

SOUSA GALITO, Maria (2000). Portugal in the EU: the Perspective of Convergence – Parte II.B. *CI-CPRI*, Tese, N°9, Setembro, pp. 48-54.

CI-CPRI



*Portugal in the EU:
the Perspective of
Convergence*

Tese de Mestrado

Âmbitos (2000):

Economia

Estudos Europeus

If in the short run, more exportations mean stronger national output, an indirect impulse influencing several economic sectors simultaneously, in such a way that the value of the total output depends on the structure of intersectoral relations, according to the neo-classic theory trade pushes growth and therefore economic development, because in the long run productivity gains are usually pushed because of higher commercial transactions promote an efficient management under competitive pressures from abroad, incentives for technological improvements, capacity of utilisation as well as scale economies.

Considering this determinant, the following step will be the presentation of the study of the related literature, including the gravitational models, along with the ex-post analysis of the composition and functioning of Portuguese trade patterns and volumes and their effects of Portuguese entrance in the EU until today.

2. 1. Trade, Investment and Growth

2.1.1 Relations

Benefits and costs of accumulation determine the rate of capital accumulation which means that, from the study of trade policy, trade and growth are realised consequences on benefits and costs to investing in new physical, human and knowledge capital. So:

Growth in per-capita income needs:

- ◆ Accumulation of physical capital (machines...)
- ◆ Accumulation of human capital (skills, instruction, training...)
- ◆ Accumulation of knowledge capital (technology)

Types of trade-induced growth:

- ◆ Skilled growth (specially concerned with the first condition)
- ◆ Investment-led growth (with the second one)
- ◆ Technology-led growth (with the third one)

Trade and Growth links:

- 1) Pro-competitive consequences
- 2) Intermediate goods
- 3) Intersectoral changing expenses

Grossman and Helpman (1991) show how a perfectly competitive capital-producing sector has private constant returns to scale, while a real capital-producing sector is imperfectly competitive and has increasing returns to scale. It's in a real capital-producing sector that reciprocal integration lead to pro-competitive effects with a negative influence over the price of capital and the equilibrium mark-ups, moving the Tobin's q curve higher Investment-led growth is related with

openness because producing capital usually implies the trade of intermediate goods. Consequently, prices end affected by trade barriers, entering in the calculations of the marginal cost function of the capital-producing sector. So, by reducing trade barriers, the denominator of Tobin's q is changed (Lee, 1993/94).

With this fall of prices, liberalisation also pushes more for traded goods sectors than for non-traded. Since according to Baldwin and Seghezza (1996) the firsts are more physical capital intensive than the non-traded ones, further expenses in the traded sector mean a strong impulse in the derived demand for capital. Thus, in the short run a higher return for capital and in the long run a higher steady state capital stock.

2.1.2 Presentation of the Growth Model

From the models of Dixit and Norman (1980) and Helpman and Krugman (1985) we find a starting situation without including growth and having two factors, L=labour and K=capital. Factors aren't traded, products are. The sectors are:

1) A=manufactures made with K and L, with increasing returns to scale and differentiated products in a Dixit-Stiglitz monopolistic competition. For each product variety fixed costs one unit of K and the variable cost consists of u_a units of labour per unit of output. Output of variety i is a_i . A is measured in units such that $u_a = 1 - 1/\sigma$, being $\sigma > 1$. A-varieties have trade barriers, such that $T \geq 1$ units need to be shipped to sell one unit abroad, considering here like in Krugman (1991) that those barriers stop imports but don't generate tariff income or other rents.

2) B=traditional products, made with L, produce homogenous products under constant returns and perfect competition. This sector have a specific cost function like $wu_B Q_B$, where w is wage, u_B is the unit input coefficient and Q_B the output. B is measured in units such that $u_B = 1$; like in Krugman (1991) B trading costs are null;

With C_A as a CES composite of A-varieties, C_B the consumption of sector B, c_i as a consumption of a M-variety, ϕ the optimal expense share on A products, M as the number of varieties available in the market, S the total consumption spending, p_B the price of an A variety, p_i the price of A variety and s_i the market share. So, in each country:

$$U = \ln(C) \tag{E.1}$$

$$C = C_A^\phi C_B^{1-\phi} \tag{E.2}$$

$$C_A = \left(\int_{i=0}^M c_i^{(1-1/\sigma)} di \right)^{1/(1-1/\sigma)}, 0 < \phi < 1 \tag{E.3}$$

$$C_B = (1 - \phi)S / p_B \quad (\text{E.4})$$

$$c_i = (s_i \phi S) / p_i \quad (\text{E.5})$$

$$s_i \equiv (p_i^{1-\sigma}) / \left(\int_{i=0}^M p_i^{1-\sigma} di \right) \quad (\text{E.6})$$

And with equal foreign demand functions since countries are symmetric.

