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Population ageing, capital mobility and optimal saving

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Abstract

This paper reports simulations of the effect of fertility on optimal saving and consumption under three assumptions about capital mobility: zero, perfect and imperfect. The case of imperfect capital mobility is modeled by expressing the interest rate as a function of the level of foreign liabilities. Simulations show that even a small degree of responsiveness of the interest rate to the level of foreign liabilities is sufficient to generate optimal paths of consumption and saving that are very close to the paths for a closed economy. The results of the simulations suggest that, with an exogenous rate of technical progress, the effect of a lower fertility rate on social welfare is not likely to be significantly welfare-reducing.

JEL classification: D9; E2; J0

Keywords: Demographic economics; Saving; Consumption

1. Introduction

The Australian Intergenerational Report (Commonwealth of Australia, 2002) projects that population ageing will increase the gap between government spending and revenue by around 5% of GDP by 2041–2042. These sorts of projections tend to draw the popular response that we should save more now in order to smooth the tax burden over time. Elmendorf and Sheiner (2000) compare the effect of population ageing on optimal saving for the cases of the closed economy (zero capital mobility) and small open economy (perfect capital mobility). They show that, while optimal saving does increase for the small open economy, the optimal response of saving in the closed economy is less clear-cut. The reason is that the slower growth of the labour force lowers the marginal product of capital, which implies a lower return to saving. They show

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that whether optimal saving rises or falls in response to ageing, in the closed economy, depends on the intertemporal elasticity of substitution which determines the degree to which society is willing to shift the burden of ageing between generations.

The small open economy model might be regarded as an appropriate framework in which to consider the impact of population ageing for Australia (for example, Guest & McDonald, 2001, 2002). In such a model, the economy borrows and lends at a constant world interest rate, which implies that capital is perfectly mobile. There is, however, extensive evidence that capital is not perfectly mobile internationally and is indeed quite immobile even for small open economies. For a discussion of the various explanations, see Gordon and Bovernberg (1996); and for a survey of the evidence on the Feldstein–Horioka puzzle as an indicator of imperfect capital mobility, see Coakley, Kulasi, and Smith (1998). The most important explanation according to Gordon and Bovernberg (1996) is asymmetric information between investors of different countries. In particular, foreign investors know less about the economic prospects of another country than do the residents of that country. The result is that the equilibrium interest rate in capital importing countries is higher than the interest rate in capital exporting countries. Another reason for doubting the constant world interest rate assumption is the evidence of a risk premium in the interest rate paid by small capital importing countries, where the premium depends on their level of foreign debt. For Australia, see Juttner and Luedeckie (1991).

The degree of capital immobility could be important in determining the effect of a demographic shock on optimal saving. With a constant world interest rate and a constant rate of time preference the rate of return to saving, following a demographic shock, is unaffected by the path of debt. This is not the case, however, if the interest rate is affected by the level of foreign debt, for example, in that case, the marginal cost of borrowing increases as debt increases and falls as debt falls. Hence, the rate of return to saving is a function of the path of debt and is therefore endogenous as it is in the closed economy case. The extent to which the assumption about capital mobility matters for the path of optimal saving is an empirical question which this paper seeks to address by adopting a simulation approach. Two population ageing shocks, representing different fertility rates, are simulated for three capital mobility assumptions—zero, perfect and imperfect capital mobility. For the case of imperfect capital mobility, we draw on the model in Glenn (1997) who considers the impact of a rise in the price of an imported production input for an economy facing an interest rate that depends on its level of foreign liabilities.

2. The analytical framework

Following the approach in the seminal study by Cutler, Poterba, Sheiner, and Summers (1990) and later in Elmendorf and Sheiner (2000) we adopt a Ramsey model modified to allow for heterogeneous consumers and workers. A central planner maximizes an intertemporal time-additive social welfare function of general form:[1]

$$V = \int_{t=1}^{\infty} N_t \frac{c_t^{1-\beta}}{1-\beta} \mathrm{e}^{-\theta t}\, \mathrm{d}t \tag{1}$$

[1] If $\beta = 1$, (1) becomes $V = \int_{t=1}^{\infty} N_t \ln\left(\frac{C}{P}\right) \mathrm{e}^{-\theta t}$.