

# Regional Integration and Growth in Developing Nations

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## **Abstract**

This paper explores the growth implications of regional integration. From the theory, it identifies the ‘footprints’ that such growth should leave in the data. It then checks the data on the four poor EU nations for such footprints. *Prima facie* evidence for Ireland, Portugal and Spain support the notion that EU membership induced investment-led growth, but Greek data reject it. This suggests that the integration of relatively poor nations into a rich trading bloc favoured the poor nation’s investment rates, however this was not strong enough to overcome poor macroeconomic management and market rigidities (which were features of the Greek case). (JEL Classification: F43, O4, F15)

## **I. Introduction**

Growth in per-capita income requires accumulation of physical capital

(machines, etc.), human capital (skills, training, education, etc.) and/or knowledge capital (technology). Given this, there are only three-types of trade-induced growth: skill-led growth (focusing on the accumulation of human capital), investment-led growth (focusing on the accumulation of physical capital), and technology-led growth (focusing on the accumulation of knowledge capital). In market economies, the rate of capital accumulation depends on the costs and benefits of accumulation. Any well-reasoned link between trade and growth must, therefore, explain how trade policy affects the cost and/or benefit to investing in new human, physical or knowledge capital.

Several of such well-reasoned links have been developed in the literature applying endogenous growth theory to the analysis of trade policy. The seminal works here include Rivera-Batiz and Romer [1991a, b] and Grossman and Helpman [1991]; these are summarized and extended in Baldwin and Forslid [1998]. These theoretical pieces have focused almost exclusively on trade-induced knowledge-led growth, emphasizing the impact of trade liberalization on the incentive to invest in product and process innovations.

Unfortunately, these R&D-based links are quite disconnected from the realities of growth in developing countries. For instance, Young [1992, 1994a,b] argues that even the most spectacular cases of developing country growth in East Asia appear to be instances of investment-led and skill-led growth, rather than knowledge-led growth. Moreover, recent evidence has cast doubt on the underlying assumptions of R&D based endogenous growth models. Jones [1995b], for instance, finds that a major prediction of endogenous growth models based on knowledge capital accumulation – the so-called scale effect – is clearly contradicted by the data. As a reaction, a number of authors, such as Jones [1995a], have proposed non-scale growth models.

This paper uses one such model to explore investment-led growth effects

highlighted in the general trade and growth literature, and to briefly review the relevant empirical literature. Section IV uses the Section II framework to explore issues specific to the investment-led growth impact of regional integration. We do this in two ways. First, the section examines a number of theoretical channels through which regional integration can affect investment-led growth. Second, this theory is used to develop hypotheses about the sort of 'footprints' that integration-induced investment-led growth should leave in the data. The section then looks to see if such footprints were left behind when relatively poor European nations joined the European Union. Our analysis and conclusions, therefore, are best thought of as shedding light on the possible growth effects of North-South regional integration, such as the US-Mexico FTA. Lastly, the section reviews the econometric evidence on whether regional integration produces technology-led and/or investment-led growth. The final section, Section V, presents our conclusions.

## **II. Illustration of Overarching Theoretical Issues**

Trade and growth models are not really much more complex than new trade models. This fact, however, is not well appreciated given the complexity of the presentations in the early trade and growth literature eg, Grossman and Helpman [1991] . To set the stage for our discussion of regional integration growth effects and to discuss overarching trade and growth issues, this section presents a simple trade and growth model. The presentation is in two steps. First, a static 'new trade' model is presented. Second, we show that it is quite easy to add growth to such models. The model as a whole is a slight variant of the Grossman-Helpman product innovation model of trade and growth.

and two factors (labour L and capital K). Manufactures are capital intensive relative to traditional goods, and to simplify, we adopt an extreme form of factor intensity. Namely, M is made with K and L, while T is made with L only.

The M-sector consists of differentiated varieties produced under increasing returns and Dixit-Stiglitz monopolistic competition. In particular, the fixed cost for each M-variety consists of one unit of K. The variable cost consists of  $a_m$  units of labour per unit of output and we denote output of variety I as  $m_i$ . T is a homogeneous good produced under Walrasian conditions (i.e., perfect competition and constant returns). The specific cost function assumed for T is  $w a_T Q_T$ , where w is the wage rate,  $a_T$  is the unit input coefficient and  $Q_T$  is output. For algebraic conveniences, we measure T in units such that  $a_T = 1$  and M in units such that  $a_m = (1 - 1/\sigma)$ .

Goods are traded; factors are not. For simplicity, we follow Krugman [1991] in assuming that trade in T goods is costless, but trade in M-varieties is impeded by frictional (i.e., iceberg) barriers, such that  $\tau > 1$  units must be shipped to sell one unit abroad. These frictional barriers are meant to represent red-tape barriers (eg, unusual product standards, cumbersome certification procedures, etc.) that hinder imports without generating tariff revenue or other rents.

Preferences of the representative agent in each nation are:

$$U = \ln(C); C = C_M C_T^{1-\tau}, C_M = \sum_{i=0}^N c_i^{(1-1/\sigma)} d_i^{-\frac{1}{1-1/\sigma}}, \tau > 1, 1 > \sigma > 0 \quad (2-1)$$

where  $C_T$ ,  $C_M$ , N and  $c_i$  are, respectively, consumption of T, a CES composite of M-varieties, the number of varieties available, and consumption of a typical M-variety. The representative consumer acts atomistically; his income is  $wL + RK$ , where R is K's rental rate. Utility optimization yields a unitary-elast-

$$\alpha \quad \alpha$$

With symmetric nations, foreign demand functions are identical.

Competition in T implies  $p_T = w a_T$ . With Dixit-Stiglitz monopolistic competition, profit maximizing M-firms produce a unique variety and engage in 'mill pricing' – i.e., consumer prices in the local and export markets are, respectively,  $w a_m / (1 - 1/\sigma)$  and  $w \tau a_m / (1 - 1/\sigma)$ . Thus, taking labour as numeraire:

$$p_T = 1, \quad p_i = 1, \quad p_i^* = \tau \quad (2-3)$$

where  $p_i$  and  $p_i^*$  are the local and export price of M-variety I and the expressions were simplified by using  $w = 1$ ,  $a_T = 1$  and  $a_m = (1 - 1/\sigma)$ .

