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INTEGRATION: THE CASE OF  
A TRANSITION ECONOMY**

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# OUTSIDERS IN ECONOMIC INTEGRATION: THE CASE OF A TRANSITION ECONOMY

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## ABSTRACT

### Outsiders In Economic Integration: The Case Of A Transition Economy\*

We use a spatial model of endogenous growth to investigate the likely impact of discriminatory integration among two advanced insider countries on their own welfare as well as on the welfare of an outsider transition economy. A first point is that, since convergence in *per capita* income levels depends on relative market access and local market size, piece-wise integration causes insider–outsider divergence. Nonetheless, outsiders can gain in absolute terms if integration fosters the global growth rate. We also show that exclusion from a regional agreement and ongoing transition have unpredictable joint effects on the structural adjustment, which might even exhibit a swinging behaviour. Such swings may imply large adjustment costs, which can be reduced by careful integration design. In this respect, the asymmetric phasing out of trade barriers built into the Europe Agreements seems to work in the right direction.

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## NON-TECHNICAL SUMMARY

Building on recent research in economic geography, we investigate the implications of discriminatory agreements of economic and monetary integration in terms of trade, capital flows, growth and welfare from the point of view of both included and excluded economies. In particular, we model discriminatory integration as an unexpected one-time reduction of transaction costs between two developed insider countries *vis-à-vis* an outsider transition economy.

The analysis is carried out in two steps. First, we establish some general results on the absolute and relative welfare of insiders and outsiders before and after integration occurs. In so doing, we temporarily abstract from the transitional nature of the outsider. This is explicitly introduced in the second step, in which we model 'economic transition' as the removal of production inefficiencies that lead to increased factor productivity and enlarged domestic market size. Our purpose is to capture a key feature of the process of resource re-allocation away from inefficient (state-owned) activities that is at the heart of actual transition experiences.

We show that, as a consequence of discriminatory integration, a market-size effect diverts advanced-sector investments away from the outsider and towards the insiders. In the outsider, such investment diversion materializes in the reallocation of productive resources from advanced to traditional sectors and the reduction of real income *per capita* with respect to the insiders. Therefore, the model suggests a rationale for structural assistance to mitigate the outsider's relative loss; this rationale would be strengthened if the implied insider–outsider divergence could also jeopardize future enlargement projects ('self-fulfilling exclusion'). However, although the outsider always loses relative to the insiders, it might nonetheless gain in absolute terms. This happens when the discriminatory abatement of transaction costs fosters innovation and long-run growth in the global economy through a process of international specialization in the presence of positive technological externalities that are national in scope.

This framework is used to analyse the structural adjustment occurring in an outsider 'transition economy'. In order to disentangle the various effects at work, we focus on the clear-cut case of an economy that is left out of regional integration *before* its transition process takes off. Under these assumptions, we show that structural evolution undergoes two distinct phases. First, when a country is left out of the integration agreement, the effects we have already discussed hold: advanced-sector investment is diverted towards the insiders and, whenever technological externalities are not strong enough, real income falls. Second, after transition takes off, some investment flows back and the

income gap *vis-à-vis* the insiders shrinks. Therefore, due to its outsider position, the transition economy initially hosts fewer advanced-sector firms and specializes in the traditional sectors. Later, along with successful transition, net capital inflows rise and the advanced sector expands. We show that the asymmetric phasing-out of trade barriers between the integrated area and the transition economy can be used to dampen such structural fluctuations and to reduce the corresponding adjustment costs. Under this respect, the asymmetric phasing-out of trade barriers built into the Europe Agreements seems to work in the right direction. One caveat: since our model abstracts from important features that would be crucial in determining capital flows in a more general set-up, the predicted fluctuations in the direction of such flows should be interpreted as deviations from some underlying un-modelled trend.

Other findings of the model are broadly consistent with the empirical evidence on external developments in transition economies, especially those of Central Eastern Europe. First, we find that successful transition countries attract direct investment in 'advanced' industries from the developed region and that (expected) accession to an integrated area stimulates net direct investment even further. Second, the model predicts an improvement in the terms of trade as long as economic transition proceeds, which can lead to real exchange rate (RER) appreciation. However, relative to other authors, we suggest a different direction of causality for the links among relative prices, direct investment and productivity gains. While they suggest that RER appreciation, due to the release of pent-up demand for services, *drives* the transition process, in our set-up causality runs in the opposite way *from* the removal of inefficiencies, *to* net direct investment and eventually *to* the terms of trade.

## **1. Introduction**

By reducing transaction costs across members of the area, regional agreements of economic and monetary integration, have implications for trade and investment flows, as well as for growth and welfare, both in included and excluded economies (Baldwin and Venables, 1995).

The implications of preferential trade agreements for the location of economic activity and wealth have been explored in the literature on economic geography both in static (see, e.g., Fujita, Krugman and Venables, 1999) and dynamic models (Ottaviano, 1996; Martin and Ottaviano, 1999). The same models can be naturally extended to gauge the transaction-cost effects of monetary integration in that the adoption of a single currency can be viewed as reducing trade costs and exchange frictions among insiders, with potential externalities and spillovers for residents in other areas (Portes and Rey, 1998). In this literature, the geographical distribution of economic activities is determined by the interaction between economies of scale, which support the concentration of production in large markets, and trade costs, which incentivate its presence also in small ones (Ottaviano and Puga, 1998). In equilibrium, large markets host a more than proportional share of economic activity. The more so, the lower the trade costs: when the costs of overcoming distance are small, the advantage of locating in large markets gains strength.

