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**Demography, Exchange Rates and Financial Assets:  
A Two-Country Perspective**

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Abstract:

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## Demography, Exchange Rates and Financial Assets: A Two-Country Perspective

Let me start with apologies and caveats first. I have been asked by the conference organisers to address the issue of 'International portfolio diversification and exchange rate movements', with a focus on the effect of international savings patterns on exchange rates, the risks of an asset melt-down, and the connection between capital market depth, risk, and returns. While I remain interested in the subject, I have not worked on it for quite a while now<sup>1</sup>. Nor am I specifically knowledgeable about the German situation. But I will try my best, using my own earlier research as well more recent studies from the OECD secretariat in particular. In doing so, I will divide the world into a country group with rapidly ageing populations (with some exceptions, the OECD) and a group with slowly ageing populations.

### Some Demographic Features

Despite some uncertainties in forecasting demographic trends over the next 50 or so years, uncertainties which are mostly due to assumed changes in fertility rates, some demographic trends can be predicted with a high degree of confidence. Three salient aspects deserve to be highlighted, because of their great importance for the future economic interdependence between the ageing OECD and the non-OECD area:

- While population ageing is a global phenomenon, OECD populations are ageing from the 'middle' of the age pyramid, in contrast to non-OECD which is ageing from the 'bottom'. In other words, the prospective demographic changes imply divergent trends across the two regions. Labour force growth rates will strongly decline in the ageing OECD area and turn negative after 2010. In strong contrast, ageing is increasing the labour force in the non-OECD area; the proportion of the working-age group in total non-OECD population will roughly remain constant (see Figure 1).
- Ageing from the 'middle', the ageing OECD area will face a strong drop in the ratio of workers to retirees, in particular after 2010. Likewise, the support ratio will start to fall in the non-OECD area, but from much higher levels than in the OECD area (Figure 2).
- A much-neglected aspect of prospective demographic changes is that it will shift the balance between the age groups that may be characterized as net borrowers and net savers. Changes in the age composition of the population will have consequences for the rate of net financial asset accumulation and on the rate of return of financial assets. The United States shows relatively high household savings in the high-income age cohorts (40–60), whereas net savings in the other age cohorts is low or negative. As the 'baby boom' generation filters through its peak asset accumulation years, the ratio of prime savers to the working age population will rise until the year 2007 and then decline. For the entire ageing OECD, the prime savers ratio will peak somewhat later (2015), before it starts to drop. By contrast, the rise of the prime savers ratio in the rest of the world, which started around 1990, will not halt before the year 2050 (Figure 3).

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<sup>1</sup> For more detail, see H. Reisen (2000), which collects my papers on pensions, emerging markets and savings. Poterba (2004) has at a recent symposium of the Federal Reserve Bank of Kansas City dealt with the same issues as this paper; but the basic insights still hold.

Figure 1 Relative change of labour force (= age group 15–60)  
OECD and NMEs, 1950–2050

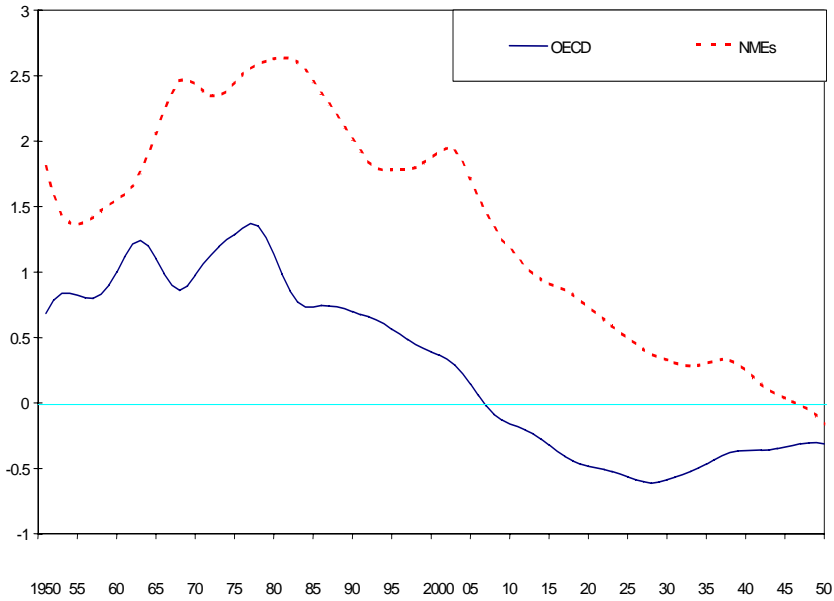


Figure 2 Support ratio = age group (15–60)/age group 60++  
OECD and NMEs, 1950–2050

