ASPECTS OF THE CONVERGENCE PROCESS INSIDE THE EU – ENDOGENOUS GROWTH PERSPECTIVE

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Abstract. In this paper the authors want to make a brief analysis regarding the potential effect of the EU accession on the development of old and new member states, in terms of economic aggregate (price, wages), the production relocation and the division of work in the EU, the relocation of jobs in the member states, but also in terms of nominal convergence into the EU. In this way, a small open economy version of the two-sector endogenous growth model is designed and the concept of human capital is introduced into the standard Lucas–Uzawa model of endogenous growth, with knowledge diffusion. The model is calibrated for the EU periphery countries first, than in the new member states and the old member states to stylized facts of the economic development during the accession process and the convergence process inside the European Union. The initial conditions and the parameters of the accession generate different accession patterns and also rather different speeds of economic, social, political, judicial and commercial convergence to the EU average.

Keywords: real convergence, nominal convergence, endogenous growth

1. Introduction

The approach of *convergence,* as a principle of integration, can be made based on the classical and neoclassical theories on free trade, based on the new growth theories and based on the custom unions theory elaborated by Viner in 1950. These theories highlight the gains obtained from a regional integration in the case where the partner countries have homogeneous development levels and concurrent productive apparatuses, because the restructuring process engendered by the free trade generates complementarities of intra-branch type.

The concept of *convergence*, in the European context, designs an economic or a monetary notion, implying that the performance of the European countries is moving closer to the one of the countries having obtained the best results, in real terms (convergence of the development levels needed for a unique monetary policy, high growth rates, wage level, income level etc.,– the real convergence being measured mainly with the help of the GDP/habitant) or nominal terms (inflation rate, interest rate, costs, budgetary situations, current operations balance, exchange rate etc.). In current speech, the notion of convergence refers to reducing gaps in terms of performances, as a condition for insuring economic and social homogeneity.

Once the process of transition and accession to the EU is finalized, the crucial problem remains if the newly entered state in the EU is able to achieve the living standards from the EU and when. The success of this process is conditioned by the realization of a certain level of real convergence, for example achieving the level of income/habitant of the most advanced countries from the EU.

The transition economies are, generally, small open economies, the degree of economic openness contributing to the evaluation of the structural convergence and representing o critical feature of the accession process.

In order to evaluate the convergence in perspective, we shall use a version of the Lucas-Uzawa model of endogenous economic growth, with two sectors.

2. Theoretic fundaments

Contrary to neoclassical growth models, that foresee the realization of convergence, the models of endogenous growth affirm the existence of multiple equilibriums and divergent behaviours of the countries involved (see Azariadis and Drazen (1990) or Kejak (2003), who developed an extended model of Lucas having these features).

In order to explain the process of convergence in a framework of endogenous

growth, the theory can be amended by the "catching-up" hypothesis (Abramovitz, 1986, 1994). A recent tendency is to include the "catching-up" hypothesis in the neoclassical framework of exogenous growth, as in Parente and Prescott (2000). This concept implies the hypothesis of the countries having a so-called social capacity – which includes, among others, human capital, capacity of infrastructure and administration – in order to be able to adopt and use efficiently the new technologies, in all the member states. It also implies that investments are a necessary, yet not sufficient condition for achieving convergence. Still, such a model of endogenous growth maintains the possibility of a divergent behaviour. Anyway, the concept of absolute divergence (implied by the marginal equilibrium), is replaced by a less evident concept, of temporary divergence, which cannot replace the general tendency of "catching-up", but which makes the transition process more dynamic, yet prolonging it.

The human capital is used with the meaning of intellectual capital, the process of diffusion of know-how is explicitly modelled and the accession process is perceived as a gradual opening of the economy as far as the capital cycles are concerned, on one hand, and as a massive technology transfer among economies, on the other hand, which allows the catching-up of the technology used by the advanced countries. The know-how diffusion implies that there is a "frontier of theoretical knowledge" which is offered in an endogenous way and that its modifications represent great achievements in science, similar tot an industrial revolution. The economy can reach this barrier through education, which facilitates the adoption and implementation of new technologies. According to Kejak (2003), such a technological diffusion creates externalities of an initial type or logistical externalities in the process of know-how accumulation, with the possibility of growing depending on the average level of know-how.

3. Conditions and effects concerning the accession
3.1. Open economy model
We shall consider an open economy of small dimensions, having 2 sectors, in which homogeneous agents are operating, each one of them a time-unity, allocated either to the production of goods (u), either to the production of knowledge (1-u). The level of ability/knowledge of the subjects is h. Therefore, the effective labour, as a production factor, is $l = u \times h$ in the goods sector and $l = (1 - u) \times h$ in the knowledge (know-how) sector.

In the goods sector, the economy consists in an important number of identical companies having a Cobb-Douglas production function: $y = F(k,l) = A k^{\alpha} l^{1-\alpha}$, $0 < \alpha < 1$,, where k stands for the physical capital.

Using the generalised linear Uzawa-Rosen model (as in Kejak (2003)) for the production function for the human capital/know-how, supposing that the level of productivity in the educational sector, B, depends on the development level of the society, expressed by the average level of know-how, H, but annihilating the effect of knowledge diffusion, we have:

$$h = B(H;\phi)(1-u)h \qquad (1)$$

and

$$B(H;\phi) = \frac{B_H}{1 + (\frac{B_H}{B_0} - 1)e^{-\phi H}} \qquad (2)$$

where

B_0 represents the productivity level for the zero level of capital,

ϕ is the parameter of diffusion that includes the institutional barriers for knowledge.