Building on these insights, we investigate the likely impact of discriminatory integration among developed insider countries on the welfare of an outsider transition economy. The analysis is carried out in two steps. First, we establish some general results on the absolute and relative welfare of insiders and outsiders before and after integration occurs. Here, we temporarily abstract from the transitional nature of the outsider. This is explicitly introduced in the second step, in which we model 'economic transition', in a very stylized way, as the removal of production inefficiencies which leads to increased factor

productivity and enlarged domestic market size. Our purpose is to capture a key feature of the process of resource re-allocation away from inefficient (state-owned) activities that is at the heart of actual transition experiences (Castanheira and Roland, 1996; Coricelli, 1998).

The paper is in four additional sections. We start with presenting a static set-up and establishing general results about the income and welfare effects of regional integration on included and excluded countries. We conclude that, as a consequence of restricted integration, a market-size effect (Helpman and Krugman, 1985) diverts advanced-sector investments away from the outsider to the insiders inducing per capita real income in the former to fall below that of the latter. In the outsider, such investment-diversion materializes in the reallocation of productive resources from advanced to traditional sectors and in absolute wealth reduction. Therefore, the model suggests a rationale for structural assistance to mitigate the outsider's loss; this rationale would be strengthened if the implied insider-outsider divergence could also jeopardize future enlargement projects ('self-fulfilling exclusion').

In section 3 we move on to an endogenous growth model whose steady state corresponds to the equilibrium of the static set-up. Here the main message is that, under certain conditions, even the outsider can gain in terms of growth and welfare from a process of regional integration, although the welfare gains are always larger for the insiders. The key condition is that the abatement of transaction costs fosters innovation and long-run growth in the global economy through a process of international specialization.

Section 4 uses this framework to analyze the structural adjustment occurring in an outsider which is modelled as a "transition economy". In order to disentangle the various effects at work, we focus on the clearcut case of an economy which is left out of regional integration *before* its transition process takes off. Under these assumptions, we show that structural evolution undergoes two distinct phases. First, when a country is left out of the

integration agreement, the effects we have already discussed hold: advanced-sector investment is diverted towards the insiders and, whenever growth spillovers are not strong enough, real income falls. Second, after transition takes off, some investment flows back and the income gap vis-a-vis the insiders shrinks.<sup>1</sup> Therefore, due to its outsider position, the transition economy initially hosts fewer advanced-sector firms and specializes in the traditional sectors. Later, along with successful transition, net capital inflows rise and the advanced sector expands. We show that the asymmetric phasing-out of trade barriers between the integrated area and the transition economy can be used to dampen such structural fluctuations.

Section 5 summarizes the results of the paper. Two are its main insights. A first point is that, since convergence in per capita income levels depends on relative market access and local market size, piece-wise integration causes insider-outsider divergence. Nonetheless, outsiders can gain in absolute terms if integration fosters the global growth rate. We also show that exclusion from a regional agreement and ongoing transition have unpredictable joint effects on the structural adjustment, which might even exhibit a swinging behavior. Such swings may imply large adjustment costs, hence careful integration design is required: under this respect, the asymmetric phasing-out of trade barriers built into the Europe Agreements works in the right direction.

Other findings of the model are broadly consistent with the empirical evidence on external developments in transition economies, especially those of Central Eastern Europe. First, we find that successful transition countries attract direct investment in “advanced” industries from the developed region, and that (expected) accession to an integrated area stimulates net direct investment even further (see Landsbury et al., 1996; Lankes and Stern, 1998; Brenton and Di Mauro, 1998; Claessens et al., 1998). Second, the model predicts an

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<sup>1</sup> As it will become clear, our model abstracts from important features that are crucial in determining capital flows in a more general set-up. Hence, the fluctuations in the direction of capital flows it implies should be interpreted as deviations from some underlying unmodelled trend.



improvement in the terms of trade as long as economic transition proceeds, which can lead to real exchange rate (RER) appreciation (see Halpern and Wyplosz, 1997). However, we suggest a different causality for the links among relative prices, direct investment and productivity gains, relative to other authors (see Grafe and Wyplosz, 1997). While they suggest that RER appreciation, due to the release of pent-up demand for services, *drives* the transition process, in our set-up causality runs in the opposite way *from* the removal of inefficiencies, *to* net direct investment and eventually *to* the terms of trade.

## **2. Static effects of trade and monetary integration and isolation**

Let us start with the welfare effects of the creation of an economic and monetary union (henceforth, EMU) for included and excluded countries. We treat the abatement of trade barriers and the introduction of a single currency as a reduction in transaction costs within a regional agreement.

Our model builds on the ‘new trade theory’ (Helpman and Krugman, 1985) which allows for increasing returns to scale and imperfect competition. In particular, it relates to the literature on the ‘new economic geography’ (Krugman, 1991a and 1991b; Fujita, Krugman and Venables, 1999) which formalizes the intuitive argument according to which, as trade barriers go down, one should expect firms in increasing-returns-to-scale sectors to relocate to the biggest national markets (‘home-market effect’). Most results in this literature are derived in simple settings in which firms can only choose between two locations. Drawing on previous work by Ottaviano (1996) and Martin and Ottaviano (1999), we address this issue in different terms. First, we adopt a multi-country framework to study the effects of an EMU on the international allocation of resources. Second, and we believe more important, we move in Section 3 to a dynamic setting in which resources are endogenously

accumulated, rather than given forever. As we will show, this turns out to be relevant when drawing welfare implications for both insiders and outsiders.

We develop a stylized model in which there are two sectors, three countries and two factors. Sectors differ in terms of relative factor intensities and we call ‘advanced’ the relatively capital intensive one. Factor mobility is assumed to be partial: labor is freely mobile between sectors in the same location but internationally immobile; capital is freely mobile between countries. The general result is that, when an EMU is created, return to capital will become higher inside the integrated countries (the ‘insiders’) with respect to the isolated one (the ‘outsider’). This will cause capital to leave the latter in order to be invested in the former thus leading to a contraction of advanced activities in the outsider and a corresponding expansion in the insiders.