As usual, each M-firm earns operating profit equal to  $1/\sigma$  times the value of sales.<sup>1</sup> Given symmetry of varieties and countries, the value of sales for a typical M-firm is  $\alpha E/n$ , where  $n$  is the number of home M-varieties (with symmetry  $N = 2n$ ). A typical operating profit,  $\pi$ , is therefore:

$$\pi = \alpha E / \sigma n \quad (2-4)$$

Free entry in M drives pure profits, namely  $\pi - R$ , to zero, so:

$$R = \pi \quad (2-5)$$

Recall that  $R$  is capital's equilibrium rental rate.

Full employment of capital (with one unit of  $K$  per variety) and labour requires:

$$n = K, \quad L = a_T Q_T + a_m n m_i \quad (2-6)$$

To close the model, supply must meet demand. To calculate demand, we need equilibrium income. In this static model, consumption expenditure  $E$  equals income, namely  $wL + \pi K$ , so:

$$E = wL + \pi K = \frac{L}{1 - \alpha/\sigma} \quad (2-7)$$

$$C_T = \frac{(1 - \gamma)L}{1 - \alpha}, \quad m_i = (s_i E + s_i^* E^*) = \frac{L}{(1 - \alpha)K} \quad (2-8)$$

where  $s_i$  and  $s_i^*$  are the market shares of a typical variety in its local and export market, and we have used symmetry ( $E = E^*$  and  $K = K^*$ ) and the adding up constraint ( $s_i + s_i^* = 1/K$ ) to derive the final expression for  $m_i$ .<sup>2</sup>

Given that  $K$  units are employed only as fixed costs in the M-sector, the static equilibrium can be completely described by the allocation of  $L$  between the T and M sectors. Using (2-7), the cost functions and full employment, the equilibrium values of  $L_T$  (total employment in T) and  $L_M$  (total employment in M) are:

$$\bar{L}_T = \frac{(1 - \gamma)L}{1 - \alpha}, \quad \bar{L}_M = \frac{(1 - 1/\alpha)L}{1 - \alpha} \quad (2-9)$$

### **B. Adding Growth**

The static trade model introduced above is the foundation of the Grossman-Helpman product innovation model of trade and growth. As discussed in the introduction, growth is driven by the accumulation of human, physical or knowledge capital. Adding growth to this model therefore requires us to endogenize the capital stock. This, in turn, requires introduction of a capital-producing sector, which we call the I-sector ('I' is a mnemonic for investment-goods).

**The I-sector;** We assume that the I-sector is Walrasian (perfectly competitive with constant returns) and that it takes  $a_I$  units of L to make one unit of capital. Thus the production and cost functions are:

$$Q_K = L_I/a_I, \quad F = w a_I \quad (2-10)$$

where  $Q_K$  is the flow of new capital,  $L_I$  is I-sector employment, and  $F$  is the I-

evolves according to:

$$\dot{K} = Q_K - \delta K : 1 > 0 \quad (2-11)$$

Plainly, the number of varieties also evolves according to  $\dot{n} = Q_K - \delta K$ .

It is useful to note that  $L_I$  is real investment. To see this, note that all I-sector output is purchased and invested in equilibrium. Since L is numeraire and the I-sector is competitive, the value of I-sector inputs,  $L_I$ , also equals the level of gross investment measured in units of the numeraire.

**Intertemporal Preferences and State Variables;** Since capital now lasts more than one period, the free-entry condition requires M-firms to evaluate the present value of future profits. This, of course, requires intertemporal preferences and a discount rate. To this end we assume intertemporal preferences:

$$U = \int_{t=0}^{\infty} e^{-rt} \ln C_t dt; 1 > 0 \quad (2-12)$$

As is well known, the path of optimal consumption, given (2-12) and the intertemporal budget constraint, is described by the Euler equation  $\dot{E}/E = r - \rho$ , where  $r$  is the rate earned on foregone consumption.

Analysis of any dynamic model is simplified by a judicious choice of state variables. The natural state variables here are real investment,  $L_I$ , and  $K$ . The first payoff to taking  $L_I$  as a state variable is that it tells us that  $r = \rho$  in steady state. To see this, note that the total amount of labour devoted to the production of consumption goods, viz.  $L_T + L_M$ , equals  $L - L_I$ . Since  $\dot{L}_I = 0$  in steady state (by definition of a state variable),  $L_T + L_M$  also stops evolving in steady state. Given the underlying static trade model described above, we know that when the amount of labour devoted to consumption goods is time-invariant, the value of expenditure measured in units of L, viz. E, must also be time-invariant. To show this more directly, note that since income

$\rho$  $\sigma$  $\alpha$ 

The second payoff to our choice of state variables is that with  $L_I$  constant in steady state, (2-11) implies that the steady-state capital stock rises until the flow of depreciation,  $\delta K_T$ , equals the flow of new capital,  $L_T/a_I = L_T/F$ , where 'bars' indicate long-run equilibrium values and we have used (2-10). Thus:

$$K = L_T/\delta F \quad (2-14)$$

**Analysis with Tobin's  $q$ :** Given (2-14) and the expressions that describe the static-trade-model equilibrium, we can close the dynamic dimension of this growth model by determining  $L_T$ . Given that  $L_I$  is real investment, the basic problem is to characterize investment in a general equilibrium framework. The  $q$ -approach of Tobin [1969] is a powerful, well-known and intuitive method for doing precisely this. The essence of Tobin's approach is to assert that the equilibrium level of investment is characterized by the equality of the stock market value of a unit of capital – which we denote with the symbol  $V$  – and the replacement cost of capital,  $P_K$ . Tobin takes the ratio of these, so what trade economists would naturally call the M-sector free-entry condition (namely  $V = P_K$ ) becomes Tobin's famous condition  $q = V/P_K = 1$ .

In steady-state, the numerator of Tobin's  $q$  is simply the discounted flow of operating profits net of maintenance costs. The flow is permanent and discounted at  $\rho$ , so using (2-4), (2-13) and (2-14):

$$\bar{V} = \frac{\bar{L} - F}{(\bar{L} - \bar{L}_I)} = \frac{F}{(\bar{L} - \bar{L}_I)} \quad (2-15)$$

where  $V$  is the numerator of Tobin's  $q$ , namely the discounted flow of operating profits net of maintenance costs. The denominator of Tobin's  $q$  is  $P_K = F$ . We can, therefore, write the steady-state  $q$  as a function of the steady-state  $L_I$ . Namely:

$$\bar{q}[\bar{L}_I] = \frac{\bar{V}}{F} = 1 \quad \bar{L}_I = \frac{L}{\bar{L}} \quad \bar{K} = \frac{L/F}{\bar{L}} \quad (2-16)$$

long time (since consumers smooth consumption). Estimates of transition half-lives are often in the neighborhood of 40 years Mankiw, Romer and Weil [1992] . What this means in practice is that a policy or parameter shock that raises the steady-state level of K will produce decades of above-normal growth driven by an above normal rate of investment. For this reason, we focus on comparative steady-state analysis, using the fact that an increase in the steady-state K will generate decades of above-normal growth.