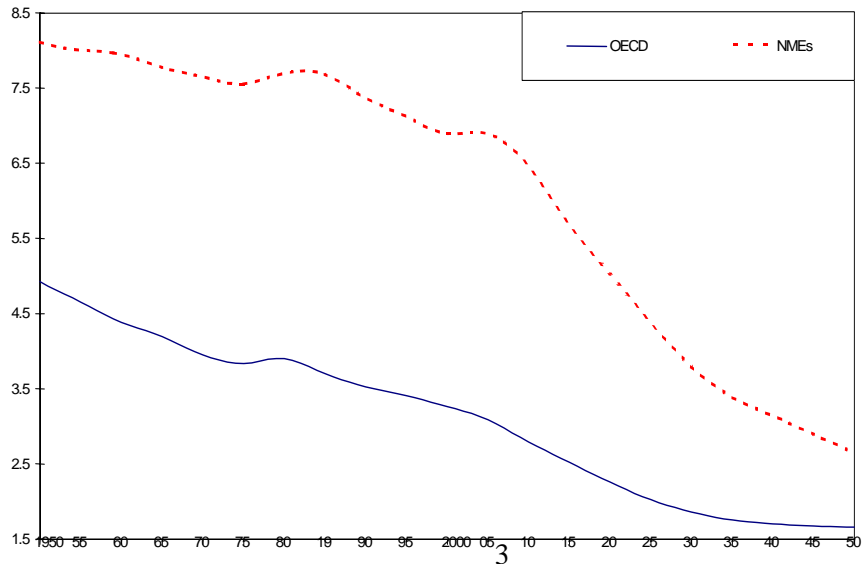
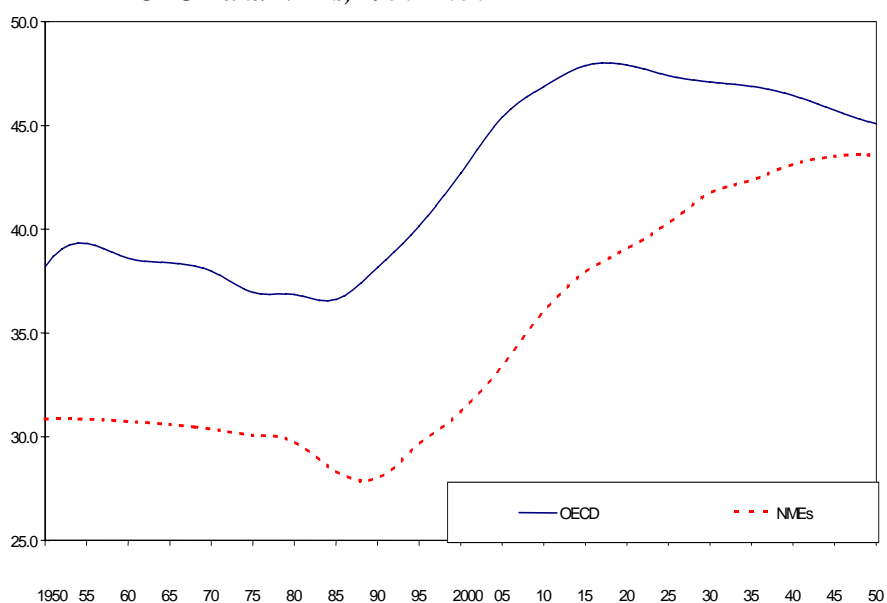