For the sake of simplicity, we start from an initial symmetric situation of three identical countries with the same fixed endowments of labor ( $L$ ) and capital ( $N/3$ ). The supply side consists of two highly stylized sectors, where entry and exit are free.

## **2.1. The ‘traditional’ sector**

The first sector produces a homogeneous ‘traditional’ good with constant returns to scale and perfect competition, using labor as the only input with a unit labor requirement equal to one. Furthermore, for analytical convenience, we assume no transaction costs of international trade in the traditional sector. This is clearly an oversimplification, but one that is commonly adopted in economic geography models; moreover, introducing trade costs in the traditional sector does not generally lead to qualitative different results (see, Fujita et al., 1999, chapters 5 and 7).

Under these assumptions the traditional good will be priced at marginal cost. Given that only labor is used in its production and the unit input requirement is

one, in each country the traditional good price will be equal to local wages. However free trade will ensure that the wage will be the same across countries as long as each country produces the traditional good. This will be the case if global demand of the traditional good cannot be satisfied by a single country alone which is henceforth assumed. Finally, by choosing labor as the numeraire, the price of the traditional good and the wages will be equal to one in every country.

Of course, the last result is generally counterfactual and removes one of the relevant factors affecting firms' location choices. However, this simplification is useful in order to focus on other factors, namely transaction costs and economies of scale, that seem more relevant in those capital-intensive industries that attract the bulk of international direct investment.

## **2.2. The 'advanced' sector**

The second sector supplies a horizontally differentiated 'advanced' good with increasing returns to scale and monopolistic competition, using both labor and capital. Each variety of the differentiated good has a linear cost function (for further details, see Martin and Ottaviano, 1999, p.285): variable costs are paid in terms of labor with a unit input requirement equal to  $\beta$ . Fixed costs are paid in terms of capital whose unit input requirement is set to one so that the number of active firms in a given location is equal to the capital endowment. Since a unit of capital is required to produce each variety, but the scale of production is determined by the input of labor, we have increasing returns to scale in the production of each variety. Assuming zero costs of product differentiation is enough to ensure a one-to-one relation between varieties and firms (hence capital) in each country, namely all scale effects work through the number of available varieties as in most of the 'new geography' models (see for instance Fujita et al., 1999, p. 52).

International trade costs in the ‘advanced’ sector are modelled following Samuelson (1954) as ‘iceberg’ costs: to sell a unit of the differentiated good from one country to another more than one unit have to be sent. This ‘erosion’ is due to the resources absorbed by tariffs, transport and other transaction costs (for instance, foreign exchange costs). Let  $\tau > 1$  be the number of units to be sent for one unit to arrive from one EMU member to the other, and  $\tau' > 1$  from (to) a insider to (from) the outsider. It is as if  $\tau - 1$  ( $\tau' - 1$ ) units of the good melt away because of frictions: this is equivalent to assume that trade costs are paid in terms of the transported good.

### 2.3. Preferences, pricing and the equilibrium location of firms

Consumers’ preferences are nested C.E.S. (Dixit and Stiglitz, 1977):

$$U = D^\alpha Y^{1-\alpha} \quad D = \left[ \sum_{i=1}^{N(t)} D_i^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} \quad (1)$$

where  $\sigma > 1$  is the elasticity of substitution between any two varieties and the elasticity of demand for each variety of the advanced good,  $D_i$  is the consumption of the  $i$ -th variety,  $D$  is the C.E.S. quantity index or aggregator,  $Y$  is the consumption of the traditional good and  $0 < \alpha < 1$  is the share of expenditure devoted to the differentiated good.

Because of monopolistic competition the varieties of the differentiated good will be priced according to the standard mark-up rule over marginal costs:

$$p = \frac{\beta\sigma}{\sigma-1} \quad (2)$$

where  $p$  is the domestic price of any variety and we have used the fact that, as stated before, the price of the traditional good (and, thus, the wage rate) is constant and equal to one in each country. With free entry and exit profits have to be zero in equilibrium. Together with free international capital mobility, this determines the worldwide return to capital, say  $r$ , as the residual value of sales after labor costs (i.e. operating profits):

$$\pi = \frac{\beta x}{\sigma - 1} \quad (3)$$

where  $x$  is the scale of production, i.e., the output of each variety, which is therefore the same for all firms no matter where they are located.

In equilibrium the supply of each variety  $x$  must equal its demand (inclusive of trade costs). For an insider this means:

$$x = \frac{\alpha(\sigma - 1)}{\beta\sigma N} \left[ \frac{(1 + \delta)EL}{(1 + \delta)\gamma + \delta'(1 - 2\gamma)} + \frac{\delta'EL}{2\delta'\gamma + (1 - 2\gamma)} \right] \quad (4)$$

where the two terms inside the brackets come respectively from insiders' and outsider's demand and  $\gamma$  is the share of advanced firms located in one of the identical insider countries. A similar condition holds for the outsider:

$$x = \frac{\alpha(\sigma - 1)}{\beta\sigma N} \left[ \frac{2\delta'EL}{(1 + \delta)\gamma + \delta'(1 - 2\gamma)} + \frac{EL}{2\delta'\gamma + (1 - 2\gamma)} \right] \quad (4)'$$

Equations (4) and (4)' can be solved together for  $x$  and  $\gamma$  to find their equilibrium values. As to the scale of production, this yield:

$$x = \alpha L \frac{\sigma - 1}{\beta\sigma} \frac{3E}{N} \quad (5)$$

which, given (2), shows that the global revenues of the ‘advanced’ sector ( $Npx$ ) equal the ‘advanced’ share  $\alpha$  of total world expenditures ( $3LE$ ):  $Npx=3\alpha LE$ . Moreover, given (3), it also implies that the world rate of return on capital is  $\sigma = 3\alpha LE/(\sigma N)$ .