### *C. Overarching Trade and Growth Issues*

**Source of Growth;** In the long-run, this economy ceases to accumulate capital when K arrives at its steady-state level. The economy's long-run growth rate is, therefore, zero. While capital is rising, however, the expanding range of varieties raises real wages, incomes and consumption. To see this directly, note that the perfect price index that corresponds to the assumed preferences is:

$$P = p_T^{1-\phi} P_M, \quad P_M = K^{\frac{1}{1-\phi}} (1 + \tau)^{\frac{1}{1-\phi}} \quad (2-17)$$

where  $\phi - \tau^{1-\phi}$  is a measure of trade free-ness (phi-ness);  $\phi$  varies from 0 (prohibitive trade costs) to 1 (free trade), and we have used (2-3) to simplify  $P_M$ . Since  $p_T = 1$  and  $\phi$  does not vary, the price index falls at  $\alpha/(\sigma - 1)$  times the rate that K rises. Consequently, with  $w = 1$ , real wages  $1/P$  rise as K climbs to its steady-state value.

In our simple model, M-varieties are consumed directly. One can, however, equally well assume that M-varieties are used as intermediate inputs by a Walrasian final-good sector as in Ethier [1982] , so that the fall price index  $P_M$  gets translated into cheaper final goods.

**New Versus Old Growth;** The above model is an 'old' growth model

To this end, it is convenient to interpret  $K$  as knowledge capital, to ignore depreciation ( $\delta = 0$ ), and to follow Romer [1990] and Grossman and Helpman [1991] in assuming learning externalities in the I-sector.<sup>5</sup> Specifically, the I-sector marginal cost,  $a_I$ , is assumed to fall as cumulative output rises (this is the definition of a learning curve). The specific learning curve and production functions assumed are:

$$F = a_I, \quad \dot{K} = L_I / a_I; \quad a_I = (K + K^*)^{-\xi} \quad (2-18)$$

where  $\xi$  is the learning elasticity.

As before competition ensures  $P_K = a_I$ . Notice, however, that learning forces down  $a_I$  at a rate that is equal to  $\xi$  times the rate that  $K = K^*$  rises. If  $\xi = 1$  (as assumed in the Romer and Grossman-Helpman models), then the denominator of Tobin's  $q$  falls at the same rate as  $\pi$ . In this case,  $q = 1$  does not determine the steady-state capital stock (indeed,  $K$  drops out of Tobin's  $q$  altogether), rather it determines the rate of growth of  $K$ . These learning externalities are, therefore, the key to cease-less accumulation of capital. Another way to look at this is to note that when  $\xi = 1$  as the capital stock rises, the ratio of marginal benefit to marginal cost of investing (i.e., Tobin's  $q$ ) has no tendency to fall as  $K$  rises.

Importantly, our basic approach of focusing on  $L_T$  is sufficiently robust to deal with both exogenous and endogenous growth versions of the basic model. That is, in both cases  $q = 1$  determines  $L_T$ . With exogenous growth (i.e., when  $\xi < 1$ ) the I-sector production function and depreciation determine  $K$  as in (2-16). With endogenous growth  $\xi = 1$ , so from the production function in (2-18) and symmetry of nations,  $L_T$  determines the endogenous growth rate of capital, i.e.,  $g = 2L_T$ .

The critical role of  $L_I$  in solving both the old (exogenous) and new (endogenous) growth versions of the basic model brings us to the third and

model. Moreover, we have seen that Tobin's famous  $q = 1$  condition is a convenient way of pinning down the equilibrium level of the critical variable  $L_I$ . It seems natural, therefore, to use Tobin's  $q$  as a way of organizing our thinking about how various forms of international integration affect medium-run growth (in exogenous growth models) and long-run growth (in new growth models).

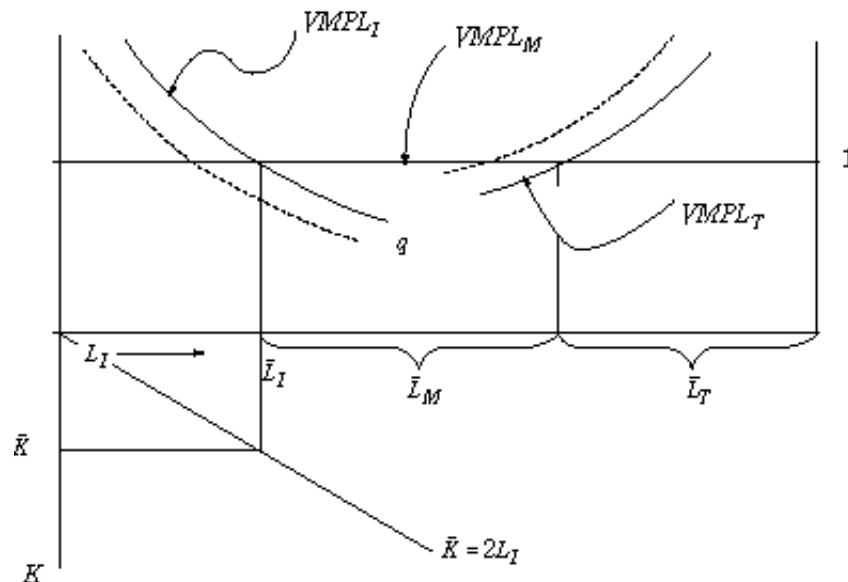
All forms of international integration, ranging from trade policy to monetary union, can potentially affect growth by affecting the present value of investing in new capital, i.e. via  $V$  ( $q$ 's numerator), or by affecting the cost of capital goods, i.e. via  $P_K$  ( $q$ 's denominator). Here, and in the rest of the paper, we concentrate on old growth models – i.e. trade-induced investment-led growth – so that (2-16) gives the relevant  $q$ .

As it turns out, most trade and growth models, including the one in this paper, have a simple graphical representation. This representation makes it very easy to present trade and growth links, so we turn now to the representation.