Importing physical capital and installing it implies specific adjustment costs.

The agents inside this economy can borrow money on the capital market, where, for example, the credit rating of the economy influences the costs of the external loans, at an interest rate that depends on the ratio between debt and capital,

$$b = \frac{a}{k}$$

where a represents the external debt, and k the capital.

Because of the know-how externalities we have to consider the equations (1) and (2) in order to observe the human capital development and the evolution of the productivity B, respectively. This implies that the dynamics of the model is not reduced to the development of capital ratios, as in the original Lucas model (Mulligan, 1993).

At a very schematic level, the accession process can depend on the openness of the economy to the foreign markets, and on a major improvement of institutional structures. The last aspect is perceived by the country wanting to accede to the union, as an improvement of access to higher levels of know-how (knowledge

accumulations) and/or smaller difficulties related to the know-how absorption, noticed in a higher value of the diffusion parameter ϕ in equation (1) and (2).

3.2. Absence of positive externalities

We shall suppose that the economy has less knowledge capital than human capital and that the ratio debt-capital is high. Since the physical capital is relatively abundant in the economy, the results in terms of human capital are higher than those in terms of physical capital, but also the investment in human capital is higher than the one in physical capital. The population spends more time in the sector of knowledge accumulation than in the production process. The important differences between the 2 types of capital and a high real interest rate constitute a real stimulant for the capital leak, while, at the same time, the increase of consumption contributes in a small proportion to capital dissemination. The leak of capital is manifested as massive negative investments.

The whole process can be represented in 2 phases. During the first phase, a fast loss of capital, similar to an almost instantaneous leak of excessive capital, contributes to the surplus of the current account and to a pronounced decline of the debt (*a*). As the decline of capital takes place through the capital leak, the debt is reduced roughly in the same proportion as the capital. By means of consequence, the debt-capital ratio remains constant. As the physical capital drops and the human capital is growing, the marginal productivity of capital is growing, which determines a continuous growing of the production efforts. The development of capital is related to the diminishing of the real interest rate paid for the debt, which is the result of a smaller debt obtained through capital leak.

During the second phase, when the k/h ratio is small and almost constant, a very small change of k has a considerably larger effect on the marginal productivity of capital and therefore q is growing. Also, u responds much faster to these changes and the growth rate of the human capital, initially very large, is diminishing. As the reduction of k, in this phase, is larger than in the first phase, the debt/capital ratio, b, is dropping dramatically. Due to a higher increase of productivity, knowledge accumulated and working time, there is a period of excessive growth of the output during the transition.

3.3. Accession and calibration of the model for the periphery countries from the EU

The discussion of the theoretical model in the previous sections revealed the factors and the decisions than promote growth and convergence, on one hand, and a relative stagnation and divergence, on the other hand. The description highlighted some of the phases and possibilities an economy can be facing. The investigation, based on this concept, of the possible trajectories of the transition countries needs a validation through its calibration for the statistical data for their level of economic development. The recent experience of the countries from Central and Eastern Europe, members of the EU, often called peripheral countries, is relevant for the calibration (measurement) of the model, due to a numerous factors.

First, many of the CEEC newly entered into the EU recently passed through the majority of reforms imposed by the accession process. The special features of the transformation (transition) process become less important and the economic development is modelled more and more by the standard market mechanisms.

Second, the peripheral countries of the EU had many common features at the time of their entry into the EU. The income/habitant, especially, was similar, relatively low, and the open economies along with their infrastructures, underdeveloped compared to the centre of the EU.

Third, the economic development of the marginal countries needs a massive relocation of resources, for allowing the gradual liberalizing the trade, a rapid change the technology, important foreign capital flux (especially in the form of foreign direct investments) and increasing the accumulation of physical and human capital.

These similarities show that the recent economic experience of the EU periphery can become a useful instrument for the study of the convergence process of the most advanced states in transition. This fact was also acknowledged by other studies recently done on transition economies.

4. Conclusions

The paper contribution can be highlighted in 2 ways. First, we built a model of endogenous growth for a Lucas type small open economy with human capital and knowledge capital and with knowledge (know-how) externalities. Second, the model can analyse the effect of the accession to the EU in terms of growth perspectives.

The individual experiences along the transition model can be different in many important points. First, the countries having a lower initial level of capital can initially experience a period of consistent growth, which will raise the level of results to the one of the country richer in capital, who will stagnate. The slowing down of relocation among sectors will influence all countries in a similar way. Second, the intensity and duration of relocation slowing varies according to the constant growing rate or can be completely absent. Another issue illustrated is the fact that lower costs with the adoption of know-how are associated with a faster catching-up process.

We consider that the transition process is prolonged when the costs of accession are high. The combination between smaller depreciation rates and smaller growing rates is working well in most of the countries. An initial boom produced by the accession process (led by the capital infusion) will be followed by recession, some countries being more affected than others. Also, the role of costs of adjustment of the physical capital during the accession process cannot be neglected. Higher adjustment costs will affect the transition process making the adjustment of the physical capital need more resources. Anyway, they bring along higher investments in the research area, the final effect not being very obvious. The inter-correlation of these mechanisms and initial conditions can make

the effect of higher adjustment costs beneficial to the speed of the transition process. Anyway, both higher adjustment costs, and smaller adjustment costs, lead to the increase of the speed of catching-up process.

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