Competition in B means $p_B = wu_B$, picking labour=1 and $w=1$, $u_B = 1$ and $u_A = 1 - 1/\sigma$. With free entrance, full employment of capital and profit derivation $\pi = \partial S / \partial m = r$, the revenue equilibrium is reached when:

$$S = wL + rk = L / (1 - \phi / \sigma) \quad (\text{E.7})$$

From which results:

$$C_B = \frac{(1 - \phi)L}{1 - \phi\sigma} \quad (\text{E.8})$$

K units unique propose is the payment of fixed costs in the M-sector, thus the static equilibrium is totally formulated by the allocation of L between B and A sectors:

$$\bar{L}_B = \frac{(1 - \phi)L}{1 - \phi / \sigma} \quad (\text{E.9})$$

$$\bar{L}_A = \frac{\phi(1 - 1/\sigma)L}{1 - \phi / \sigma} \quad (\text{E.10})$$

To all this we can join the Growth, for which we need to endogenize the capital stock and the introduction of a capital-producing sector.

For this objective, capital producing sector assume constant returns and perfect competition. Being Q_k the flow of new capital, L_s is the sector's employment of new capital, u_s units of L produce one unit of capital and D the sector's marginal cost. For this matter the production is $Q_k = L_s / u_s$ and $D = wu_s$. The price of a unit of K is $p_k \leq D$. So, considering proportional depreciation at the rate of χ , the capital stock is:

$$\dot{K} = Q_k - \chi K \quad , \text{ being } 0 \leq \chi < 1. \quad (\text{E.11})$$

Consequently, the number of varieties evolve is:

$$\dot{m} = Q_k - \chi K \quad (\text{E.12})$$

Tobin q (1969)

Tobin show that the equilibrium level of the real investment L_s may be described by the equality of the stock market value of a unit of capital (Z) and the replacement cost of capital (p_k), so that results:

$$Z / p_k = 1 \equiv q \quad (\text{E.13})$$

In the steady state, the numerator of Tobin's q is the permanent and discounted flow, at γ , of operating profits net of permanent costs:

$$\bar{Z} = \frac{(\bar{\pi} - \chi D)}{\gamma} = \frac{\chi D(\phi L - \sigma \bar{L}_s)}{\gamma(\sigma - \phi)\bar{L}_s} \quad (\text{E.14})$$

Resulting the following steady-state q as a function of the steady state L_s , where \bar{L}_s and \bar{K} define the long run:

$$\begin{aligned} \bar{q}(\bar{L}_s) &= 1 \\ \bar{L}_s &= \frac{\chi \phi L}{\sigma \chi + \gamma(\sigma - \phi)} \quad (\text{E.15}), (\text{E.16}), (\text{E.17}) \\ \bar{K} &= \frac{\phi L / D}{\sigma \chi + \gamma(\sigma - \phi)} \end{aligned}$$

Channels of transmission

The level of resources devoted to creating new capital is what determines the long run equilibrium level of capital in the exogenous growth model and the long run growth rate of capital in an endogenous growth model.

Using the Tobin's q, all forms of international integration may potentially affect growth by affecting the present value of investing in new capital (through q's numerator) or by affecting the cost of capital goods (through q's denominator).

2. 2. Advantages of Localisation

It is important to test if the European industry concentrates itself around an industrial sector that can be geographically central or peripheral, or if its growth is regularly distributed between countries.

Some countries tend to specialise themselves in certain sectors according to the advantages of localisation, from which two countries can have a combined

gain of the consumer and the producer, for more that the gains from the specific industry will be higher in the country that bet his strategy on it. But is this what happens in the European Union?

After realising some important issues of the new trade theory of the international trade about industrial localisation and trade structure, my work will analyse the intra-industrial trade and its industrial localisation, this work will discuss some empirical results, applying them to the study of the intra-industry trade.

2.2.1 Model of Krugman - Economic Integration and Industrial Localisation

Scale economies and intra-industry exchanges

From the new models of international trade, the most significant lesson is that when there are a weak intra-industry trade there are strong scale economies because the relationship is discontinuous.

Facing decreasing costs, the production function of a certain good equalise the function of costs of just one firm and scale economies are internal. There aren't comparative advantages. All firms work under the same technology and with only one production factor (labour) with growing profits. All consumers have the same utility function with symmetric preferences. So, the monopolistic concurrence reduces the surplus to zero.

The Model of Krugman (1980) over inter-industry trade, allows an extension to analyse the intra-industry trade, with the following general characteristics:

- ⇒ Different goods are demanded by a different kind of consumers.
- ⇒ Relative demand different for the two countries.
- ⇒ Because of the perfect symmetry of this demand, prices and production are equal for all different goods and different industries.
- ⇒ Offer of inputs is perfectly elastic for the differentiated industry.
- ⇒ Firms want to localise themselves in the country that offers a bigger market for its products or surrounded by a strong disposability of factors.
- ⇒ The transport costs correspond to international trade. Which means that equilibrium is reached with an intra-industry trade result from an incomplete specialisation of not too strong scale economies and not too high transport costs.
- ⇒ This allows a concentration of activities with growing revenues. This doesn't affect wages.