#### **D. Static-Economy Representation of the Model**

The long-run equilibrium can be represented in a simple diagram that resembles the well-known specific-factors diagram. Tobin's  $q$  turns out to be – somewhat surprisingly – the value of the marginal product of I-sector labour (call this  $VMPL_I$ ). The reason is that  $q$ 's numerator is the value of the output produced by  $F$  units of labour, thus  $V/F$  is the value of average labour productivity of  $L_I$ . Because all scale effects are external to I-firms, the average and marginal products of labour are identical, so  $q = V/F$  is the  $VMPL_I$ . This is graphed in Figure 1 as a decreasing function of  $L_I$ . The figure's horizontal axis gives the country's  $L$  endowment, with  $L_I$  measured from the left and  $I$  from the right. Since manufacturing is imperfectly com-

Figure 1  
Static Representation of the Long-Run Equilibrium



T-firms choose  $L_T$  such that the value of the marginal product of labour ( $VMPL_T$ ) equals  $w = 1$ . From (2-2) and T-sector technology  $VMPL_T = (1 - \alpha)E/L_T$ , where  $E$  is related to  $L_T$  by (2-13). By inspection,  $VMPL_T$  is decreasing in  $L_T$  for any given  $L_I$ . The intersection of  $VMPL_I$  and  $VMRPL_M$  identifies the steady-state  $L_I$ , and the intersection of  $VMPL_I$  and  $VMRPL_T$  pinpoints  $L_{\bar{I}}$ .  $L_M$  is just  $L - L_I$ . The steady-state capital stock is found using (2-14); this is graphed in the lower quadrant of the figure as  $K = L_I(\delta F)^{-1}$ . Figure 1, therefore, is the static representation of the model.<sup>7</sup>

The diagram allows a simple, systematic approach to policy analysis. In steady-state  $q = 1$ , but policy changes can lead to incipient changes in  $q$ .<sup>8</sup> For

unchanged, pure profits would appear in the I sector. These incipient profits direct I-firms to engage more labour, so in fact  $L_T$  increases instead of V (the steady state V, of course, remains equal to F). The resulting change in the underlying static economy – viz. the rise in  $L_T$  – has obvious implications. In particular, it raises the steady-state capital stock thereby raising real GDP growth during the transition to the new steady state. The real GDP growth is due to an above-normal level of investment; this explains the terminology, investment-led growth. Notice also that a drop in  $L_T$  raises  $VMPL_T$ , so  $L_T$  also rises, but this has no dynamic implications.

During the transition the investment rate is above its steady-state level and it is declining. It is obvious from the diagram that any incipient increase in  $q$  will have a pro-growth effect and any incipient decrease in  $q$  will have an anti-growth effect.

### **III. Trade and Growth Links: Theory and Evidence**

#### **A. Trade and Growth Links**

Using the diagram, we consider a number of trade and growth links.

**Traded Intermediates;** The production of capital typically involves traded intermediate goods and this creates a simple link between openness and investment-led growth in an expanded version of the Section II model. When the manufacture of human, knowledge or physical capital involves traded intermediate inputs, the price of traded goods enters the I-sector's marginal cost function. Trade barriers affect these prices, so the price of capital F becomes a function of trade barriers. Consequently, liberalization affects the denominator of Tobin's  $q$ . For instance, global liberalization can lower  $P_v$  in both countries, thereby creating an incipient increase in  $q$  that is

more recently Lee [1993, 1994]. Although the analysis is sketchy, this link also seems to be the focus of the so-called lab equipment version of Rivera-Batiz and Romer [1991a].

**Intersectoral Expenditure Shifting;** Most tariffs on trade among rich nations have been eliminated over the past five decades and this global liberalization has reduced prices and stimulated output of traded goods relative to non-traded goods sectors. Baldwin and Seghezza [1996] presents evidence that traded sectors are relatively physical capital intensive relative to non-traded sectors. Taking this as true for the moment, we note that any policy reform that shifts expenditure to the capital-intensive traded sector boosts the derived demand for capital. In the short-run, this would show up in an increase in the return to capital. In the long run, it raises the steady state capital stock. During the transition to the new steady state, we have faster capital accumulation and growth. Given all this, the massive postwar reciprocal liberalization of trade would appear to be a source of investment-led growth as long as two conditions hold: (i) traded goods and services are more capital intensive than nontraded goods and services, and (ii) global trade liberalization stimulates traded goods sectors in the liberalizing nations.

The Cobb-Douglas preferences in the section II model imply that nothing can shift expenditure intersectorally. However, in Baldwin and Seghezza [1996], where preferences over T and all M-varieties is given by a CES function, a drop in the relative price of M-varieties, i.e.,  $P_M/P_T$ , will shift expenditure onto M.

**Procompetitive Effects;** One of the most objectionable simplifying assumptions in the trade and endogenous growth models is the simplistic nature of I-sector competition. For instance, Grossman and Helpman [1991] assume that the I-sector is marked by private constant returns and perfect

financial sector and in the X sector. A formal derivation of the procompetitive effect in the financial sector is in Baldwin and Forslid [1996], and Baldwin and Seghezza [1996] provides a formal derivation of the procompetitive effect in the manufacturing sector.

### ***B. Empirical Evidence***

Levine and Renelt [1992] perform robustness tests on standard cross-country growth regressions, finding that six standard measures of trade openness (including export/GDP and import/GDP) do not have a robust relationship with growth when the investment rate is included in the regression. However, they find that three trade/openness variables do have a robust relationship with the investment rate. Summarizing this pair of results, the authors note: "These results suggest an important two-link chain between trade and growth through investment. Interestingly, however, the theoretical ties between growth and trade typically seem to run through improved resource allocation and not through higher physical investment share." The Levine-Renelt puzzle is easily resolved using the theory discussed above. The theory, together with Levine and Renelt's empirical findings, therefore provides strong evidence that trade affects growth by boosting national investment rates.

This findings are confirmed by regression analysis in Baldwin and Seghezza [1996, 1997] and Lee [1993]. In particular, Baldwin and Seghezza [1997] use system estimation techniques to show that there is a two-link chain between multilateral openness and investment-led growth in developing countries as well as in developed countries.

effects of North-South regional integration, such as the US-Mexico FTA, although we make some observations on South-South FTAs.

### A. *Exploration of Theoretical Issues*

There are two distinct aspects of regional liberalization - discrimination and liberalization. We address these separately in order to highlight each. In the first two subsections, we focus on economies that match the Section 2 model. That is, firms have similar tastes and technologies, and only the simplest trade and growth links are in operation.

**Pure Market Access Issues with Discriminatory Liberalization;** We start by sketching the growth implications stemming from the way in which discriminatory liberalization tends to affect the location of industry. Industry location can affect growth in many ways, however, here we focus only on the simplest. Manufacturing is intensive in its use of physical capital relative to services and agriculture, and national capital stocks are endogenous.

