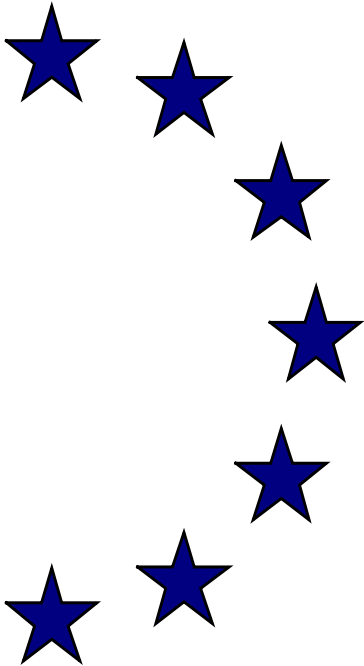


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**Economic and financial market
Consequences of ageing populations**

by

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Directorate-General for Economic and Financial Affairs

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ECONOMIC AND FINANCIAL MARKET CONSEQUENCES OF AGEING POPULATIONS

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INTRODUCTION

FOCUS OF PAPER : The implications of ageing populations over the coming decades at the global level will be significant in terms of not only a slowdown in the growth rate of output and living standards but also with regard to fiscal and financial market trends. Given the backdrop of the downward trend in worldwide potential growth rates over the past number of decades, driven by falling rates of capital accumulation and a slowdown in productivity growth, the additional negative impact of relative declines in the growth rate of working age populations over the coming decades bodes ominously for future worldwide economic developments. The focus of the present paper will be to quantify and analyse the nature, extent and geographical reach of the “real” economy and budgetary aspects of ageing populations as well as providing an initial assessment of the financial market implications of this phenomenon. Particular attention will be devoted to the impact of ageing for labour supply trends; for expenditure pressures on the public finances; for savings, investment and productivity developments; as well as interest rate, exchange rate and current account effects. Finally, an initial assessment will also be provided regarding its effects on globalisation trends in general but more specifically international financial flows and pension fund investments.

OVERVIEW OF PROBLEM : Life expectancy, fertility rates and migration flows are the key determining factors underlying all population projections. Any objective assessment of the likely evolution of these factors over the coming decades suggests that ageing populations will be an inescapable global phenomenon, due to the progressive lengthening in life expectancy in many countries and the fall in fertility rates to below the critical threshold levels required for generational renewal. At the global level, the number of elderly people will grow from less than ½ a billion in 2000 to 1 ½ billion in 2050 which as a share of the overall population is equal to an increase from 7% to 16 ½%.