As to the location of firms, we obtain:

$$\gamma = \frac{(1-2\delta'+\delta)-\delta'(1-\delta')}{3(1-2\delta'+\delta)(1-\delta')} \quad (6)$$

where  $\delta = \delta(\gamma)$  and  $\delta' = \delta'(\gamma)$  are inverse functions of the trade costs.

Equation (6) can be used to shed light on the location effects of an EMU between two of the three countries. It is useful to start with a situation of perfect symmetry in which  $\delta = \delta'$  so that  $\gamma = 1/3$ . As expected, equation (6) entails a uniform initial distribution of firms among countries with  $\gamma = 1/3$ . In this stylized economy the impact of an EMU is modelled as a one-off reduction in the frictional costs of trade between the insiders. Formally, this is equivalent to a reduction in  $\delta$  and an increase in  $\delta'$  while holding  $\gamma$  constant, which in turn alters the distribution of firms among countries:

$$\left. \frac{\partial \gamma}{\partial \delta} \right|_{\delta=\delta'} = \frac{1}{3} \frac{\delta'}{(1-2\delta'+\delta)^2} \Big|_{\delta=\delta'} = \frac{1}{3} \frac{\delta}{(1-\delta)^2} > 0 \quad (7)$$

Hence, starting from an initial situation where all countries face the same obstacles to trade, an EMU between the two insiders induces a capital flow from the outsider to the insiders so that the number of advanced-sector firms increases in each of the insiders and falls in the outsider.

The intuition is the following. As transaction costs fall inside the integrating area, its consumers demand more of the now cheaper insider products and less of the now more expensive outsider ones. As a result, at the initial symmetric

situation, insider firms start enjoying higher returns to capital than outsider firms. This triggers capital flows towards the integrated area that cause firms' death in the outsider and birth in the insiders.

As a further comment, it can be noticed that the absolute value of the impact in (7) is decreasing in  $\tau$ , in  $\tau'$  and  $\tau''$ . It is decreasing in the trade costs between the insiders because high trade costs make it difficult to supply the insiders' markets from a single location. It is decreasing in the trade costs between the insiders and the outsider because location in the integrated area is less attractive the more difficult it is to supply the isolated country from the integrated area. Finally, it is decreasing in the elasticity of substitution between differentiated products because the more substitutable these products are the easier it is for a consumer in the excluded country to substitute cheaper domestic varieties for more expensive foreign ones. As pointed out by Krugman (1991b), the elasticity of substitution  $\sigma$  can also be seen as an inverse index of the equilibrium degree of returns to scale. Therefore one can read the former result as stating that location in the insiders is more attractive the stronger the returns to scale, namely the larger the cost savings (losses) that would be incurred by firms in the integrated (excluded) market through scale expansion if entry (exit) were not allowed for.

With respect to welfare, integration represents an improvement for the insiders for two reasons. First, for a given international distribution of the increasing-returns-to-scale sector, insiders pay lower trade costs on each other's products and this is a *direct* cost saving effect. Second, because an EMU shifts plants from the outsider to the insiders, insiders have to import fewer varieties from the outsider and this represents an *indirect* cost saving effect of the EMU. For the outsider, the direct effect is of course null while the indirect effect is adverse since, due to relocation, more products have to be imported with a rise in transaction costs leading to a fall in real income.

Therefore, our static setting has two strong implications: *first*, per capita real income in the outsider diverges relative to the insiders; *second*, piece-wise integration is always welfare-reducing for the excluded country. However, it can be shown that the latter is not necessarily true when we move to a dynamic setup in which integration not only redistributes *given* resources among countries but also affects the rate of accumulation of resources hence long-term growth.

### 3. Integration, isolation and long-run growth

#### 3.1. The dynamic set-up

To analyze the implications for long-run growth, our analytical framework must be enriched to allow for ongoing capital accumulation. We assume that the typical consumer maximizes an intertemporal utility function which is equal to the discounted flow of instantaneous utility. Such instantaneous utility is modeled as a monotone transformation of that in equation (1). Assuming unit elasticity of intertemporal substitution, the intertemporal utility function is:

$$U = \int_0^{\infty} \log D(t)^{\alpha} Y(t)^{1-\alpha} e^{-\rho t} dt \quad D(t) = \left[ \sum_{i=1}^{N(t)} D_i(t)^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} \quad (8)$$

where, apart from the introduction of the time variable  $t$  and the rate of time preference  $\rho$ , the definitions of the other variables and parameters are the same as before.

The main differences come from the supply side. Drawing on Grossman and Helpman (1991), accumulation of capital is assumed to take place through R&D modeled as a costly, perfectly competitive activity that produces new capital using labor as the only input. Entry and exit are free in the R&D sector.



In each country the labor unit input requirement in R&D is  $\frac{1}{N}$  divided by the number of local firms of the advanced sector (in other words, the stock of resident capital). This is aimed at capturing the presence of a local technological spillover between plants and labs that will sustain long run endogenous growth (Martin and Ottaviano, 1999). To be consistent with the previous analysis we assume that all countries are initially identical.