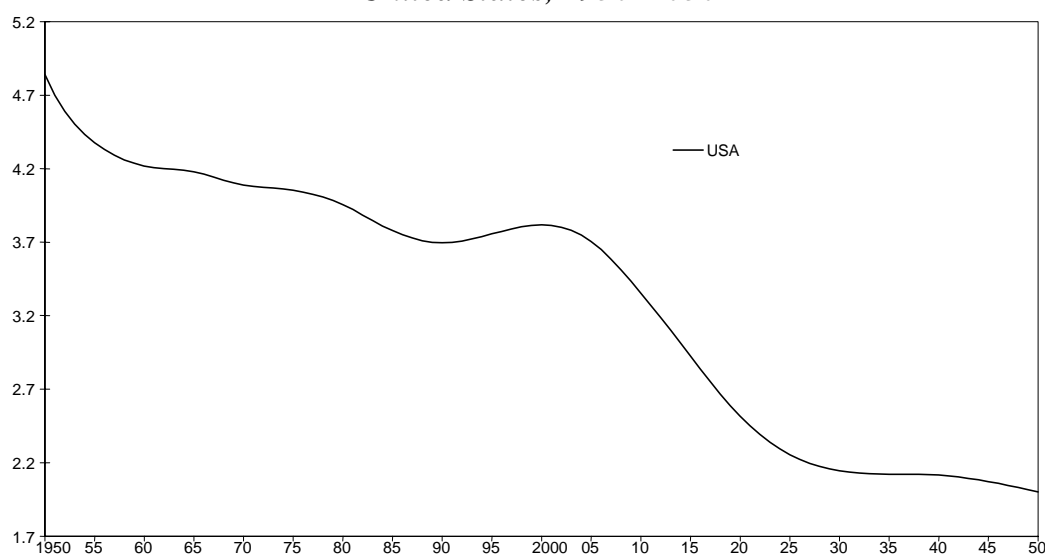
Figure 3 Prime savers ratio = age group (40–60)/age group (15–60)  
OECD and NMEs, 1950–2050



Multiplying the prime savers ratio (40–60 years old/15–60 years old) with the support ratio (15–60 years old/60+) yields another ratio that relates the prime savers cohort in the United States with the age cohort of people 60 years and older. This demographic variable, which corresponds to the peak asset accumulation relative to the peak asset decumulation cohorts according to the life cycle hypothesis, can be expected to drive financial asset accumulation and stock market valuations, at least in the United States (Figure 4).

Indeed, it does. I have shown elsewhere (Reisen, 1998) that US stock market valuations have been significantly supported by the rise in the prime savers ratio (since 1983), while the support ratio has remained fairly stable. That favourable demographic support for valuations will not last for much longer, as around the year 2000 the support ratio is prospected to start a 30-year long decline, to be reinforced by the prospected decline of the prime savers ratio from the year 2007. For the entire ageing OECD, the prime savers ratio will peak somewhat later (2015), before it starts to drop. By contrast, the rise of the prime savers ratio in the rest of the world, which started around 1990, will not halt before the year 2050; this should provide incentives to increase portfolio investments into non-OECD regions where prime savers cohorts will become strong. Obviously, PAYG schemes cannot exploit such divergent demographic trends, but funded pensions can.

Figure 4 Support ratio = age group (15–60)/age group 60++  
United States, 1950–2050



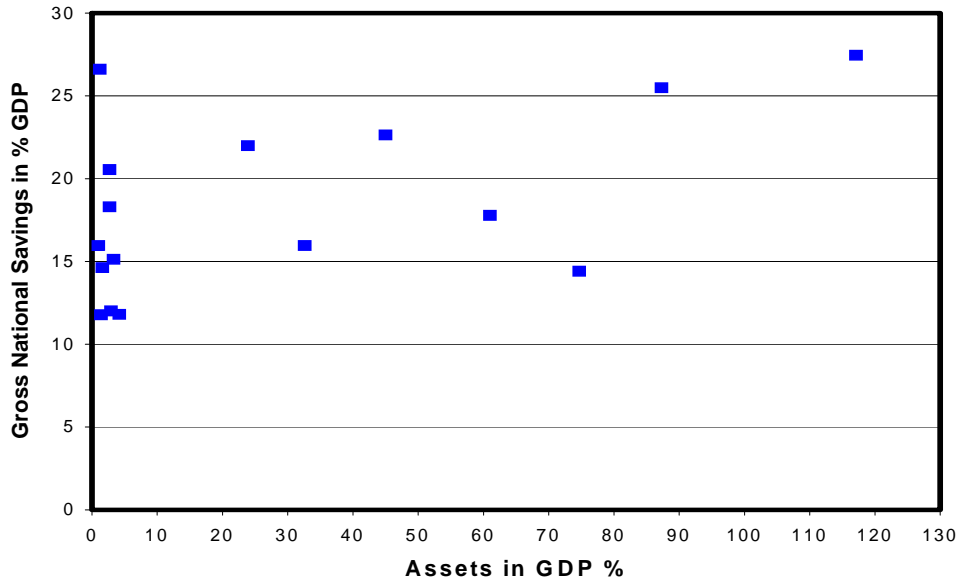
## Savings-Investment Balances and Exchange Rates

