

# **Foreign Direct Investment in Services and the Domestic Market for Expertise**

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## Motivation and Overview

- Foreign producer services such as managerial or engineering consulting services can provide substantial benefits of knowledge which may be costly in terms of time and money for domestic firms to develop on their own.
- Policies which impact on trade and direct investment in services are often quite different from those that impact on trade in goods.
- Standard analytical framework: monopolistic competition in differentiated goods, the number of firms affects productivity through a Dixit-Stiglitz aggregation.

- Key contribution of this paper is a computable framework for analyzing the comparative static and dynamic effects of investment and FDI policy reforms.

## Results

- While foreign services are partial-equilibrium substitutes for domestic skilled labor, they may be general-equilibrium complements.
- Service trade can provide crucial missing inputs that reverse comparative advantage in final goods.
- The optimal tax on imported services may be a subsidy.
- In a dynamic formulation, there are disruptions along a transition path that suggest potentially important equity consequences of reform.

## Literature

*Key idea:* a diverse set (or higher quality set) of business services leads to an improvement in total factor productivity.

- Urban and regional economics literature highlights role of producer services produced under conditions of increasing returns to scale as a source of agglomeration externalities. (e.g., Greenfield, 1966; Jacobs, 1969, 1984; Chinitz 1961; Stanback, 1979)
- Economic geography literature has also focused on the fact that related economic activity is economically concentrated

due to agglomeration externalities (e.g., Krugman, 1991; Porter, 1992; Fujita, Krugman and Venables, 1999)

- Firms operating in economically dense areas are more productive than firms operating in relative isolation. (Ciccone and Hall, 1996).
- Caballero and Lyons (1992) show that productivity increases in industries when output of its input supplying industries increases.
- Marshall (1988) shows that in three regions in the United Kingdom (Birmingham, Leeds and Manchester) almost 80

percent of the services purchased by manufacturers were bought from suppliers within the same region. He cites studies which show that firm performance is enhanced by the local availability of producer services.

- In developing countries, McKee (1988) argues that the local availability of producer services is very important for the development of leading industrial sectors.

## Conceptual Framework

- Services are intermediate inputs.
- Services involves an exchange of knowledge which has been accumulated by the seller through previous investments.
- Services are characterized by firm-level product differentiation.
- Services require a personal presence in a country or at least personal contact and discussions between the service provider and the client.



- Restrictions on goods trade only affect service trade indirectly.
- Restrictions on foreign investment, right of establishment, the movement of business personnel, and lack of intellectual property protection and contract enforcement have major, direct impacts.

## Model Formulation

- Two final goods:  $X$  (skill-intensive) and  $Y$  (other factor-intensive)
- One intermediate good  $Z$  representing a Dixit-Stiglitz aggregate of service inputs.
- Two primary factors:  $S$  (skilled labor) and  $L$  (composite other inputs)

- Production function for  $Y$ :

$$Y = S_y^{\alpha_y} L_y^{(1-\alpha_y)}$$

- Production function for  $X$ :

$$X = S_x^{\alpha_x} L_x^{\beta_x} Z_x^{(1-\alpha_x-\beta_x)}$$

- $X$  is skilled-labor intensive relative to  $Y$ , in the sense that  $\alpha_x/\beta_x > \alpha_y/\beta_y$ .

- Services are produced by imperfectly competitive firms, with a one to one correspondence between the firm and their differentiated service varieties.  $Z_x$  is a CES function of domestic services ( $Z_D$ ) and imported services ( $Z_M$ ):

$$Z_x = (Z_D^\gamma + Z_M^\gamma)^{1/\gamma}$$

- Domestic and multinational composites are functions of the number of products and the output per firm of those composites:

$$Z_D = \left[ \sum_i^{n_D} z d_i^{\delta_D} \right]^{1/\delta_D} = n_D^{1/\delta_D} z d$$

$$Z_M = \left[ \sum_j^{n_M} z m_j^{\delta_M} \right]^{1/\delta_M} = n_M^{1/\delta_M} z m$$

- $n_D$  and  $n_M$  are the number of domestic and imported service varieties. The elasticity of substitution within product groups are:  $\sigma_D = 1/(1 - \delta_D)$  and  $\sigma_M = 1/(1 - \delta_M)$ .