This specification of the mechanics of accumulation does not affect the instantaneous ('short-run') dimension of the model hence all the above results apply. As to the solution of the dynamics, it can be noticed that this model is essentially a so-called 'AK-model' and therefore jumps immediately to a steady growth path. Along this equilibrium path, both the global and the national capital stocks grow at a constant rate ( $g$ ) and location ( $\gamma$ ) does not change. Since all the future of this economy is embedded in the initial value of a unit of capital ( $v_0$ ), to find  $g$  one has to solve the following system under the assumption of a constant growth rate of  $N$ :

$$v_0 = \int_0^{\infty} \pi e^{-\rho t} dt \quad (9)$$

$$v_0 = \frac{\eta}{\gamma N_0} \quad (10)$$

$$3EL = 3L + \frac{\rho\eta}{\gamma} \quad (11)$$

The first equation states that the value of a unit of capital is equal to the discounted flow of the operating profits of the corresponding firm. The second is the zero-profit condition in the R&D sector: the benefit and the cost of R&D have to be equal in equilibrium. As we argue later, in equilibrium all R&D activities concentrate in the larger market because of the stronger localized spillover due to the larger share of advanced-sector firms; therefore, the costs

of innovation are decreasing in number of the *world* firms but according to a factor of proportionality equal to the share of firms in *insider* countries. The third equation states that total expenditure is equal to total factor permanent income. Together with (3) and (5), these three equations imply that the equilibrium rate of growth of  $N$  is:

$$g = \frac{3L}{\eta} \frac{\alpha}{\sigma} \gamma - \left( \frac{\sigma - \alpha}{\sigma} \right) \rho \quad (12)$$

while the equilibrium location of firms is still determined by equation (6).

Equation (12) re-states a standard result (see Grossman and Helpman, 1991) according to which the equilibrium growth rate is increasing in the world stock of labor ( $3L$ ), the expenditure share of the differentiated good (###) and the degree of increasing returns to scale (a negative function of ### as already argued), while it is decreasing in the cost of innovation (####) and the rate of time preference ###.

In addition, equation (12) shows the importance of location which is peculiar to our model. All the rest equal, the equilibrium growth rate is *increasing* in the share of industrial firms in an insider ###. The reason why is the following: because of free trade in the traditional good, wages are the same everywhere, and this makes spillover intensity the only relevant cost dimension for R&D location. Before piece-wise integration takes place, when trade costs are the same between any locations, the increasing-returns-to-scale sector is evenly split among countries. As a result, both the spillover intensity and the cost of innovation are the same in all countries: R&D activities are evenly spread too. After integration occurs, firms relocate to the insider countries. This enhances spillover effects in the insiders while reducing them in the outsiders: as a consequence, the cost of innovation becomes lower in the insiders and all R&D activities concentrate there because of free entry and exit. Therefore, by

inducing spatial concentration of the advanced sector in the insiders, the EMU *reduces* the global cost of R&D and *fosters* growth in every region. In reality, one would not expect such a dramatic effect on R&D location; nonetheless, even partial relocation of R&D would not change the basic insight of these results.

### 3.2. Welfare comparisons

We showed how an EMU causes firms in the advanced sector to move production to insider countries. This enhances the innovation spillover in those countries and makes innovation more costly in the outsider. Consequently, *all* R&D labs move to the insiders. What really matters is that an asymmetric geographical distribution of the ‘advanced’ sector allows a better exploitation of localized (national) spillovers and lowers innovation costs. From a welfare point of view, the outcome is twofold. On one hand, as it is cheaper to produce new capital by innovation, the value of the initial stock of capital (i.e. the value of the initially existing firms) drops and this implies a negative welfare effect for everybody. On the other hand, lower R&D costs raise the incentive to innovate thus fostering growth in *every* country.

To investigate under which circumstances negative or positive welfare effects will eventually dominate, additional formal analysis is required. The chosen welfare measure is the present value of indirect utility flows in a insider ( $V$ ) or in the outsider ( $V^*$ ). Instantaneous indirect utility is equal to the logarithm of factor incomes divided by the relevant (‘exact’) price indexes that correspond to the instantaneous utility (1). They are:

$$P = \left\{ \frac{\beta\sigma}{\sigma-1} N[(1+\delta)\gamma + \delta'(1-2\gamma)] \right\}^{\frac{\alpha}{1-\sigma}} \quad (13)$$

for each insider and

$$P^* = \left\{ \frac{\beta\sigma}{\sigma-1} N [2\delta'\gamma + (1-2\gamma)] \right\}^{\frac{\alpha}{1-\sigma}} \quad (13)'$$

for the outsider (see, for details, Fujita et al., 1999, p.50).

Since only the profits of firms already existing at time 0 are pure rents, we can write  $V(V^*)$  as:

$$V = \frac{1}{\rho} \ln \left\{ \alpha^\alpha (1-\alpha)^{1-\alpha} \left( 1 + \rho \frac{\eta}{\gamma N_0} \frac{h_0}{L} \right) \left( \frac{\sigma-1}{\beta\sigma} \right)^\alpha N_0^{\frac{\alpha}{\sigma-1}} [(1+\delta)\gamma + \delta'(1-2\gamma)]^{\frac{\alpha}{\sigma-1}} e^{\frac{\alpha g}{\rho(\sigma-1)}} \right\} \quad (14)$$

$$V^* = \frac{1}{\rho} \ln \left\{ \alpha^\alpha (1-\alpha)^{1-\alpha} \left( 1 + \rho \frac{\eta}{\gamma N_0} \frac{h_0^*}{L} \right) \left( \frac{\sigma-1}{\beta\sigma} \right)^\alpha N_0^{\frac{\alpha}{\sigma-1}} [2\delta'\gamma + (1-2\gamma)]^{\frac{\alpha}{\sigma-1}} e^{\frac{\alpha g}{\rho(\sigma-1)}} \right\} \quad (14)'$$

where  $h_0$  and  $h_0^*$  are the initial endowments of capital owned by residents in each country. To guarantee that individual expenditures  $E$  are the same across countries as previously assumed, we need  $h_0$  and  $h_0^*$  to take the same value so that  $N_0 = 3h_0$  (for further details, see Martin and Ottaviano, 1999). Differencing with respect to  $\delta$  starting from an initial situation of perfect symmetry in which  $h_0 = h_0^*$  so that  $N_0 = 3h_0 = 3h_0^*$ , one obtains:

$$\frac{\partial V}{\partial \delta} = \frac{1}{\rho} \left[ -\frac{3\rho\eta}{[L + \rho\eta]} \frac{\partial \gamma}{\partial \delta} + \frac{\alpha}{\sigma-1} \frac{1}{1+2\delta} + \frac{\alpha}{\sigma-1} \frac{3(1-\delta)}{1+2\delta} \frac{\partial \gamma}{\partial \delta} + \frac{3\alpha^2 L}{\eta\sigma\rho(\sigma-1)} \frac{\partial \gamma}{\partial \delta} \right] \quad (15)$$

$$\frac{\partial V^*}{\partial \delta} = \frac{1}{\rho} \left[ -\frac{3\rho\eta}{[L + \rho\eta]} \frac{\partial \gamma}{\partial \delta} - \frac{\alpha}{\sigma-1} \frac{6(1-\delta)}{1+2\delta} \frac{\partial \gamma}{\partial \delta} + \frac{3\alpha^2 L}{\eta\sigma\rho(\sigma-1)} \frac{\partial \gamma}{\partial \delta} \right] \quad (15)'$$

where we substituted for the value of  $g$  given by (12).

The four terms on the right hand side of the insider expression are respectively:

(i) the 'firm's value effect' by which relocation in the presence of spillovers

negatively affects the value of the initial stock of capital; (ii) the (direct) ‘trade cost effect’ by which integration reduces the prices of imported varieties from the insider for a given spatial distribution of firms; (iii) a positive ‘relocation effect’ by which, for given prices, integration shifts firms towards the insiders decreasing their price indexes (while increasing that of the outsider); (iv) the ‘growth effect’ by which integration through relocation affects the speed of invention. In the case of the outsider, the terms are respectively: (i) the firm's value effect; (ii) a negative relocation (or ‘delocalization’) effect; (iii) the growth effect. As already argued, the outsider is not *directly* affected by a transaction-cost reduction occurring between the insiders.

Equations (15) and (16) are cumbersome. Nonetheless two important results can be readily assessed. First, since  $\frac{V}{\tau}$  is always larger than  $\frac{V^*}{\tau}$ , if an EMU is welfare-improving for the outsider *a fortiori* it is has to be welfare-improving for the insiders. In other words, it is always the insider that gains more from an EMU. Second, all the rest being constant, one can see that the outsider gains if the initial level of trade frictions ( $\tau$ ) is low enough and if returns to scale are strong enough (low  $\tau$ ). Under such circumstances the impact of an EMU on the location of firms is strong but, because of low trade costs, the related welfare losses for the outsider are limited. Moreover, independently from the value of  $\tau$ , when  $\tau$  is low the positive impact of relocation on growth is strong too. Consequently the overall effect of an EMU on the outsider's welfare *can* be positive.

Notice however that, even if it gains in absolute welfare terms from the creation of an integrated area, the outsider always loses in *relative* terms with respect to the members of the economic and monetary union. This is true both in welfare and in real-income terms: therefore, as stated in section 2, this model predicts *absolute* divergence in per capita income between insiders and outsiders. We explore in the next section the possibility of mitigating the outsider's income loss due to piece-wise integration. In so doing, we focus on the special case of a

‘transition’ economy outside the EMU.

#### **4. Location and terms-of-trade effects of economic transition**

In this section we extend our framework to encompass the case where the outsider is a ‘transition’ economy. We showed in sections 2 and 3 that, although it may gain in absolute terms if growth spillovers are strong enough and trade costs not too high, an outsider always loses relative to insiders in terms of per capita income levels. This has potentially heavy consequences as it suggests that piece-wise integration generates divergence between insiders and outsiders: this possibly makes the future accession of an outsider more problematic, as a further enlargement could involve a larger redistribution of income or welfare between old insiders and newcomers. We draw on these intuitions to investigate the special case of a transition economy which is left out of the EMU. In particular, we study how the advancement of transition affects the geographical distribution of economic activities, the outsider’s terms of trade, and the income gap between the insiders and the outsider.

Even within our stylized model, there are several parameters that could be used to model ‘transition’. For instance, one could think of introducing *domestic* transaction costs related to the mis-functioning of markets in transition economies (a sort of internal ###); or alternatively, one could set higher fixed costs in the advanced sector. We choose instead to define a ‘transition economy’ (TE) as an economy where poor enforcement of property rights, high administrative and bureaucratic costs, and widespread corruption abate average labor productivity; the ‘transition process’ involves the removal of these obstacles to the rise of labor productivity. This definition builds on the traditional modeling of transition as a process of resource reallocation from state-owned to private enterprises (see, among others, Castanheira and Roland, 1996; and Coricelli, 1998, chapter 3), while it departs from Halpern and

Wyplosz (1997) who suggest that, during transition, the quality of domestically produced tradables improves and their prices on world markets rise. More specifically we assume that, because of inefficiencies and rent-seeking activities, unit labor productivity is proportionally smaller in TEs relative to market economies in both productive sectors. Successful transition leads to the progressive removal of this sort of inefficiencies, which is equivalent to assume that the *size* of the workforce in the TE ( $L^{TE}$ ) is initially curbed relative to the potential that could be attained if all distortions were eliminated. In other words,  $L$  now measures efficiency units instead of the mere number of workers and we call  $L^{TE}$  the ‘size’ of the TE. Then, ‘transition’ is represented by rising  $L^{TE}$  and it ends when  $L^{TE}$  reaches the insider value  $L^{INS}$ .

