1 + \beta)$, as in Acemoglu et al. (2007)

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- Problem of the firm: $\max_h \left\{ (1 + \beta)^{-1} Q^{-(\beta-\zeta)} (\theta h)^\beta - C(h) \right\}$
- Solution:

$$h(\Theta) = \phi_1^{\frac{1}{\beta}} b^{\frac{-1}{1-\beta}} Q^{-\frac{\beta-\zeta}{1-\beta}} \Theta, \quad \Theta \equiv \theta^{\frac{\beta}{1-\beta}}$$

$$w(\Theta) = \frac{\beta}{1+\beta} R(\Theta)/h(\Theta) = b$$

Labor Market

- We use DMP search and matching model
 - matching function:

$$H = M(V, N) = a_1^\eta V^\eta N^{1-\eta}, \quad 0 < \eta < 1$$

- cost of posting a vacancy: a_2

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- Indifference condition for workers:

$$x \cdot \bar{w} = w_0 = 1 \quad \Rightarrow \quad \begin{cases} x = b^{-1} = a^{\frac{-1}{1+\alpha}}, \\ w(\Theta) = b = a^{\frac{1}{1+\alpha}} \end{cases}$$

Equilibrium Conditions

Closed Economy

- Operating profits: $\pi(\Theta) = \phi_1 \phi_2 b^{\frac{-\beta}{1-\beta}} Q^{-\frac{\beta-\zeta}{1-\beta}} \Theta - f_d$
- Production cutoff: $\pi_d(\Theta_d) = 0$
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$$\int_{\Theta_d}^{\infty} \pi(\Theta) dG(\Theta) = f_e$$

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- Aggregate output of the differentiated product:

$$Q^\beta = M \int_{\Theta_d}^{\infty} q(\Theta)^\beta dG(\Theta)$$

- Supply and Demand: $N = \phi_1^{\frac{1-\beta}{\beta}} Q^\zeta$

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- Rate of unemployment: $u = (1 - x)N/L$

Effects of Labor Market Institutions

Closed Economy

Proposition

Improvements in labor market institutions ($b \downarrow$):

- (i) reduce wages in the differentiated product sector;*
- (ii) increases Q and reduces P ;*
- (iii) raise M and N proportionally;*
- (iv) raise H proportionately more, thereby tightening labor market;*

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- (v) reduce unemployment iff*

$$b < 1 + \frac{\beta - \zeta}{\beta \zeta},$$

i.e. when labor market frictions are low to begin with;

- (vi) raise welfare independently of the impact on unemployment*

$$E = L \quad \Rightarrow \quad \mathbb{W} = L + \frac{1-\zeta}{\zeta} Q^\zeta$$

Effects of Labor Market Institutions

Closed Economy

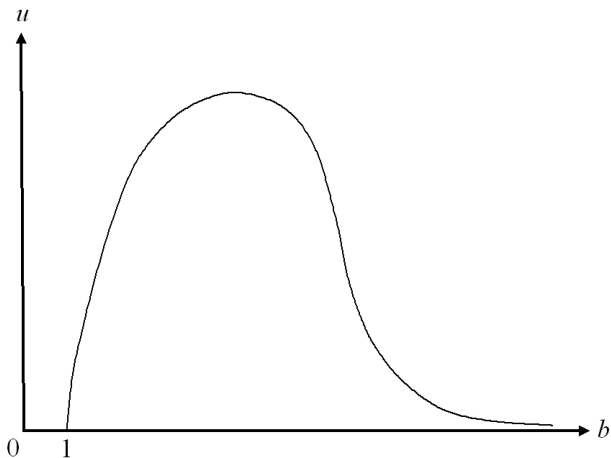


Figure: Unemployment as a function of labor market friction

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- Size of a Θ -firm and the wage rate

$$h_j(\Theta) = \phi_1^{\frac{1}{\beta}} b_j^{-\frac{1}{1-\beta}} \left[Q_j^{-\frac{\beta-\zeta}{1-\beta}} + I_{xj}(\Theta) \cdot \tau^{\frac{-\beta}{1-\beta}} Q_{(-j)}^{-\frac{\beta-\zeta}{1-\beta}} \right] \Theta,$$

$$w_j(\Theta) = b_j \quad \Rightarrow \quad w_j = x_j^{-1} = b_j = a_j^{1/(1+\alpha)}$$