Consequently, nations with large manufacturing sectors tend to have high steady-state capital-labour ratios. (This logic may seem reversed in the light of the Heckscher-Ohlin model that takes capital stocks as exogenous; Nevertheless with endogenous capital, the causality must run from incentives to locate industry to the capital stock.) What this means is that to the extent that discriminatory liberalization alters the long-run equilibrium location of industry, it also alters long-run equilibrium capital stocks. During the adjustment to the long-run equilibrium, nations experience medium-run growth effects.

To fix ideas, consider a world consisting of three initially symmetric nations, each of which is like the typical nation in the Section 2 model. Suppose that two of the three form a perfect customs union, but initially capital

In the short run, this shift in competitiveness will result in an increase in the return to investing in the CU and a decrease in the return to investing in RoW. The result will be a pro-growth effect in CU and an anti-growth effect in RoW in the medium-run. In the long-run, the CU capital stock achieves a higher steady-state level. RoW's steady-state capital stock drops.

This logic, presented more carefully in Baldwin and Venables [1995], suggests that discriminatory liberalization is good for investment-led growth in the integrating nations. However, the symmetry of nations misses an important aspect of North-South integration, namely that rich FTA members are typically much larger economically than the poor members.

**Pure Market-Access Issues between Large and Small Nations;** Formation of a North-South free trade area usually entails reciprocal liberalization between a large country (think of the EU10 or the US) and a small country (think of Portugal or Mexico). To focus on the large-versus-small issues within a regional bloc, we ignore the rest of the world and so consider only the two asymmetric sized nations. Moreover, to focus strictly on size-related issues, we assume that each nation has the basic Section 2 structure, differing only in terms of L endowment. As is well known from the economic geography literature see Krugman [1991] for instance , progressive reciprocal liberalization in this case leads to a steady outflow of industrial firms from the small nation to the large, with all firms having exited the small nation at a level of trade barriers short of free trade. The medium-run growth implications are therefore negative for the small nation and positive for the large nation.

This result is easy to understand intuitively. Start from autarky, where both nations have identical steady-state K/L ratios. Reciprocal liberalization has three effects on the rate of return to capital in each nation: One direct market access effect and two competition effects. The direct effect tends to

there are also more competitors in the larger market. This leaves the negative competition effects. Since there are more large-country firms, firms based in the small nation face a large increase in competition in their local market and a small increase in competition in their export market. Due to trade barriers, the local market is more important than the export market, so we can see that reciprocal liberalization always increases profit (i.e. the return to capital) of large-based firms more than that of small-based firms. Indeed, reciprocal liberalization lowers the rate of return to capital in the small nation, raising it in the large nation. The resulting exit and entry lowers the small nation's steady-state capital stock, raising the large nation's.

***Liberalization without Delocalization:*** This logic, however, rests on the fact that trade barriers are initially equal in the small and large regions. Such is not the usual case with North-South liberalization. For instance, when the US-Mexico FTA was initiated, the trade-weighted tariff on Mexican industry imports was about 25%, while that of the US was about 4%. Thanks to 'special and differential treatment' of LDCs in GATT rounds, this kind of asymmetric protection levels is the usual case in North and South nations.

This initial protection asymmetry has an important implication for the impact of reciprocal liberalization on delocation, as Robert-Nicoud [1996] shows. Once trade barriers are zero, the initial distribution of firms is an equilibrium (indeed, in free trade any distribution is an equilibrium). It can be shown that if the levels of small nation's barriers exceed those of the large country during the transition to free trade, it is entirely possible to achieve reciprocal liberalization without delocalization. The point is easy to see using the three effects mentioned above. The higher small-country barriers tend to offset the size of the competition effect that small-based firms face in the small market. Given a free hand with the relative protection levels on the transition path to free trade, one can design a liberalization sched-

port focuses on the cost of intermediate inputs in the I-sector (investment goods sector). With this link, the size of the growth effect from liberalization with a given trade partner depends only upon how important the partner's exports are in the I-sector's cost function. If the partner supplies a large fraction of the intermediate inputs, then liberalization will have a big growth effect. This suggests that North-South free trade arrangements are likely to be pro-growth as long as the northern partner is a major supplier of industrial goods to the southern nation. This is what we would expect for North-South arrangement between, for example, the US and Mexico, and the EU and Morocco. Since South-South trade rarely includes a large amount of intermediate inputs into the investment goods sectors, South-South FTA are likely to have little impact on the members' steady-state capital stocks, considering this trade and growth link in isolation.

The intersectoral expenditure shifting effect of liberalization again depends only upon the fraction of imports that is liberalized. To the extent that North-South FTAs tend to liberalizes a large share of the southern nation's imports, we should expect North-South FTAs to be pro-growth. Since South-South FTAs often liberalize only a small fraction of the members' imports, we should expect systematically lower growth effects.

The logic is much more complicated when it comes to the procompetitive effects of trade liberalization. The complexity stems from the fact that competition is affected by the distribution of market shares as well as the level of market shares. To make the point simply, consider the three-symmetric-nation case with capital goods traded and suppose that there is only one I-firm per nation. With symmetric levels of protection, the I-sector market structure in each nation is marked by a large market share for the local firm and equal (smaller) market shares for the firms in the other two nations. That is to say one large share and two small. With a customs union, we find

would increase the degree of competition in the Southern I-sectors and financial sectors because these sectors are typically very heavily protected. If this is the case, then we should see the price of investment goods and the cost of borrowing declining in the Southern nation. As explained in Section II, this tends to induce medium-run investment-led growth.

***Uncertainty and the Investment Climate;*** Finally, consider the possibility that formation of a North-South FTA will make the Southern nation a safer place to invest. We first quickly review the impact of risk on the steady-state capital stock and medium-run growth. Risk can be informally introduced into the  $q$ -theory approach quite simply, if we are willing to accept the notion of a risk premium. Without risk, the future stream of capital's reward is discounted at  $\rho$  (the rate of pure time preference) in steady state. With risk, the same steady-state stream of income is discounted at  $\rho$  plus the risk premium (call it  $\gamma$ ). Clearly, lowering the risk premium raises the stock market value of any given investment. This produces an incipient rise in Tobin's  $q$  and therefore triggers a medium-run growth effect, as explained in Section II.