- $zd_i$  is produced using domestic skilled labor and the composite factor
- $zm_j$  is produced using domestic skilled labor, the composite factor and a composite imported factor. Imported inputs ( $V$ ), include specialized technical expertise, advanced technology, management expertise and marketing expertise.
- Cost functions for domestic varieties are identical, and cost functions for imported varieties are also identical. Cost functions are affine functions of output:

$$C^D(r, w, zd) = c_D(r, w)zd + f_D(r, w)$$

and

$$C^M(r, w, p_v, zm) = c_M(r, w, p_v)zm + f_M(r, w, p_v)$$

- Market clearing equations for  $S$  and  $L$  can then be written as:

$$L = L_y + L_x + n_d \frac{\partial C^D}{\partial w} + n_m \frac{\partial C^M}{\partial w}$$

and:

$$S = S_y + S_x + n_d \frac{\partial C^D}{\partial r} + n_m \frac{\partial C^M}{\partial r}$$

- The demand side of the economy consists of a representative consumer, who derives income from factor supplies and possibly from tax revenues (net of subsidies):

$$U = U(X_c, Y_c)$$

- The model is closed with a trade balance condition:

$$p_x^*(X_p - X_c) + p_y^*(Y_p - Y_c) - p_v^*V = 0$$

where  $V = n_m \frac{\partial C p_v}{\partial p_v}$



- Optimization under "large-group monopolistic competition" apply to both domestic and multinational firms ( $j \in \{D, M\}$ ):

$$MR = MC \rightarrow p_j \left(1 - \frac{1}{\epsilon_j}\right) = c_j(r, w, p_v)$$

and

$$AC = price \rightarrow p_j = c_j + \frac{f_j}{n} \quad j \in \{D, M\}$$

where  $\epsilon_j$  is the price elasticity of demand,  $c_j$  is marginal cost of supply, and  $f_j$  is the fixed cost of establishing a new plant.

## Results with the Static Model

	Price of V (% of domestic cost)					
	$\infty$	100	80	60	40	20
Welfare	1.00	1.03	1.03	1.05	1.07	1.15
Wage – skilled labor	1.00	1.07	1.07	1.11	1.14	1.40
Wage – composite factor	1.00	0.99	1.01	1.00	1.02	0.96
$n_D$	1.00	0.45	0.35	0.24	0.11	0.03
$n_M$	0.00	0.51	0.67	0.98	1.42	2.80
Net imports of X	1.00	0.00	0.00	-0.41	-0.63	-3.01