Cutoffs and Free Entry

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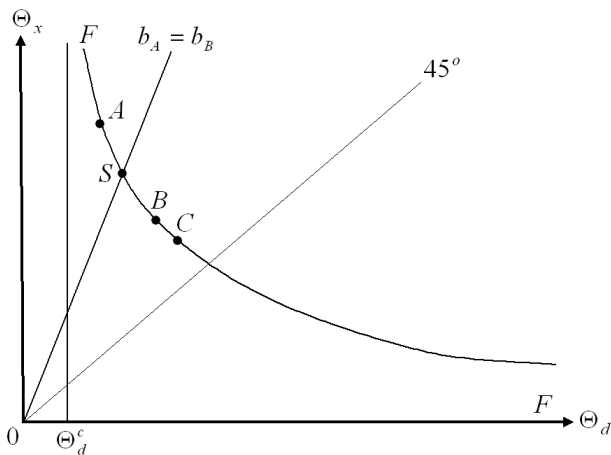


Figure: Cutoffs in a trading equilibrium

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- (ii) *The flexible country exports differentiated products on net and imports homogenous good*
- (iii) *The share of intra-industry trade is smaller the larger the proportional gap in labor market institutions*
- (iv) *If productivity is distributed Pareto, total volume of trade increases in the proportional gap in labor market institutions and decreases in the trade costs*

Productivity

Consider the following measure of productivity:

$$TFP_j \equiv \frac{M_j}{H_j} \left[\int_{\Theta_{dj}}^{\infty} \Theta^{\frac{1-\beta}{\beta}} h_{dj}(\Theta) dG(\Theta) + \int_{\Theta_{xj}}^{\infty} \Theta^{\frac{1-\beta}{\beta}} h_{xj}(\Theta) dG(\Theta) \right]$$

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Proposition

Assuming individual productivity draws are distributed Pareto:

- (i) TFP_j is higher in the flexible country;
- (ii) An improvement in b_j raises TFP_j and reduces $TFP_{(-j)}$;
- (iii) A reduction in τ raises TFP_j in both countries.

Productivity and Price Level

Price Level:

$$\mathcal{P}_j = 1 - \frac{1-\zeta}{\zeta} \mathcal{P}_j^{-\frac{\zeta}{1-\zeta}} = 1 - \frac{1-\zeta}{\zeta} Q_j^\zeta.$$

Productivity and Price Level

Price Level:

$$P_j = 1 - \frac{1-\zeta}{\zeta} P_j^{-\frac{\zeta}{1-\zeta}} = 1 - \frac{1-\zeta}{\zeta} Q_j^\zeta.$$

Proposition

The price level is lower and, hence, the real exchange rate is higher (depreciated) in the flexible country, which also has higher productivity.

- Note that the last part of this proposition implies an effect opposite in direction to Balassa-Samuelson.
- Contrast with Ghironi and Melitz (2006)

Unemployment

Symmetric Countries: $b_A = b_B = b$

In this case

$$\hat{u} = \left(\frac{1}{b-1} - \frac{\beta\zeta}{\beta-\zeta} \right) \hat{b} - \frac{\beta\zeta}{\beta-\zeta} \frac{\delta_x}{\delta_d + \delta_x} \hat{\tau}$$

Proposition

In a symmetric world economy:

- (i) improvements in the labor market institutions, common to both countries, reduce unemployment if and only if frictions in the labor market are low to begin with;*
- (ii) reductions in trade impediments raise unemployment and welfare.*

Unemployment

Nearly Symmetric Countries

In this case we show:

$$\hat{u}_A = \left(\frac{1}{b-1} - \Psi_{NA} \right) \hat{b}_A, \quad \Psi_{NA} > \frac{\beta\zeta}{\beta - \zeta}$$
$$\hat{u}_B = \Psi_{NB} \hat{b}_A, \quad \Psi_{NB} > 0$$

Proposition

In the vicinity of a symmetric equilibrium:

- (i) the flexible country has a lower rate of unemployment if and only if the levels of frictions in the labor markets are low;*
- (ii) an improvement in the country's labor market institutions reduces the rate of unemployment in its trade partner, yet it reduces home unemployment if and only if the initial level of frictions in the labor markets are low.*