How could a North-South FTA lower the riskiness of investment in the Southern nation? On the micro side, FTA membership may constrain unpredictable changes in trade, investment and indirect tax policies in the southern nation. The argument is that FTAs involve deeper-than-MFN commitments to the northern government. Consequently, a wider range of policy changes are likely to draw retaliation. Knowing that the northern partner is likely to retaliate – southern policy makers are less likely to make the changes in the first place. Of course, game theory is a world of anything-can-happen, so this line of reasoning is suggestive at best.

In the case of poor countries joining the EU, there is the additional argument the membership locks in well-defined property rights and codifies

### ***B. Testable Implications***

The logic sketched out above explains how regional integration may raise or lower a nation's steady-state capital stock? What should we expect to happen in the short and medium run, if regional integration were pro-growth?

First, the real return to capital rises in the short run, since capital-formation takes time. Moreover, the upward shift in the capital demand curve will normally be associated with an increase in the profitability of existing capital. This should show up in the average behavior of the stock market, as long as the stock market reflects a broad sample of firms. An important caveat comes from the fact that liberalization almost always harms some firms and sectors even when it is beneficial for the nation as a whole. If the stock market is dominated by, say state-controlled "white elephants" that will face increased pressure in a more liberal economy, then enlargement may be accompanied by a drop in the stock market index. Second, the diagram does not distinguish between domestic and foreign investors, but we presume that an improvement in the national investment climate should attract more investment from both sources.

These two effects are likely to leave four kinds of 'footprints' in the data when a 'poor' nation joins a 'rich' trading bloc:

- (1) Stock market prices should increase,
- (2) The aggregate investment to GDP ratio should rise,
- (3) The net direct investment figures should improve,
- (4) The current account should deteriorate as more foreign capital comes in.

### ***C. Prima Facie Evidence for European Integration***

i.e. poor, nations involved in North-South regional schemes also see Castelani [1997] . We turn now to the four empirical implications listed above.

**Portugal and Spain;** The case that EU membership induced investment-led growth is strongest for the Iberians. Following restoration of democracy, Portugal and Spain applied to the EU in 1977, with membership talks beginning in 1978. The talks proved difficult, so accession occurred only in 1986. Growth in Portugal picked up rapidly and stayed high both during the negotiations and after accession; Between 1977 and 1992, Portugal expanded 13% more than France (the country we have chosen as a "control"). In Spain, however, growth was worse than France's up until accession. From 1986, it picked up significantly and between 1986 and 1992, Spain's cumulative growth edge over France amounted to 7.5%, about the same as Portugal's.

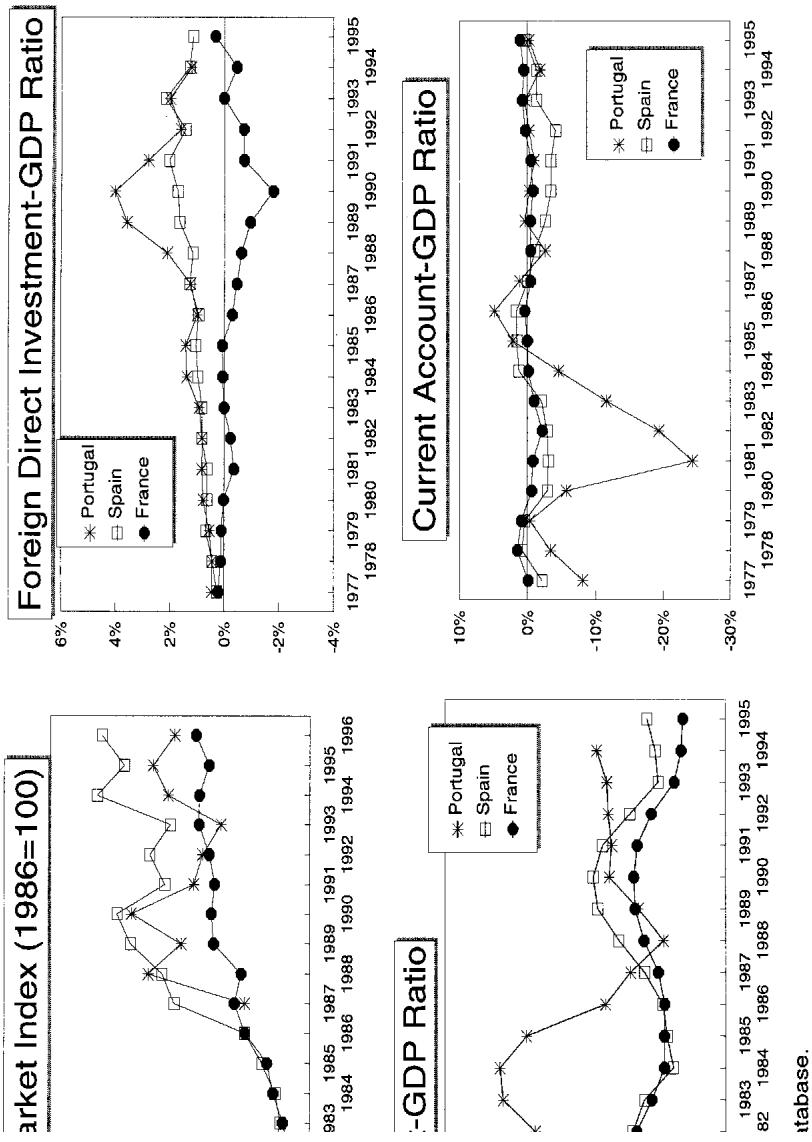
As the bottom-left panel of Figure 2 shows, much of this rapid growth was due to a higher rate of physical capital formation. Portugal's investment rate responded strongly and quickly to the combination of democracy and the prospects of EU membership. The importance of membership probably stems from some mixture of reduced uncertainty concerning the nation's stability and the prospects of improved market access. Note, however, that as a member of EFTA, Portugal already had duty-free access to the EU market for industry goods. The pattern of the Spanish investment rate, in contrast, did not differ significantly from that of our 'control' country until accession actually occurred. At that point, however, the Spanish investment-rate pattern does follow the predictions of integration-induced investment-led growth.

The top-left panel of the figure shows the same pattern for the stock market price indices. Spain's index tracked that of France until accession but thereafter showed signs of a significant improvement in the investment climate. Portuguese data are available only from 1987, but clearly shows a bet-

Figure 2  
Evidence of Integration – Investment-led Growth in Spain and Portugal

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database.

by foreign capital inflows, although foreign capital played a more important role for Portugal prior to accession and Spain after accession.