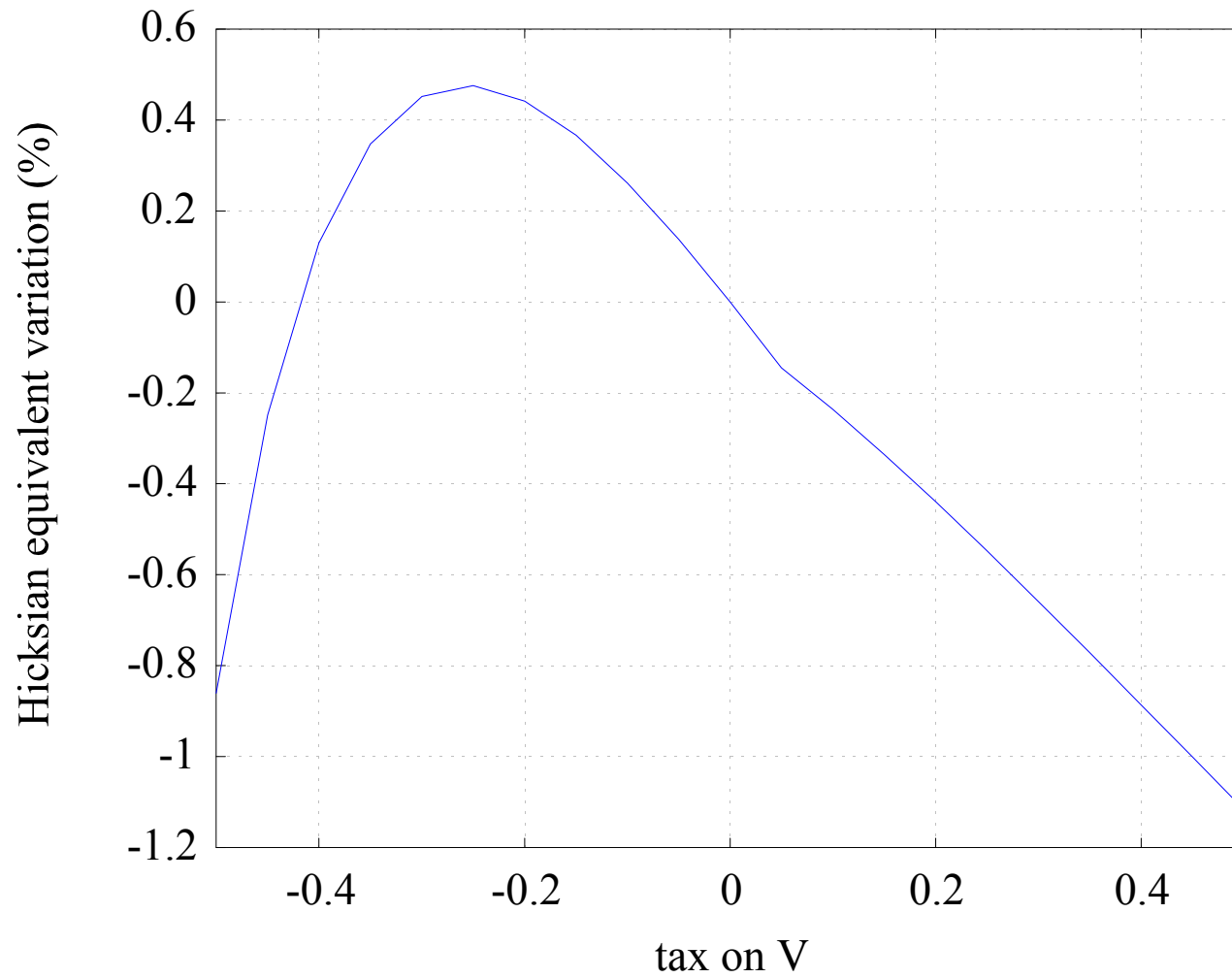
## Interesting Results with $p_v = 1$

- In traditional competitive models, no entry would occur and the initial no-FDI equilibrium would continue to be an equilibrium once entry is permitted.
- Due to product differentiation, the marginal productivity of foreign varieties is unbounded in the initial no-FDI situation. Therefore, we must have some entry by foreign firms to reduce the value of their marginal product to their marginal costs.
- Given the initial high marginal productivity of the banned FDI, it can be expected to convey a large productivity boost.

- An entering  $zm$  producer confers an "externality" effect on  $zd$  producers raising the price received by an individual producer of  $zd$  for a given demand for aggregate  $Z_D$ . Entry of more  $zd$  and/or  $zm$  firms occurs until factor prices adjust to reach a new equilibrium. The result is a pure variety or productivity effect.
- The real wage of skilled labor rises by 7.0%. This is an effects suggested earlier, in which the substitution effect away from domestic skilled labor (V economizes on domestic skilled labor in producing ZM) is outweighed by a scale effect.
- Imported services produce a sort of productivity effect that lowers the cost of final output and increases the X-sector's direct demand for skilled labor.

- A final interesting result in the second column is change in the trade pattern. Imports of X are eliminated due to the economy's increased ability to produce it domestically, and trade consists of a small export of Y to pay for imported V.