As stated above, population aging is a global phenomenon. Thus, the effect on a country's current account position is determined by whether its population ages relatively faster or slower than average, rather than by its absolute demographic position. The dependency ratio variable for each country should be expressed as the *deviation from the average* dependency ratio for all countries in the sample, rather than the *level* of the ratio.

General-equilibrium multi-country studies have either used the Solow optimal growth model, where the aggregate savings rate responds to age-induced changes in the relative scarcity of labour and capital, or a macroeconomic dynamic model, such as IMF's MULTIMOD or OECD's MINILINK, where the demographic shock impacts on output and investment, with endogenous changes to corporate, public and household savings.

In the OECD model (Turner et al., 1998), pressures on savings and investment originate from three main sources: a world-wide slowdown in growth; a decline in the weight of the OECD in world output; and the negative impact on savings, concentrated in the OECD. First, the decline in population growth causes a gradual slowdown of growth in the OECD and non-OECD, which in turn reduces the marginal return to capital and interest rates in both regions. Lower global growth lowers investment needs to maintain the required capital stock and hence lowers interest rates, with virtually no effect on exchange rates and net

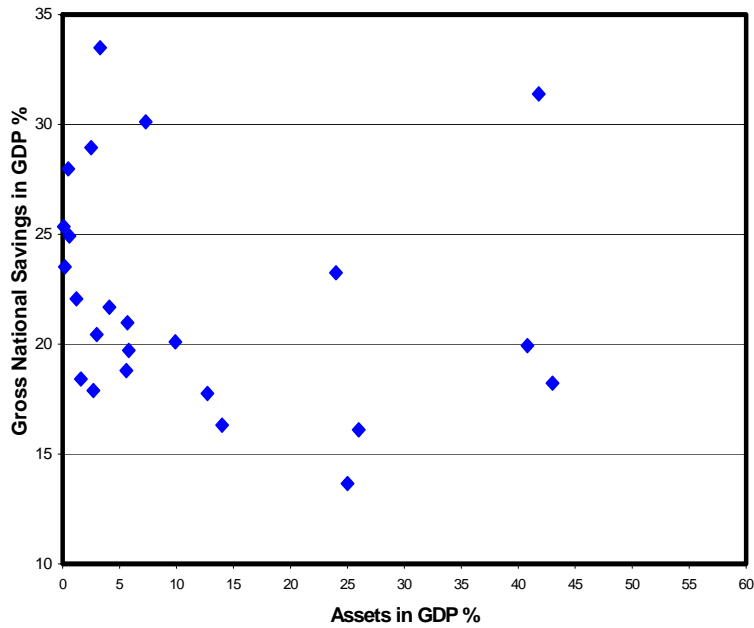
Figure 5 Countries with Mandatory Schemes



foreign asset positions. (Note that with consumption-smoothing, a permanent drop in interest rates should affect current account positions in net debtor, resp. net creditor countries.) Second, an age-induced decline of the OECD share in world output leads initially to larger OECD current account surpluses, a downward pressure on OECD relative to non-OECD interest rates, but – with increasing relative demand for OECD goods – to an upward pressure on the OECD exchange rate. A third simulation features a fall in the OECD private savings propensity, which leads to a relative scarcity of global savings relative to investment and hence increases interest rates in both regions. The overall effect on world interest rates depends on whether the effect of the slowdown in world growth dominates the demographic pressures on savings, but interest rates will be higher in the non-OECD in any case (regardless of the level of sovereign risk premia). The OECD exchange rate is likely to rise, because the relative scarcity of OECD goods is likely to dominate the demographic pressures on savings. There will be an initial build-up of OECD net foreign assets, driven by faster growth in the non-OECD region, which is subsequently reversed as a result of demographic pressures on OECD savings.