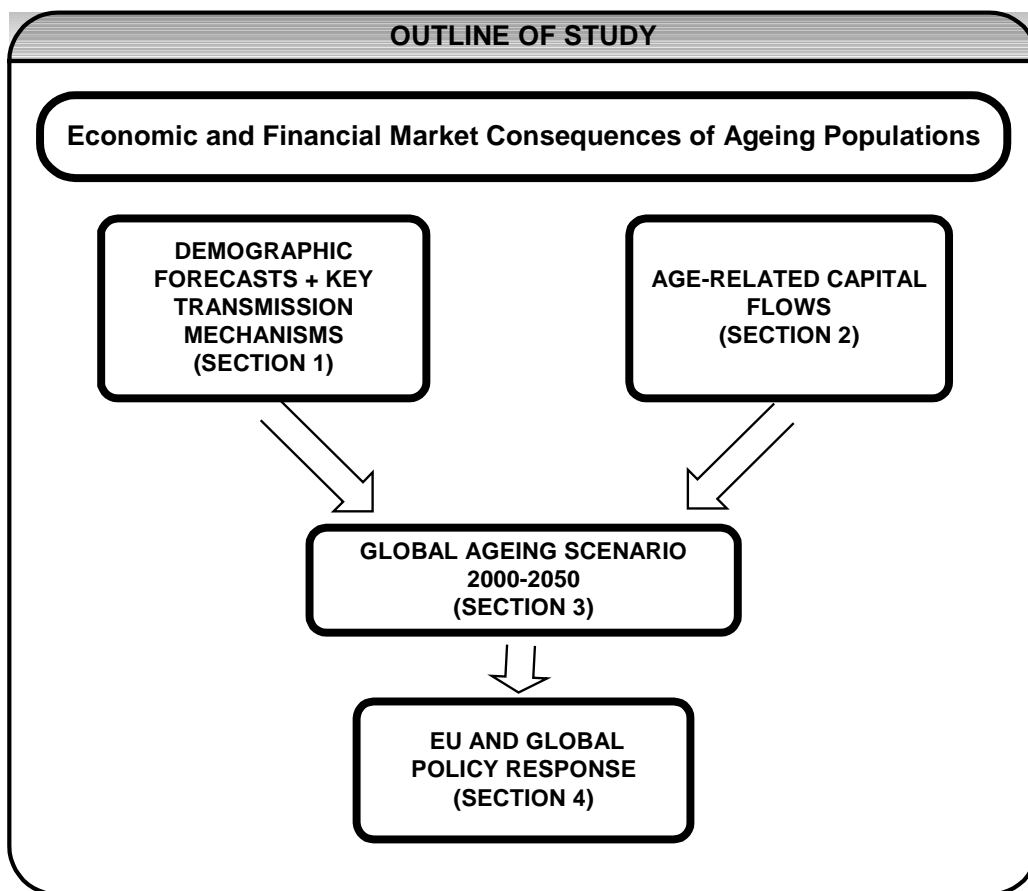
Of course the extent of the ageing phenomenon varies substantially in the different regions of the world, with the present more developed parts of the globe being relatively more affected by the “greying” of their populations. For example, compared with a global share of around 7% in the year 2000, the number of over 65’s in the total populations of the EU, US and Japan is presently in the 13-17 percent range, with the latest demographic projections predicting that these shares are likely to almost double between now and 2050 in the case of the EU and Japan to reach 28% and 31% respectively, while growing more modestly in the US to just over 20% at the end of the period. In the case of the latter areas, while the share of the elderly also grew over the last number of decades, increases up to the present time did not pose insurmountable problems because the population of working age was also growing rapidly and dependency ratios actually fell. This latter luxury of growing numbers entering the labour force, which governments could turn to in order to fund the additional pension and health care expenditures associated with an ageing population, is fast disappearing. Over the next half century, sharp increases in dependency ratios are projected to emerge in most areas of the world. These twin developments, i.e. growing shares of the over 65s in the population allied to declining numbers in the age groups which traditionally supported the non-economically active age groups, is ensuring that “grey” pressure is rapidly emerging as a key medium to long-term policy concern.

RESEARCH APPROACH : A lot of research has been carried out on this issue in various organisations either on the situation in individual countries or on specific age-related topics such as the impact of ageing on the public finances, potential output or private savings behaviour. While this work is vital and adds considerably to the ongoing debate, it suffers from its inherently partial nature in that the importance of international linkages and the role of systemic interactions and feedback mechanisms are inadequately catered for. These “general equilibrium” elements are crucial in providing a complete understanding of the likely impact of a global phenomenon such as ageing. ECFIN’s ageing model, with its large geographical coverage and with its behavioural equations firmly based on current microeconomic principles, is able to provide a single, internally consistent, framework for handling all the macroeconomic aspects of the “greying” issue.

As is typical with all such models, the structure and coverage of ECFIN’s ageing model has undergone substantial change over time. The present study in fact builds on earlier work with the model which was presented in the research papers Mc Morrow and Röger (1999) and (2002) and which had a particular focus on the real economy and budgetary consequences of ageing populations. Since that time ECFIN has continued to develop its model in a number of important respects. In particular, and one of the important areas of focus for the present paper, is that the model has now a greater capacity to examine the financial market implications of ageing populations since all countries and geographical zones around the world have been given a clearly defined series of equations linking the demographic, GDP, net foreign asset, consumption and savings variables. In addition, the basic driving forces influencing retirement income provision, health expenditure and an individuals labour supply decision have also been modelled. Finally, the model is now a generalisation of simple overlapping generation models since it allows for realistic male and female life expectancies as well as credible average work and retirement duration’s.