**Figure 2: Welfare Effects of a Tax on FDI Imports**



## Dynamic Extensions of the Model

- Intertemporal welfare optimization:

$$W = \sum_{t=0}^{\infty} \Delta^t U_t(X_t, Y_t)$$

- Workers enter the labor force at age 20 and retire at 70.
- At at 20, workers choose whether to enter school or the unskilled workforce. Graduates subsequently choose either to work in the domestic or FDI service industry:

$$L_{t+1} = 0.98L_t + \ell_t$$

- New vintage labor market:

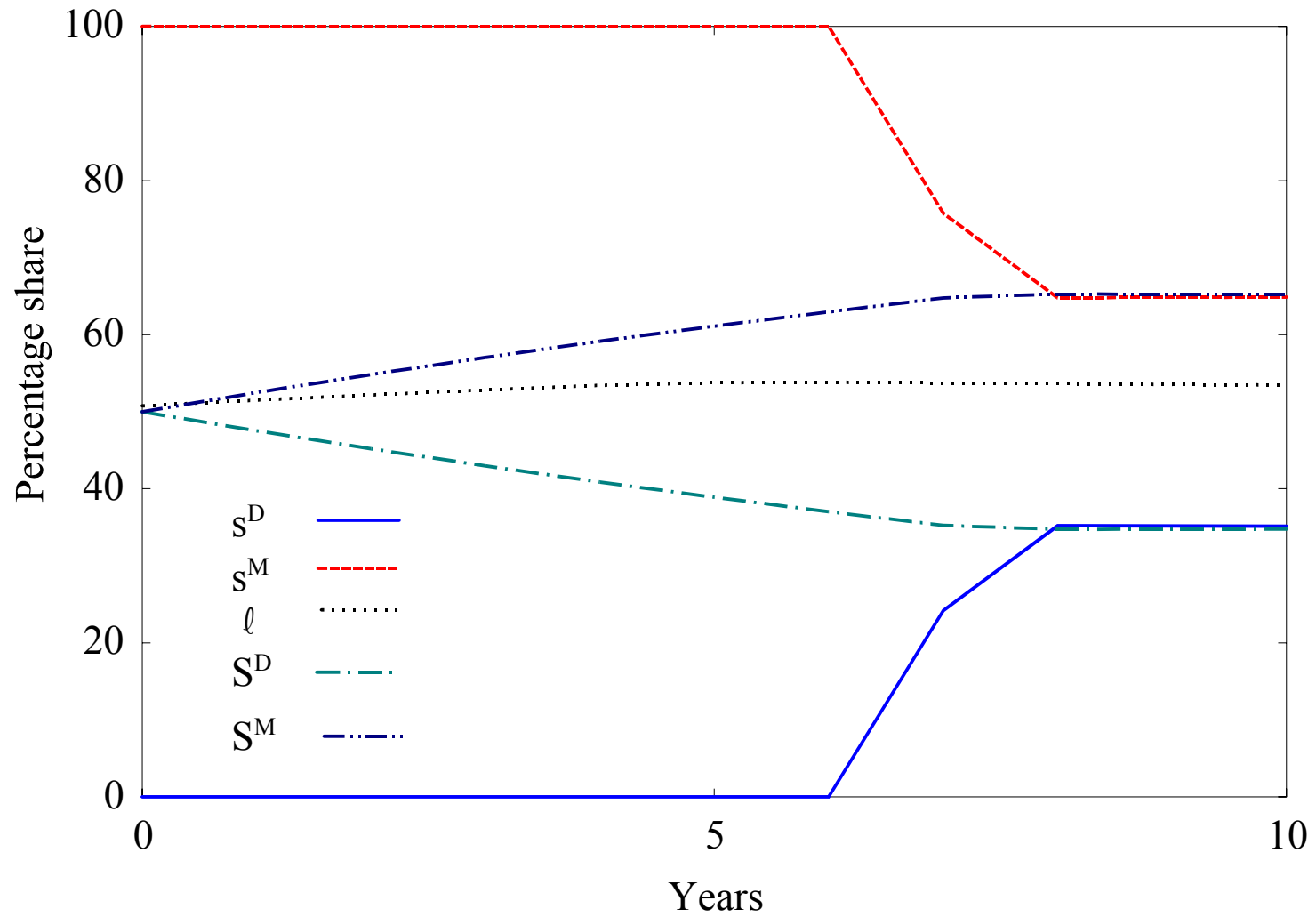
$$l_t + s_t^\beta = n_t$$

- Workers choose whether to enter the domestic or multinational industry:

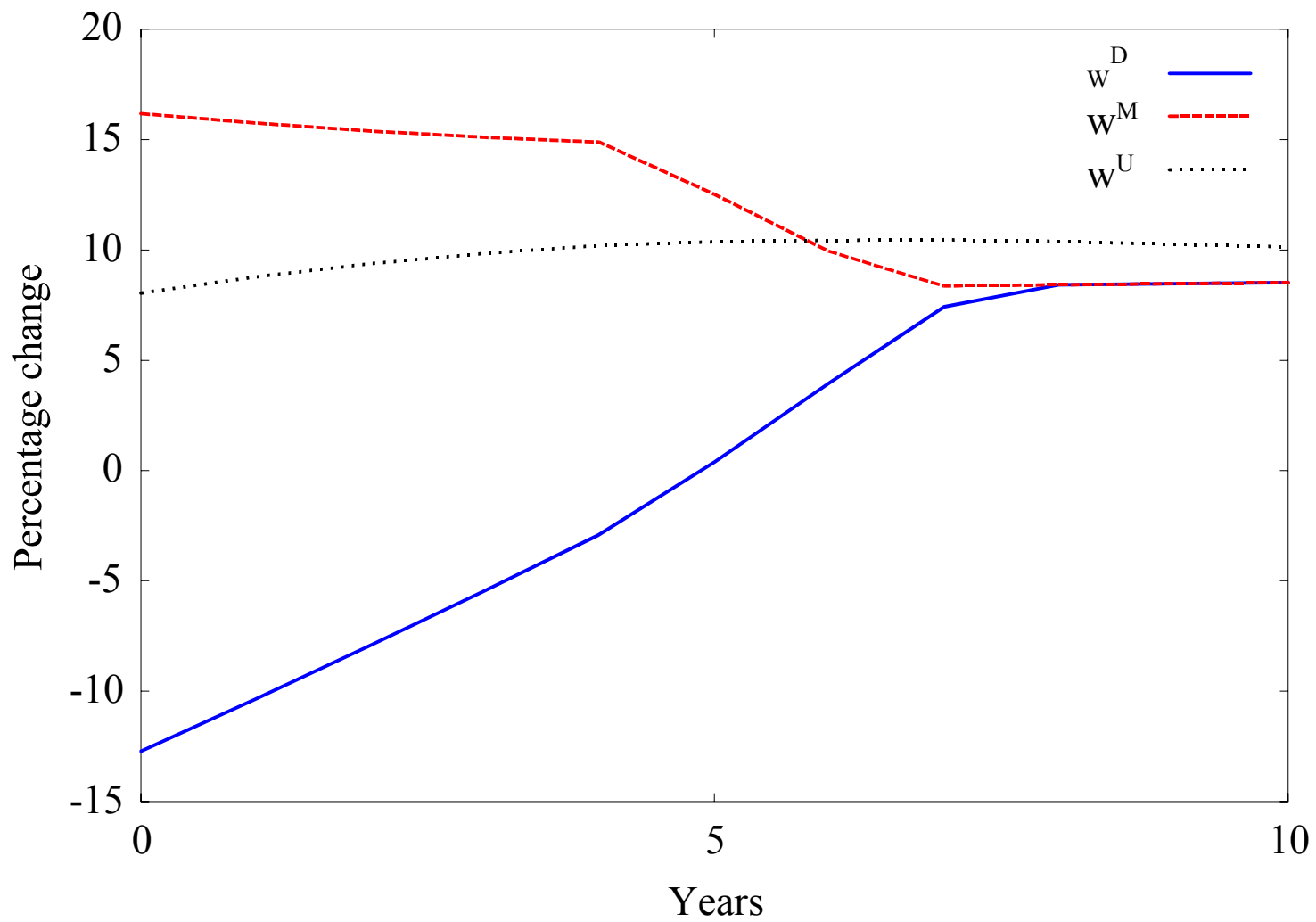
$$s_t = s_t^D + s_t^M$$



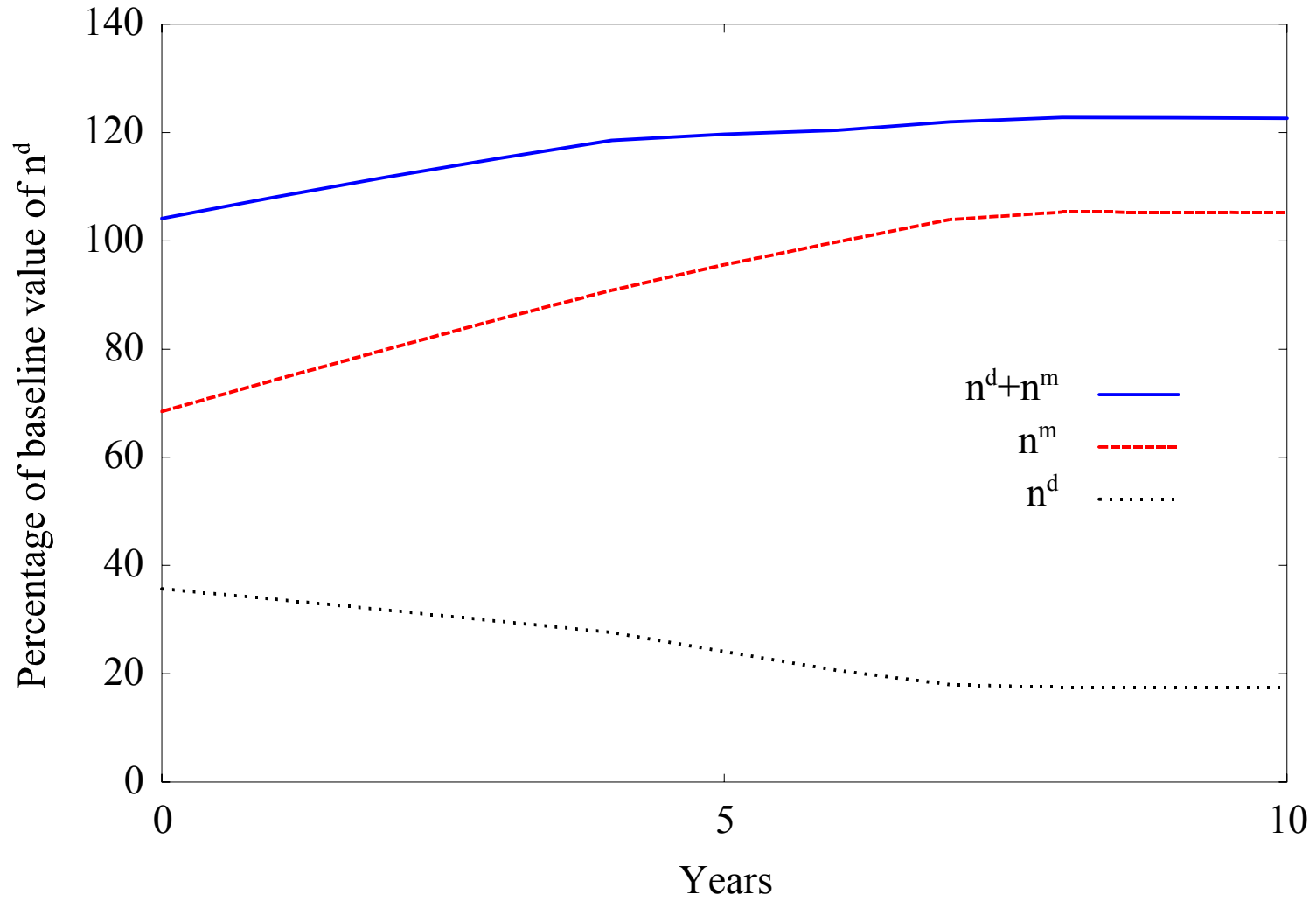
**Figure 3: Labor Market Adjustment**



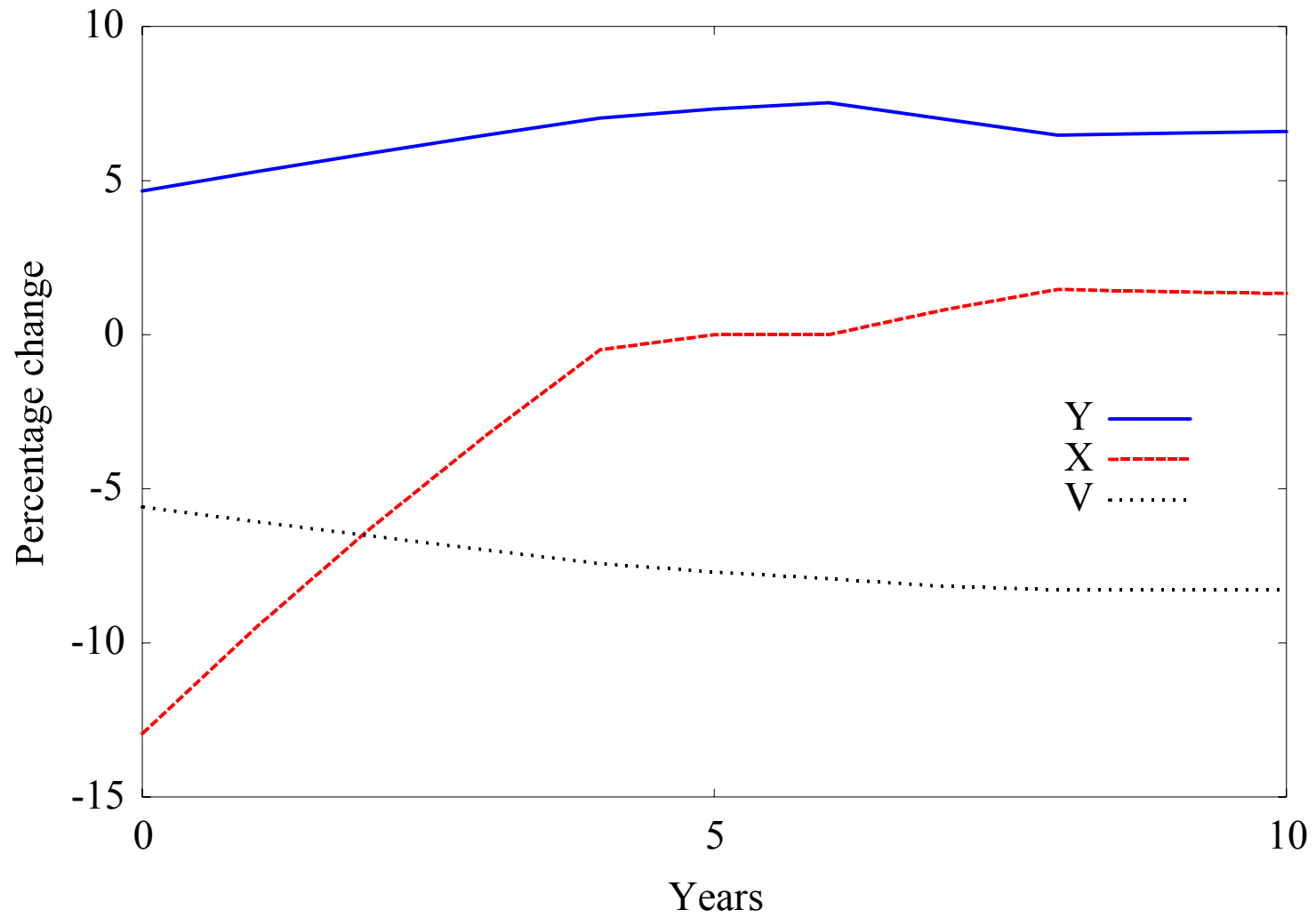