Much will depend on the degree of pension funding with which the OECD regions will enter the coming decades of acute demographic pressures. Bailliu and Reisen (1998) find a significant negative impact of the level of PAYG benefits per elderly on the aggregate national savings rate, while funded pensions tend to stimulate savings (but only in the presence of strong-incentive/mandatory schemes and liquidity constraints). By contrast, the arithmetic of unfunded, earnings-related PAYG pensions is largely governed by changes in the support ratio and by real wage growth (which in turn depends on labour productivity in the long run). These pension arrangements are essentially locked into the ageing economy, unable to escape the prospective demographic pressures resulting from the expected drop in support ratios.

Figure 6 Countries with Non Mandatory Schemes

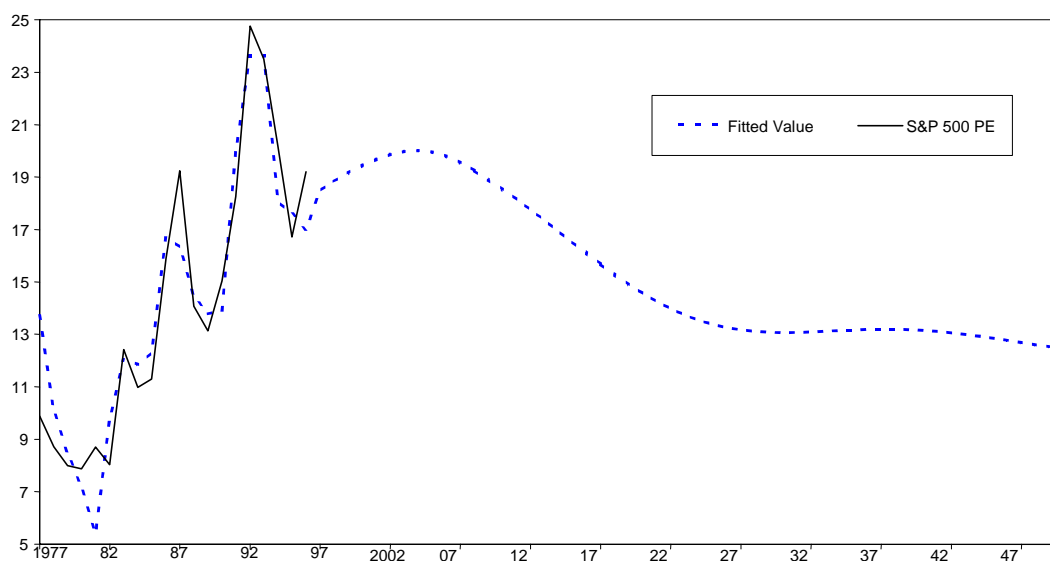


It is less understood, however, that even fully funded pension schemes will not escape demographic pressures in the absence of considerable capital flows (retirement-related or other) between the ageing OECD and the younger part of the world. First, higher life expectancy will put pressure on the arithmetic of funded pensions. Second, the demographic changes highlighted above may well add to that pressure by driving down the rate of return on pension investments.

### **Pension Decumulation, Asset Returns, and Global Diversification**

During the 1990s, financial markets in general and equity markets in particular may have benefited from large inflows into pension funds and other institutionalised forms of saving. These inflows reflected to a considerable extent saving for retirement by baby boom generations. These baby boom generations are expected to start to move into retirement after 2010. Almost as a natural corollary to the developments during the 1990s, some observers have argued that when baby boomers start entering retirement they will become net sellers of financial assets to finance retirement consumption. As subsequent generations are smaller in numbers, other things equal, this would put downward pressure on financial asset prices (“asset meltdown hypothesis”). Others have pointed out that large-scale liquidations of assets are unlikely to occur because of bequest motives and lifetime uncertainty and that international capital mobility and forward-looking capital markets will mitigate any possible impact of mass retirement of baby boomers on financial asset prices.