Unemployment

Asymmetric Countries: Response to Labor Market Frictions

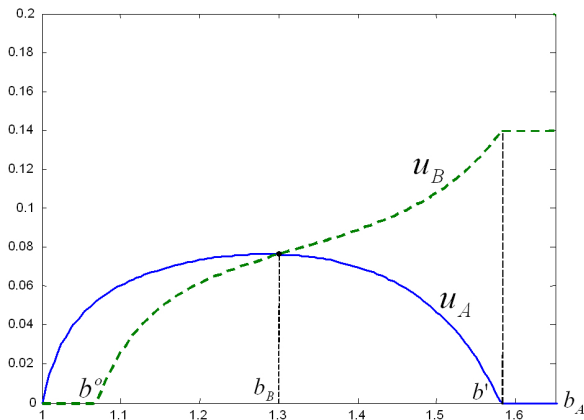


Figure: Unemployment as a function of labor market friction: $b_B = 1.3$

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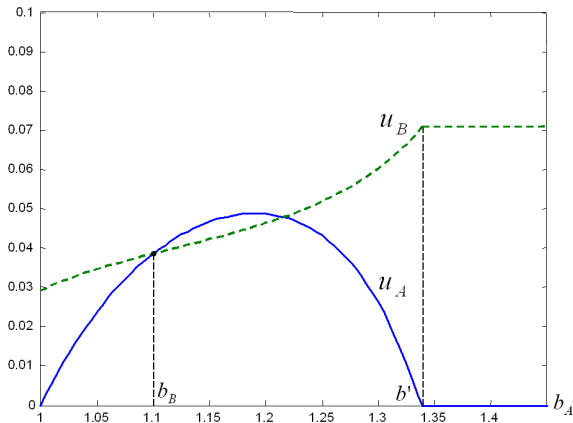


Figure: Unemployment as a function of labor market friction: $b_B = 1.1$

Unemployment

Asymmetric Countries: Response to Trade Frictions

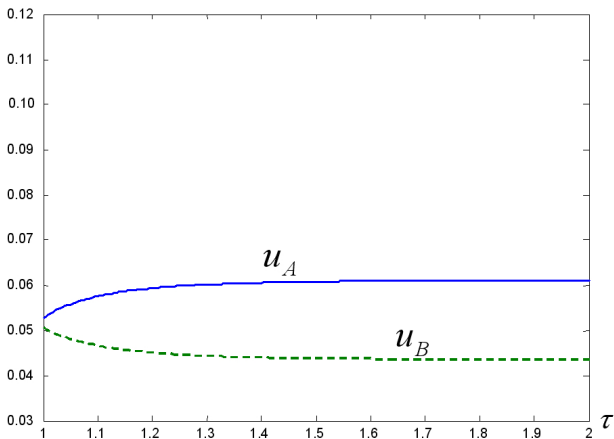


Figure: Unemployment as a function of τ : $b_A = 1.20$ and $b_B = 1.12$

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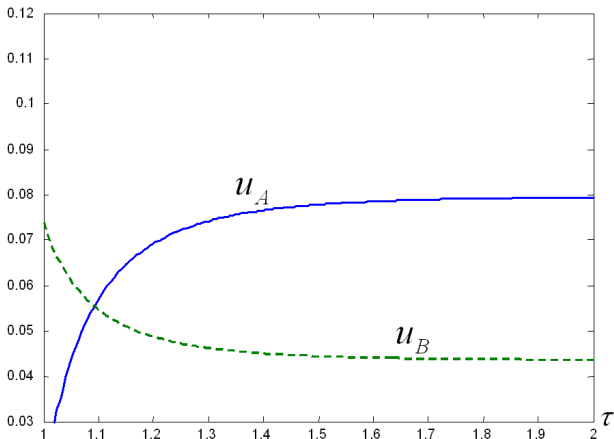


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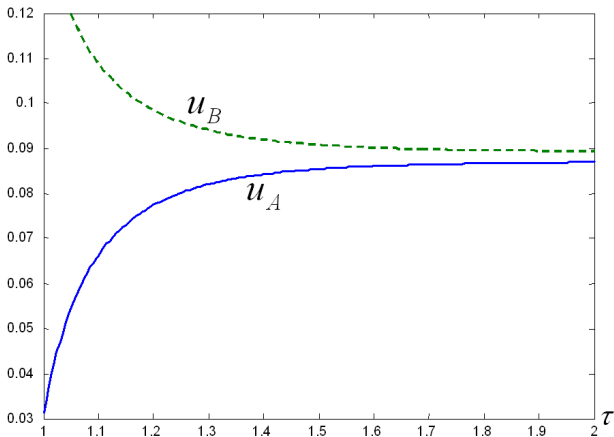


Figure: Unemployment as a function of τ : $b_A = 1.9$ and $b_B = 1.6$

Summary and Policy Implications

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- Trade liberalization and labor market deregulation are complementary
- Labor market reforms in one country are likely to encourage labor market reforms in its trade partners