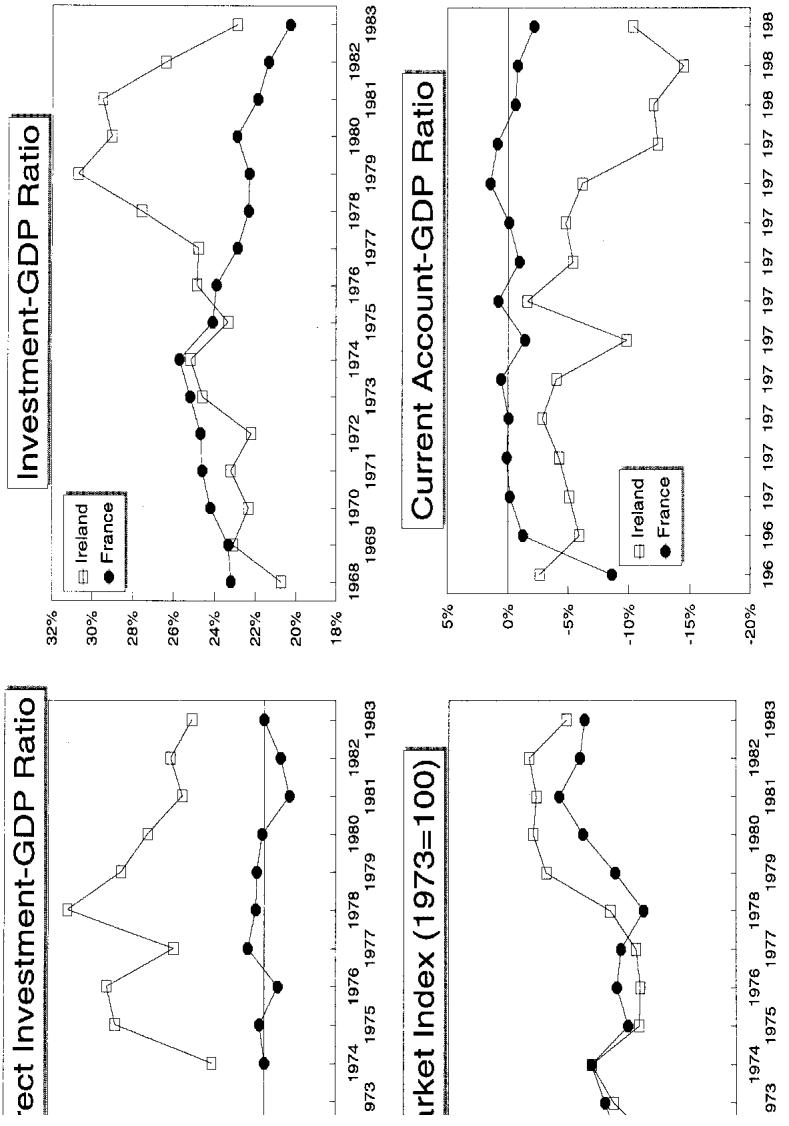
**Ireland;** Ireland's long trek to EU membership shadowed that of the UK. Namely, its first application in 1961 was rejected in 1963; Its second application, which came in 1967, was accepted in 1972.

Ireland was the first poor country to join the EU and is a fairly clear case of integration-induced investment-led growth. Between its accession and 1983, Ireland experienced a cumulative growth differential of 12% percentage points over France (by 1995 the cumulative difference was almost 50%). Figure 3 shows data on our four indicators of investment-led growth for the five years prior to and ten years subsequent to the Irish accession. As the top-right panel of the figure shows, Ireland's investment rate did pick up faster than that of France, once the first oil shock recession ended. The bottom-right panel (current account to GDP ratio) shows that much of the above-normal investment ratio was coming from foreign capital. As far as foreign direct investment is concerned, the top-left panel shows that Ireland's inflow was similar in magnitude and pattern to that of Spain fluctuating between 1% and 3% of GDP.

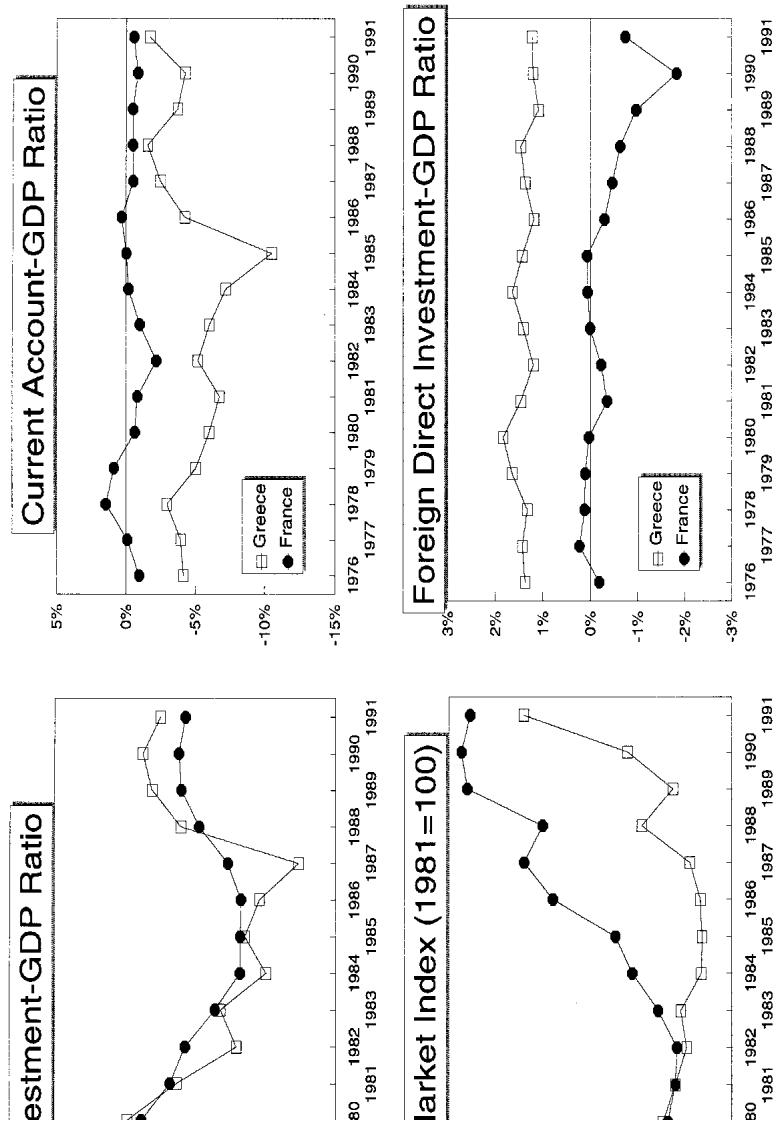
Irish stock prices, however, did respond directly to the accession. Part of this may be explained by the composition effect involved in Ireland's growth. Since its accession, Ireland's 'traditional' manufacturing sectors such as textiles, clothing and footwear have experienced a secular decline, while foreign-owned firms have expanded rapidly. To the extent that the Irish stock market was dominated by the declining traditional sectors - at least in the short run – it is not surprising that the Irish stock prices did not diverge significantly from those of the control nation.