STRUCTURE OF STUDY : This study is structured as follows. Section one provides a short overview of the basic data in terms of the past and expected global population trends over the period 1950-2050, with the world broken down into 5 areas, namely the EU, US, Japan and two groups of fast and slow ageing countries. In addition, it also discusses, in a partial equilibrium framework, the main channels via which ageing will impact on the various economies, namely : expenditure pressures on the public finances; private savings behaviour; labour supply; capital accumulation and productivity implications; and finally the financial channels, namely real interest rates, real exchange rates and shifts in external balances. Section 2 takes a closer look at the financial market effects and in particular assesses the evidence regarding age-related international capital movements. The ageing scenario for 2000-2050 presented in section 3 takes the broad numbers from section one as well as the insights from section 2 to provide a, no-policy change, general equilibrium, perspective on ageing at the global level using ECFIN’s ageing model. Finally, section 4 examines the main elements of an effective policy response to the problems highlighted in section 3 and assesses the implications for the EU and world economies of various policy changes. More specifically, the effect on the EU of policy reforms in the labour market, pensions and productivity areas are assessed in section 4.1 in terms of both easing the economic burden of ageing and evaluating the financial market implications of such reforms. Section 4.2 examines the effects of a mutually beneficial partnership between the developed and developing world, based on gains from a further boost to globalisation in terms of higher world

growth, less global income inequalities and higher rates of return on international capital flows.



SECTION 1 : GLOBAL DEMOGRAPHIC FORECASTS AND THE ECONOMIC CHANNELS VIA WHICH AGEING WILL IMPACT ON ECONOMIES

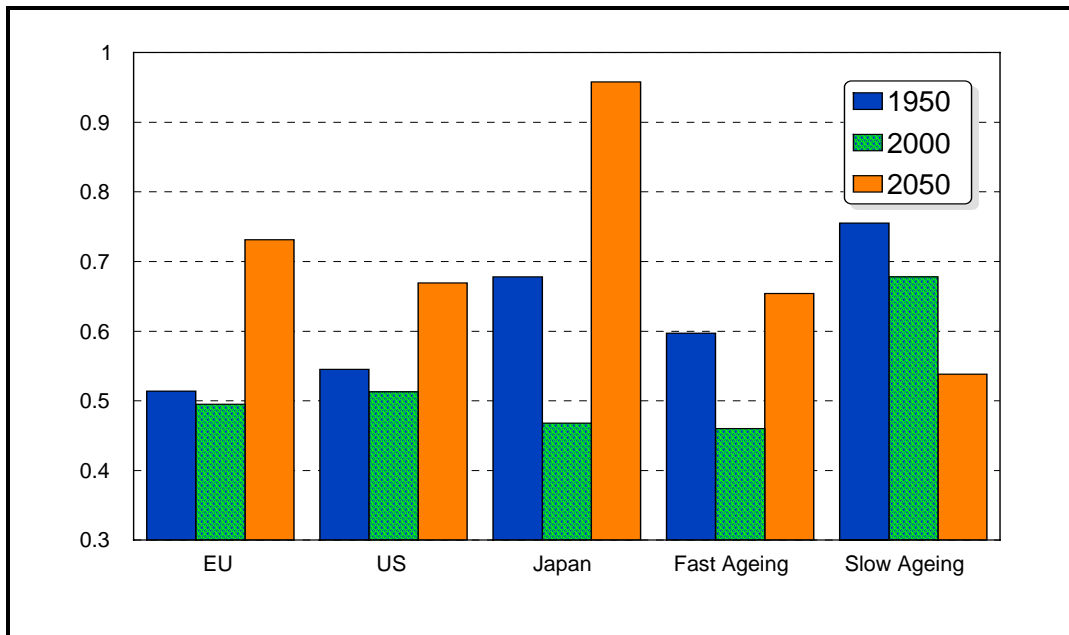
1.1 DEMOGRAPHIC TRENDS AND FORECASTS 1950-2050

The present section examines past (1950-2000) and projected (2000-2050) population trends and assesses the implications of these latter trends for dependency ratio developments. The population projections used for the analysis draw on Eurostat's baseline projections for the EU, on the US Census Bureau's equivalent projections for the US, and on the UN's long-term, medium variant, projections for the rest of the world. All 3 sets of projections cover the period 2000-2050 and were carried out in the year 2000. The text also includes references, where appropriate, to data covering the period from 1950 to the present time, in order to place the expected trends for the next 50 years in their proper historical context. While the UN, US Census Bureau and Eurostat population projections appear realistic, with their mid-point estimates being based on a plausible examination of the most recent trends for the key determining variables, it is nevertheless important for policy makers to be conscious of the potential uncertainties which are involved. The usual warnings therefore apply to these projections, i.e. they are prone to forecasting errors, due in particular to unpredictable and sometimes substantial fluctuations in fertility rates as well as the difficulty in predicting the impact of various social, economic and political factors in the determination of net migration flows.