To assess the impact of transition on firms’ location, first we need to write the system that corresponds to (4) and (4)’ after allowing for different country sizes:

$$x = \frac{\alpha(\sigma - 1)}{\beta\sigma N} \left[ \frac{(1 + \delta)EL^{INS}}{(1 + \delta)\gamma + \delta'(1 - 2\gamma)} + \frac{\delta'EL^{TE}}{2\delta'\gamma + (1 - 2\gamma)} \right] \quad (16)$$

$$x = \frac{\alpha(\sigma - 1)}{\beta\sigma N} \left[ \frac{2\delta'EL^{INS}}{(1 + \delta)\gamma + \delta'(1 - 2\gamma)} + \frac{EL^{TE}}{2\delta'\gamma + (1 - 2\gamma)} \right] \quad (16)'$$

Then, we need to solve it for  $\gamma$  and, finally, to differentiate the result with respect to  $L^{TE}$ . This gives:

$$\frac{\partial \gamma}{\partial L^{TE}} = - \frac{1 + \delta - 2(\delta')^2}{(1 - \delta')(1 + \delta - 2\delta')} \left[ \frac{L^{INS}}{(2L^{INS} - L^{TE})^2} \right] \leq 0 \quad (17)$$

where the sign derives from the fact that  $L^{TE} \leq L^{INS}$  and  $\delta' \leq \delta \leq 1$ . Equation (17) shows that successful transition, through its effect on efficiency hence on the size of a TE, leads to a new distribution of firms with more

varieties of the differentiated good now produced in the outsider TE. This in turn implies that per capita real income increases in the outsider *beyond* the rate involved by the pure efficiency gain: in other words, the transition process involves faster convergence of the TE in this model with respect to a ‘benchmark’ situation of non-increasing-returns-to-scale technologies. This is due to the enlargement of the domestic market that triggers capital inflows and a relocation of firms in the ‘advanced’ sector. The marginal impact on the *growth rate* could be negative in the case of localized spillovers because production in the advanced sector is more dispersed after transition is completed; nonetheless, welfare improves in the TE provided the discount rate is large enough (see equations (15) and (15)').

Interestingly, in our model the increase in per capita income occurs along with an improvement in the *terms of trade* of the TE, which is a feature of the post-1990 experience of the most successful among Central Eastern European countries (see table 1). Notice that the outsider is a *net exporter* of the traditional good, and a *net importer* of the differentiated good: the relative price of this two sets of products then represents the outsider’s ‘exact’ terms of trade, in analogy with the concept of ‘exact price index’ mentioned above. As the price of the traditional good, say  $p_T$ , is fixed to 1 by the choice of the numeraire, a decline in the price of the differentiated good in the outsider corresponds to an *improvement* in its terms of trade, and viceversa.

Let us define the outsider’s exact terms of trade ( $\Phi^*$ ) as:

$$\Phi^* = \left( \frac{p_T}{P^*} \right) = \frac{1}{P^*} \tag{18}$$

where  $P^*$  is the exact price index (13)’.

After controlling for the secular decline in the price of advanced goods due to



the introduction of new varieties (i.e., holding  $N$  fixed), one can check that the outsider's terms of trade *improve* as  $\gamma$  declines:

$$\frac{\partial \Phi^*}{\partial \gamma} = -\frac{2\alpha(1-\delta')}{\sigma-1} \left( \frac{\beta\sigma}{\sigma-1} N \right)^{\frac{\alpha}{\sigma-1}} [2\delta' + \gamma + (1-2\gamma)]^{\frac{\alpha}{\sigma-1}-1} \leq 0 \quad (19)$$

where the sign is due to the fact that  $\delta' \leq 1$ .

Hence, the improvement in  $\Phi^*$  is a side-effect of the rise in the share of firms producing differentiated goods which decide to relocate in the outsider as transition proceeds. This in turn suggests that fastening the transition process can be a remedy against exclusion from the EMU, as it enlarges the outsider's domestic market, triggers direct investment from abroad in the advanced sector and reduces the TE's income gap vis-a-vis the insiders. A possible drawback is that the global growth rate may diminish in the case of localized (national) innovation spillovers. In any case, per capita real income in the TE converges towards those of the insiders at a faster rate than what the mere efficiency gains would suggest.

The above results show how the structural changes induced by the exclusion from the integration process are later (partially) reversed by successful transition. Therefore, if structural adjustment is costly, resources are wasted along the way. We argue that the asymmetric phasing-out embodied in the Europe Agreements provides an effective way to control for that waste. By those agreements, transition economies are allowed to remove their trade barriers with the European Union (EU) at a slower pace than EU members commit to do with them. In terms of our model, it is readily shown that asymmetric phasing-out reduces capital outflows from the transition economy and therefore the extent of structural adjustment.

The easiest way to convey the message is to consider an initial situation where all countries have the same size ( $L^{TE}=L^{INS}$ ) and insiders unilaterally lower their

external barriers from  $\tau'$  to  $\tau''$  so that trade flows to the EMU incur a cost  $\tau''$  while trade flows towards the outsider incur a higher cost  $\tau'$ . For a marginal change, the impact is the following:

$$\left. \frac{\partial \gamma}{\partial \delta''} \right|_{\delta''=\delta'} = -\frac{1}{3} \frac{1+\delta}{(1+\delta-2\delta')^2} < 0 \quad (20)$$

and its sign reveals that asymmetric phasing-out indeed reduces the capital outflows from the outsider triggered by piece-wise integration.

An effective way to convey this idea is embodied in Figure 1. It depicts the share of firms located in an insider economy ( $\gamma$ ) as a function of time. Time covers a period during which the outsider undergoes three major events: exclusion from an EMU, subsequent accession, and transition. For the sake of neatness and of some wishful realism, the three events are shown to happen sequentially and the time span is artificially divided in three corresponding subperiods: piece-wise integration comes first, transition follows and enlargement concludes. The solid curve depicts the evolution of  $\gamma$  through the three subperiods. It shows that the share of firms in an insiders first goes up due to piece-wise integration, thus exacerbating the initial discrepancy between the insiders and the outsider. Then, as the transition process takes off, the gap is reduced and eventually it disappears as a consequence of enlargement. Although one could argue that in reality there were no significant direct investment from transition to industrial countries at the beginning of transition, our story can be viewed as approximately matching the post-1990 experience if one considers that a large number of (inefficient) firms in increasing-returns-to-scale sectors were shut down in Central Eastern Europe, and they were not initially replaced by new more efficient firms. At the same time, the international specialization of those countries shifted towards “traditional”

labor-intensive sectors, and capital flight from transition to industrial countries was substantial.