Normalisation of the model:

Knowing that k is the number of national and K^* the number of foreign goods inside an industry, p is price, x is production of each good, L is labour and w is wage. Being $(1-T)$ the transport costs, λ inverse indicator of consumers preferences for different goods, σ the relation of the total demand of national residents for each foreign good with the demand for each national good is independent of relative prices or wages, since is expressed as: $\sigma = T^{\lambda/(1-\lambda)}$ where $0 < T < 1$ and $0 < \lambda < 1$, so $0 < \sigma < 1$. Considering $k \neq 0, k^* \neq 0$, than the total expense in goods of each sector, as the sum of national and foreign purchases is:

$$kpx = \frac{k}{k + \sigma k^*} wL + \frac{\sigma k}{\sigma k + k^*} wL^* \quad (F.1), (F.2)$$

$$k^* px = \frac{\sigma k^*}{k + \sigma k^*} wL + \frac{k^*}{\sigma k + k^*} wL^*$$

So, the ratio total exportation/total importation of an industry is:

$$\delta = \frac{\sum_{j=1}^k X_j}{\sum_{j=k+1}^{k+k^*} M_j} = \frac{\frac{\sigma k}{\sigma k + k^*} L^*}{\frac{\sigma k^*}{k + \sigma k^*} L} = \frac{L^* \sigma k (k + \sigma k^*)}{L \sigma k^* (\sigma k + k^*)} = \frac{\frac{L}{L^*} - \sigma}{1 - \sigma \frac{L}{L^*}} = \frac{k}{k^*} \quad \text{with } \sigma < \frac{L}{L^*} < \frac{1}{\sigma} \quad (F.3)$$

This because of the symmetry hypothesis, and the fact that p and w are equal for any industry and any good, each sector's ratio k/k^* is the inverse of the ratio of the other industry, allowing us to better understand and reach the indicators of intra-industry trade, which are the following:

According to Brulhart (1996), the analysis of this model allows some remarks. Since σ is a function of T and λ , then λ is strictly negatively related with scale economies and there is a negative relation (or null) between intra-industry trade and scale economies, a conclusion applied to all possible situations except the one considering equal markets or where intra-industry trade is everywhere equal to 1. So, for minimising costs, firms want less transport costs, so they prefer sell in bigger markets. But firms not always work in large markets because of demand. In other words, if a smaller market has stronger demand for the good produced by the firm in question, if total transport costs are inferior to the studied advantages, the firm will change its localisation, this because a strong λ mean weaker scale economies and more intra-industry transactions.

To understand the slower growth in the European Union it can be used the model of Krugman and Venables (1990) where firms' localisation is fixed. From its study transport costs and intra-industry trade have a relation negative or equal to

zero, this because, in a context of no entrance of new firms and production of just one good horizontally differentiated, production continues positive.

From comparing the oligopoly model with the monopolistic concurrence of non entrance of new firms in the market, first intra-industry will have a big augmentation and afterwards an inverse tendency caused by the stronger and stronger industrial agglomeration, all this if there is backwardness in the re-localisation of production waited upon a retard of trade liberalisation. It may be an explication for the slower growth of the GNP in the European Union verified in these last years.

Added considerations

The preceding propositions about Krugman (1980) get less realistic as factors pass from non-specific to specific needs and as they're used in bigger industries, because prices of factors rise becoming indispensable in the model. But prices constraint profits, those that come from scale economies internal and external, so they are a negative externality to industrial concentration.

That's way Krugman and Venables (1991) argument how the function of production of a small country is non-monotonous. Its "U" shape is caused by a drop of production and, some time afterwards, by decreasing wages that lead to less commercial barriers and, consequently, to an intensification of commercial transactions. As production grows, wages disparities between small and big countries get less significant and have the entire tendency to disappear. Intra-industry trade increases, so doesn't have a "U" curb as the function of production does, as Krugman and Venables (1990) show how.

Between the spot at which trade is completely limited by commercial barriers and the one corresponding to the minimum of the "U" curb, industrial activity concentrates itself inside the gravitational EU and there's a unidirectional trade of industrial goods from the centre to the periphery. As commercial barriers decrease in such a way that they pass a certain limit, production with low wages localises itself in the periphery, that with this industrial concentration, allow crossed commercial proportion to grow regularly.

2.2.2 Gravitational Models of Spatial Interaction Behaviour

Models like the ones of Linnemann (1966) and Bergstrand (1985,89) are the so-called gravitational models with fluxes of external exchanges that are determined by variables like geographic proximity of commercial partnerships and economic weight.