Figure 7 S&P 500 price/earning ratio: fitted values and projection



The out-of-sample scenario, which is fully driven by the ratio of prime savers to people older than 60, tells us that the US stock market valuations will peak soon (2006/7) and then start a long decline, before P/E ratios will stabilize around 2030. The prospective drop in the SP 500 P/E ratio would represent a decline of 30 per cent, on account of deteriorating demographic fundamentals.

This scenario would confirm earlier concerns (Schieber and Shoven, 1994) that, as US funded pensions cease to be a source of net savings, asset prices will be negatively affected. This can reinforce the maturity-induced shift of pension portfolios from equities and long-term bonds into short-term securities or cash, as Schieber and Shoven suggest, but it can also lead to a shift of equity portfolios into the younger economies where the prime savers ratio will continue to rise well into the year 2050.

However, several arguments suggest that there may not be a strong adverse impact of the retirement of baby boom generations on financial asset prices. First, the assumption of rational expectations provides an argument against the 'asset meltdown hypothesis', provided that demographic developments are predictable with some degree of accuracy. Well-functioning asset markets would price financial assets so that their current market price would equal the expected present discounted value of future earnings and demographic developments and their impact on future earnings should be reflected in current prices once the information on demographics-induced developments becomes available. However, while financial markets have been assumed to be efficient, no arbitrage opportunities exist if demographics affect the demand for assets in a similar way.

Second, bequest motive and lifetime uncertainty may imply that financial assets are decumulated at a less rapid rate than the standard life cycle hypothesis would suggest. Given increasing longevity and life time uncertainty, decumulation of assets may be slow and only start at a more advanced age, as retirees attempt to ensure that sufficient capital remains available for the entire uncertain lifetime. As well, there may be intergenerational transfers out of the bequest motive.

Third, deregulation and liberalisation of financial systems over the past decades have increased international capital mobility, which could weaken any link between *domestic* asset prices and *domestic* demographic developments. Increasingly integrated international financial markets should provide better opportunities for the global allocation of saving and investment.

In principle, the case for mutual benefits arising from the global diversification of portfolios is nowhere stronger than for funded retirement savings (Reisen, 1994). The diversification of OECD pension assets into the non-OECD stock markets provides the prospect of higher expected return for a given level of risk or, put alternatively, lower risk by eliminating non-systemic volatility without sacrificing expected return. It is less the superior growth performance of the non-OECD area than the low correlation of returns generated by the emerging stock markets with those of the OECD stock markets that governs this expectation. The correlation between returns on OECD and emerging stock markets will remain low even when diversification gains are seriously exploited. Differences between the two areas with respect to the exposure to country-specific shocks, the stage of economic and demographic maturity and the (lack of) harmonization of economic policies suggest that the diversification gains for OECD pension assets will not disappear quickly.

The evidence has not been kind to the reasoning outlined above. Two distinct regional currency crises, the 1994–95 tequila crisis in Latin America and the 1997–98 Asian crisis, have tarnished the reputation of emerging stock markets to provide superior returns to OECD-based investors. While the emerging economies have grown more quickly than the OECD countries, this has not translated into higher earnings per share growth in the emerging markets. The emerging markets have to increase corporate profitability if they are to attract a growing share of OECD pension assets.

Moreover, a series of financial crises over the last decade has triggered strong contagion effects. Contagion leads to higher correlation of stock market returns among the emerging markets, taking away their potential diversification benefits. Contagion leads to shrinking benefits of international portfolio diversification as returns to emerging stock markets are driven by systemic factors external to these markets themselves. Global diversification can reduce only non-systemic risk. Therefore, emerging markets will only then be able to improve OECD pension returns if they catch up with OECD levels of corporate profitability and if they reduce their vulnerability to the currency crises witnessed in the 1990s.

As emerging-market stock (and bond) markets are likely to remain peripheral asset classes for a considerable period, much of financial integration will occur through foreign direct investment, which suffers less from asymmetric information problems than other forms of finance. Consequently, an investor who puts a stock such as Nestlé in his portfolio is participating in the demographics of the non-OECD world where the firm retains a large part of both earnings and cost reductions.