**Greece;** As in the case of Portugal and Spain, the Greek accession [1981] came just after a period of undemocratic governments. However unlike the

**Figure 3**  
**Evidence of Integration-Induced Investment-led Growth in Ireland**



**Figure 4**  
**Evidence of Integration-Induced Investment-led Growth in Greece**



database.

1981 to 20% in 1991). Moreover, during this period the inflation fluctuated greatly, jumping up or down by more than three percentage in a single year in five out of the ten years.

Given this background, it is not surprising that we find no evidence of investment-led growth. Figure 4 shows the Greek figures for the five years prior to and ten years subsequent to accession. None of the figures suggests that EU membership had any impact on our four indicators.

***Evidence on FDI Flows in the Western Hemisphere;*** Blomstrom and Kokko [1997] present *prima facie* evidence on the FDI effects of regional integration agreements (RIA) in the Western Hemisphere, focusing on three case studies: A North-North integration (Canada-US FTA, i.e. CUSFTA), a North-South integration (US-Mexico FTA) and a South-South integration (MERCOSUR). In the case of CUSFTA they find that the regional integration had relatively little influence on direct investment patterns. They account for this by noting that much of the bilateral trade between Canada and the United States had been liberalized long before the establishment of the CUSFTA. The US-Mexico FTA, by contrast, seemed to have a significant impact on the inflows of FDI, although no econometrics is performed. Mexico's joining NAFTA brought about significant policy changes, which Blomstrom and Kokko cite as the major explanation for the increasing interest of multinational in Mexico. They suggest that the Mexican experience may capture some general characteristics of North-South agreements, primarily related to the potential for improved policy credibility and gains from guaranteed access to large northern markets. This evidence is very much in line with our *prima facie* evidence on Portugal, Ireland and Spain.

The third case examined the impact of the establishment of the MERCOSUR Common Market. The available evidence shows that a strong investment expansion has coincided with this integration process, however, the

judge the independent contribution of stability and integration.

#### **D. Econometric Evidence on Growth Effects of European Integration**

This subsection reviews the econometric work on growth effects of regional integration. Using data for 101 countries from 1960-1985, De Melo, Montenegro and Panagariya [1992] use dummy variables for various regional integration schemes to test for growth effects in a Barro-type regression. They find the only regional integration scheme that influenced growth over this period was the South African Customs Union. When the sample is split into developed and developing countries, physical capital investment is significant for both groups but human capital only for developing nations. The authors interpret this as evidence that regional integration has no effect on economic growth. It should be noted, however, that the authors include the investment ratio as a right-hand-side variable, so they have already controlled for any investment-led growth. Thus a more accurate interpretation of their results is that they find no evidence of integration-induced productivity-led growth.

Coe and Moghadam [1993] use multi-equation cointegration techniques on French time-series data from 1971 to 1991, to estimate a linear relationship among the level of non-farm GDP, non-farm hours worked, physical capital, cumulated R&D spending and intra-EU trade as a share of EU GDP. They arrive at some very strong conclusions such as "trade and capital - broadly defined – account for all of the growth in the French economy during the past two decades." Of course this result is only suggestive since the authors do not distinguish between the general trend toward MFN openness and the regional aspects of France's post-war liberalization (the intra-EU trade share is the only openness parameter and over the 1971-1991 peri-

stock, or human capital formation (depending upon the desired interpretation), the investment ratio, a rough proxy for trade policy—the real exchange rate distortion index from Dollar [1992], and a measure of integration. The authors' measure of European integration consists of a dummy that equals 1 for members of the EU or EFTA and zero for all other countries in the world. This is, of course, a quasi-reduced form regression that can only test for integration-induced, technology-led growth effects. Using data from 1976 to 1985, the authors find that the Dollar exchange rate distortion index is always negative and significant and their Euro-dummy is always positive and significant in their growth equation. On the basis of their point estimates, the authors go on to calculate that membership in the EU or EFTA has added about one percentage point to members' average growth rates. Again this sheds little light on the question of investment-led growth since the investment ratio is included on the right-hand side.

Baldwin and Seghezza [1996] uses the methodology of Baldwin and Seghezza [1995] to specify a pair of simultaneous equations for the investment rate and the growth rate. To test for growth effects of European integration, they include a dummy for EU membership. In all variants of the basic regressions, they find the membership dummy is insignificant in both the growth and investment equations. This can be taken as evidence that EU membership has not been pro-growth when other factors are controlled for.

## V. Concluding Remarks

This paper explores the implications of regional trade liberalization on the growth of developing nations. The exploration is advanced in three steps: 1) The theoretical links between openness and investment-led growth are reviewed together with the empirical evidence on these links; 2) The theo-

The theoretical investigation yielded ambiguous results on the growth effects of regional integration. This, of course, was expected given the second-best nature of regional integration and the presence of distortions in the growth model employed.

The empirical evidence presented painted a similarly ambiguous picture. In particular, *prima facie* evidence for Ireland, Portugal and Spain supported the notion the EU membership induced investment-led growth, while the evidence for Greece did not. This suggests that a finer hypothesis is necessary. In particular, the integration of relatively poor nations into a rich trading bloc seems to have exercised a positive influence on the poor nation's investment rates, however the influence was not strong enough to overcome poor macroeconomic management and market rigidities (which were features of the Greek case).

The econometric evidence on regional-integration induced, investment-led growth consists of a single study (by the authors) using cross-country regression analysis. That paper finds no evidence that European integration boosted growth in the EU12 nations taken together, when multilateral openness is controlled for. It is entirely possible, however, that Ireland, Portugal and Spain did get a growth fillip from membership for, say, ten years, but this is buried by the average over long periods and by the inclusion of many countries that did not experience integration-induced investment-led growth. Clearly more research is needed. Finally, econometric evidence on integration-induced productivity-led growth is also mixed. One study, which focuses on the European case, finds a positive growth effect on the EU12 and EFTA6 nations. A broader study that looked at all regional integration schemes found no evidence of a growth effect. More detailed econometric work will be needed before the issue can be settled.

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