

## **Population Ageing, R&D and Human Capital Policies: A CGE – OLG Perspective**

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According to the official statistics over the next 40 years the European regions will face a dramatic decrease in population. Consequently, all the European economies will experience a pronounced ageing process in the coming decades. The most obvious economic costs of population ageing are the expected decline in the growth rate of the labour force. The slowdown of the labour force is the main reason why many believe that previous acquired economic performance and improved standard of living will be hard to carry on with population ageing (Marette, 2002). Several studies suggest that population ageing will be accompanied by an important decline in the rate of interest and an increase in the average wage rate (Merceiner et al, 2007). Indeed, a reduction in the working population might generate an upward pressure on wages increasing as a result the cost of production. This might occur because of regional labour market conditions and cost of geographical mobility is still high due to punitive housing taxation and widespread rent control. Thus, even in the presence of high wage rate, there will be no stimulus to generate in-migration to offset the slowdown in labour supply if unattractive job market conditions hold over.

Furthermore, by ageing population, the production structure of the regions could be modified as for example an increase in expenditure in Health care (Merceiner et al, 2004) and a reduction in the production in high technological sectors. If the increase in public service and a decline in high technological manufactures might be sustainable in the short run, as the time goes over a negative shift in productivity might produce important drawbacks with consequences on local demand and competitiveness through negative terms of trade. This would also imply a decline in the rental rate of capital with fall in domestic investment, especially investments in R&D. Moreover, capital inflow should decrease reducing foreign direct investment which is one of the most important source of development for a regional economy given the high degree of openness of a region.

The main research questions might be to understand how Government policies can compensate the negative effect of population ageing. R&D investment and human capital accumulation have been identified in literature as the most important driver behind economic growth. Such forces are able to determine the growth that cannot be explained by the accumulation of traditional physical capital. In the economic literature the human capital is considered an important engine of growth however, with population ageing, the contribution of human capital to solve problems related to decline in working population and older workforce is unsure.

Indeed, considering human capital composed by education and experience, if labour forces decline the real wage should increase. But the wage is the opportunity cost of education, so the contribution of education to human capital may reduce. The Government can intervene trying to eliminate this trade off making profitable for younger population invest in education re-equilibrating the return to education with wages. The contribution of education will depend very much from its expected return and then to the sensibility of younger population to undertake rational decisions that involve intertemporal preferences.

The literature (Merceiner et al. 2004 and 2007) has also stressed that the rise in the stock of human capital through an increase in experience may flatten the lifecycle earnings profile, and hence reduces the net return to education. This means also that there is trade-off between the main components of human capital: experience and education. This kind of results is obtained especially from partial equilibrium analysis and from general equilibrium analysis where the target economy was a nation. Regional economies are different from their national counterparts. Regions are more open than nations and capital and labour mobility is greater. In this paper we address this question by using a numerical inter-regional overlapping generation's model, where human capital accumulates endogenously through a flexible accelerator mechanism and migration is incorporated.