Still, financial globalization can only attenuate, not compensate the demographic impact on capital returns and net savings. Table 1 reports some selected results from simulating age-structure effects and two scenarios on future financial integration between the OECD and the non-OECD area. The results are based on MacKellar and Reisen (1998) who use a neoclassical economic-demographic accounting model in which age-specific saving and labour force participation rates are held constant. In the baseline scenario, which in view of assumed growth differentials in favour of the South corresponds roughly to a situation of autarky, OECD investors – including pension funds – allocate 10 per cent of their annual investment expenditure to the non-OECD. In the alternative scenario, designed to illustrate the impact of financial globalization, this share is increased to reflect the growing share of non-OECD in global stock market capitalization and in global output.

With financial autarky, the drop in the Northern labour force will lead to higher capital–labour ratios in the OECD, resulting in a drop to capital returns by 150 basis points in the OECD area. Lower capital returns in

turn drive net savings lower, from 6.9 per cent of GDP in 1995 to 2.7 per cent in 2050. But even under the autarky scenario, net pension flows from the OECD to the non-OECD will strongly rise by the year 2020 and rise further (albeit more slowly) for the rest of the century. These trends result from growth differentials that favour the non-OECD area, reinvested pension returns and higher OECD pension assets. Other capital flows to the non-OECD will even rise more strongly, as high capital returns are reinvested (by half of earnings). This will result in a higher non-OECD share of OECD pension assets until 2050, before the run-down of pension assets invested abroad and more favourable demographic trends in the OECD area will lead to reversals in these trends.

*Table 1 Summary results of the MacKellar/Reisen simulation*

	1995	2020	2050
Rate of return to capital, OECD (%)			
Autarky scenario	8.0	7.1	6.5
Globalization scenario	8.0	7.3	6.9
Difference	-	0.2	0.4
Net saving rate, OECD (% of GDP)			
Autarky scenario	6.9	5.0	2.7
Globalization scenario	6.9	5.4	3.4
Difference	-	0.4	0.7
Non-OECD share of OECD pension assets (%)			
Autarky scenario	0.9	6.4	7.5
Globalization scenario	0.9	14.1	22.0
Difference	-	7.7	14.5
Net foreign assets, OECD (% of GDP)			
Autarky scenario	2.6	9.3	10.3
Globalization scenario	2.6	24.3	54.9
Difference	-	15.0	44.6
Income at retirement age, OECD (1995 US dollars per person aged over 60)			
Autarky scenario	16 830	17 947	19 005
Globalization scenario	16 830	18 092	19 754
Difference (per cent)	-	0.8	3.9

*Source: MacKellar and Reisen (1998), A Simulation Model of Global Pension Fund Investment', OECD Development Centre Technical Paper No. 137.*

Financial globalization can only attenuate, not compensate the demographic impact on capital returns and net savings in the neoclassical simulation model. Globalization leads to a partial convergence of capital returns between the two regions, reducing the ageing-induced drop in the North by 40 basis points by 2050. Globalization is estimated to slow the drop in the net saving rate in the OECD countries by one half of one percentage point over the next half-century. Analysis of the components of saving reveals that this increase in aggregate savings is entirely attributable to increased corporate savings. Higher capital returns on domestic capital and a higher share of foreign investment abroad where capital returns are higher account for this result. By contrast, globalization depresses household savings below their already sluggish level in the baseline scenario, as OECD labour is equipped with relatively less capital and thus earns lower wages.

The distributional effects of globalization are much discussed, but the generational dimension is underappreciated. Improved performance of retirement saving portfolios in the globalization scenario raises the income of the OECD retirees significantly, by roughly 3 per cent in 2020–30, when retirement of the baby boom generation will peak. Lower availability of capital in the OECD, on the other hand, slightly hurts the income of workers. In other words: financial globalization may hurt OECD retirees as long as a large share of their pensions is pegged to wages through the PAYG system; it only will benefit retirees with funded pensions.

Finally, net foreign asset positions and net capital flows grow so important in terms of OECD output under the globalization scenario that they will become clearly vulnerable to sovereign risk and changes in investor sentiment (witness Asia's crisis in 1997–98). As the MacKellar/Reisen simulation suggests only modest benefits for capital returns and savings from financial globalization which in turn implies massive exposure of OECD pension assets to sovereign risk, it is suggested that global diversification will not be able to 'beat demography'.

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