**Figure 4: Wages in Transition**



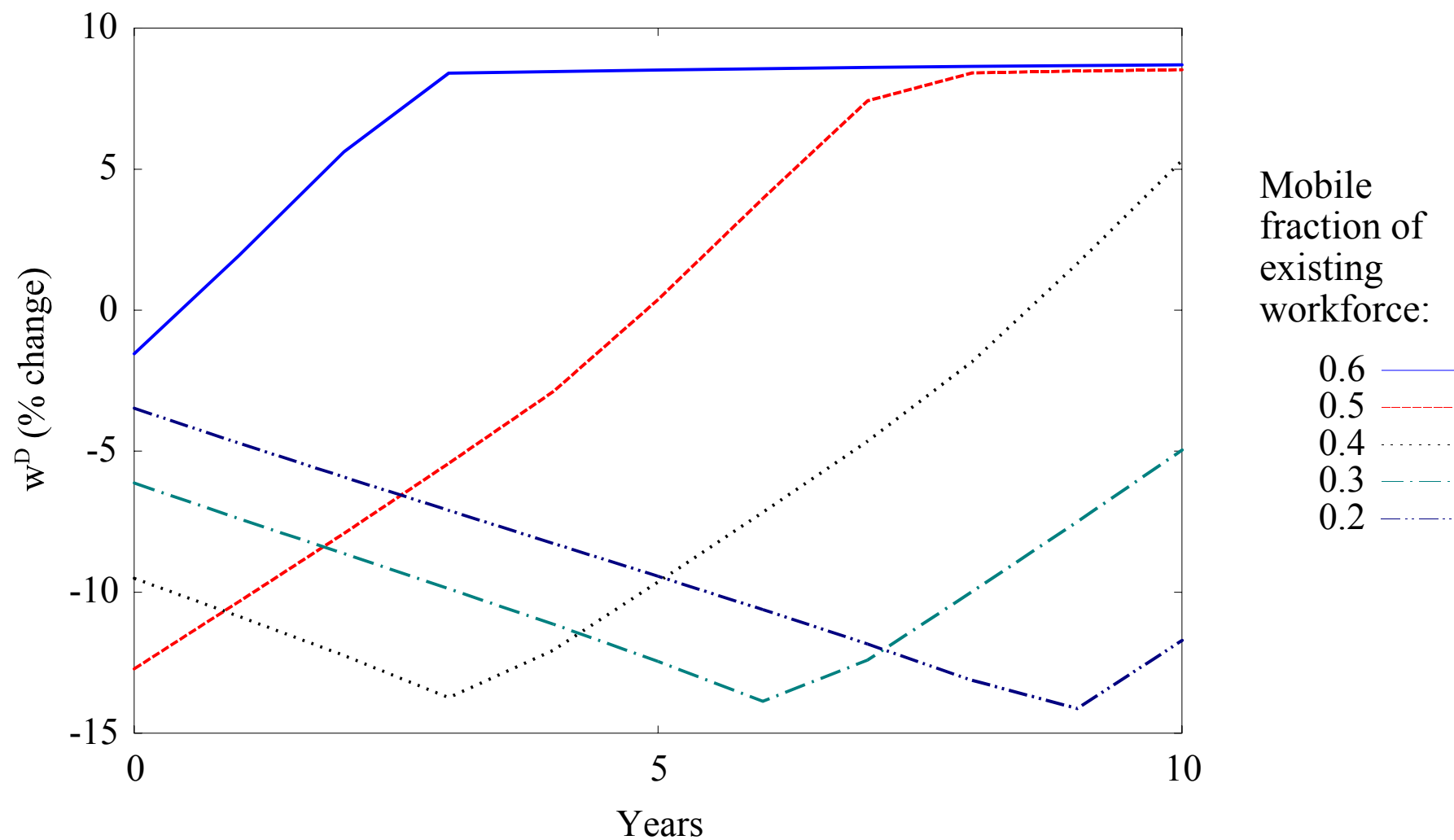
**Figure 5: Number of Firms**



**Figure 6: Net Exports**



**Figure 7: Mobility and the Wages of Skilled Workers in Domestic Sector**



## Conclusions

- FDI liberalization is ongoing, but many restrictions remain.
- Adverse effect on local skilled workers is not certain.
- Possibility of changes in comparative advantage have been illustrated.

## Future work

- Markusen and Rutherford (2002) focus on spillover effects of foreign consultants
- Jensen, Rutherford and Tarr, in progress, effects of FDI reform in a multisectoral model Russia's accession to the WTO.