The dotted curves represent two possible paths that the adjustment might follow under asymmetric phasing-out (a.p.o.). The lower curve is attained for wider gaps between insiders' and outsiders' import duties. Such curves show how asymmetric phasing-out can be used to dampen wasteful swings along the process of structural adjustment.

## **6. Concluding remarks**

We have shown that, due to investment diversion, piece-wise integration leaves the outsider in a worse position than insiders. Although even the excluded country can gain in absolute welfare terms - if the growth effects of integration are strong and insider-outsider trade costs are low - this is nonetheless associated with per capita income divergence, which might make it more difficult for the outsider to join in at a later stage ('self-fulfilling exclusion').<sup>2</sup>

When the excluded country is a transition economy, we have shown that the removal of inefficiencies enlarges the size of the isolated economy, attracts direct investments and reduces the insider-outsider income gap. Of course, the interpretation of this finding must be careful: for instance, whenever the transition process involves a peak in the rate of unemployment, the size of the economy may actually shrink before enlarging so that our results could be initially reversed (Castanheira and Roland, 1996; Coricelli, 1998). Thus, simultaneous exclusion from the integration process and ongoing transition have unpredictable effects on the structural adjustment, which might even exhibit a swinging behavior. Since in practice such swings imply large

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<sup>2</sup> Overall, our analytical findings are consistent with the numerical results by Baldwin, Forslid, and Haaland (1995, 1996) who simulate the effects of 1992 Single Market on investment creation and diversion in insiders and EFTA outsiders.

adjustment costs, careful integration design is required. Like other authors, but for a slightly different reason (see, e.g., Baldwin, 1999, p.273), we conclude that the asymmetric phasing-out of trade barriers built into the Europe Agreements works in the right direction.

Other interesting results of the model can be related to the literature on the external developments of TEs, especially in Central Eastern Europe. First, we have found that transition triggers a net inflow of direct investment from the integrated developed region. This seems to be consistent with the empirical literature on Central Eastern Europe, which shows that direct investment from the European Union has been disproportionately directed towards successful transition countries where the dimension of the domestic market has grown (see Landsbury et al., 1996; Lankes and Stern, 1998; Brenton and Di Mauro, 1998). The model also formalizes the idea that accession in an integrated area stimulates net direct investment: in fact, a common finding of the empirical literature on direct investment in TEs is that *even* perspective EU accession raises capital inflows (Claessens et al., 1998; Lankes and Stern, 1998).

Second, as far as the terms of trade are concerned, Halpern and Wyplosz (1997, p.455) argue that, as a result of successful economic transformation, labor productivity gains and terms-of-trade improvements have been amongst the channels of real exchange rate (RER) appreciation in transition countries. While their argument rests on quality and marketing improvements, we have shown that a similar effect arises due to the location implications of increasing returns and trade costs.

Third, in terms of the links among relative prices, direct investment, and productivity gains, our model stresses a direction of causality which differs from the one pointed out by Grafe and Wyplosz (1997). While for those authors RER appreciation, due to the release of pent-up demand for services, *drives* the transition process - defined as the re-allocation of labor from the inefficient state sector to newly established private firms - in our set-up causality runs in

the opposite direction *from* the removal of inefficiencies, *to* net direct investment and eventually *to* the terms of trade. In Grafe and Wyplosz (1997), RER appreciation raises the real wage in a TE and therefore progressively crowds out the state sector (what the authors call a “reverse Balassa-Samuelson effect”); here it is the removal of pre-transition inefficiencies that triggers net direct investment in the increasing-returns-to-scale sector. This matches the general observation that economic and political distortions seem to affect the allocation of foreign capital to transforming economies (see for instance Manzocchi, 1999, chapter 6). Net investment in the advanced sector, in turn, yields a terms-of-trade improvement which is consistent with a tendency towards RER appreciation, although in this paper we do not elaborate further on this point.

Future research should build on the complementarity between these two visions of the links among relative prices, direct investment, and productivity gains in transition: for instance, improvements in property rights enforcement or in anti-corruption provisions can lead to foreign investment and to a rise in the terms of trade, and this in turn may crowd out production units in the public sector (a sort of virtuous transition circle).

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**Table 1 - Progress in transition and terms-of-trade dynamics in Hungary and Poland**

<b>Hungary</b>	1990	1991	1992	1993	1994	1995	1996	1997
Index of reform progress (§) (#)	0.57	0.74	0.78	0.82	0.86	0.86	0.91	0.91
Terms of trade (*)	1	0.89	0.89	0.92	0.94	na	na	na
<b>Poland</b>								
Index of reform progress (§) (#)	0.68	0.72	0.82	0.82	0.86	0.84	0.86	0.88
Terms of trade (*)	1	0.88	1	1.07	1.09	1.17	1.08	1.08

(§) Over 1990-94, defined according to De Melo M., Denizer C., Gelb A. (1996), From plan to market: patterns of transition, World Bank Research Paper n.1564, Washington DC.

(#) Over 1995-97, defined as the ratio of average country score to full transition score according to the EBRD's Transition Report indicators.

(\*) Defined as the ratio of export to import prices (equal to unity in 1990). Source: International Financial Statistics, IMF, Washington DC.



Figure 1 – Structural adjustment