For the purposes of the historical and future analysis in this paper, ECFIN's ageing model is split into five country blocks, the EU, the US, Japan and with the rest of the world broken into two distinct groups of countries, namely "fast ageing" and "slow ageing". This classification for the rest of the world is similar to the approach adopted by Turner et al (1998) and is based on the dependency ratio calculations underpinning the UN's global population projections. In effect those countries which are expected to experience an increase in their overall dependency ratio over the coming decades are classified as fast ageing, with this latter group made up of OECD member countries (other than EU15, US, Japan, Mexico and Turkey) plus all of the Eastern European countries, Russia, China, Hong Kong, Korea, Singapore and Thailand. The slow ageing group simply includes all the remaining countries of the World not classified elsewhere.

The essential feature to highlight regarding past and current demographic developments at the global level is the extent of the demographic upheaval which has and is occurring, due to falling birth rates and lengthening life spans. As regards future projections, while uncertainties exist, especially regarding the evolution of fertility rates, one fact appears indisputable, namely that large increases in the share of the over 65s in the overall population of all five areas is set to occur over the coming decades due to global increases in life expectancy. These trends in life expectancy were also a feature of the last 50 years but what is new is the reduction in the share of the population of working age which provides the economic support for the youth and retired populations. Changes in the 15-64 age group will ensure that increases in dependency ratios will occur in four of the five areas, with the "slow ageing" group being the only exception. It is envisaged that the ageing process, leading to higher dependency ratios in the remaining areas, will have major economic and social consequences for the countries affected.

GRAPH 1 : DEPENDENCY RATIO* DEVELOPMENTS AND FORECASTS 1950-2050



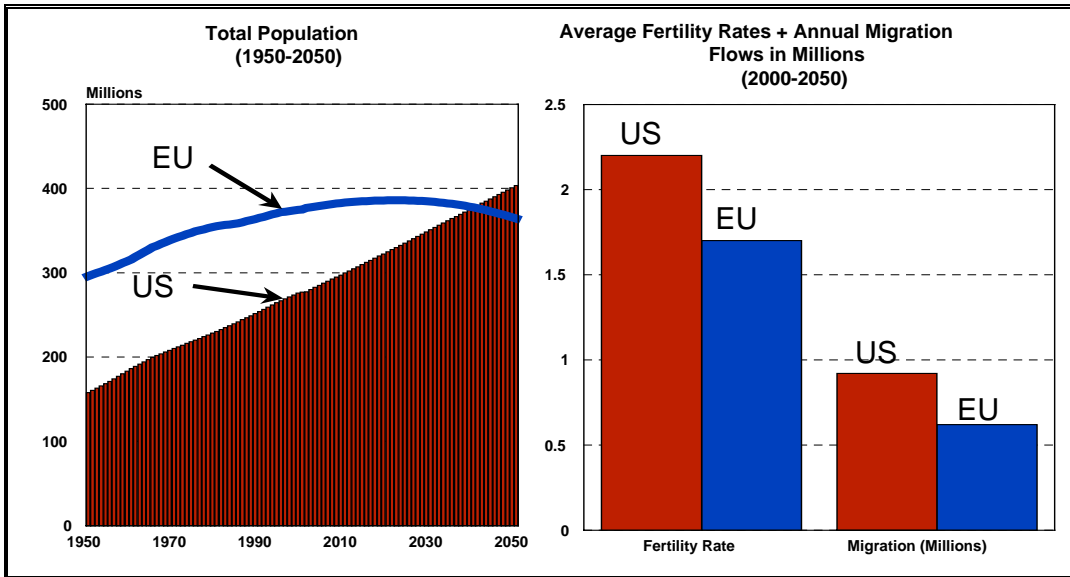
*Dependency ratio = (Pop. under 14 or above 65) / (Pop. aged 14-64)
 Source : Eurostat, US Census Bureau and UN

Recent Revisions to the Demographic Outlook for the US :

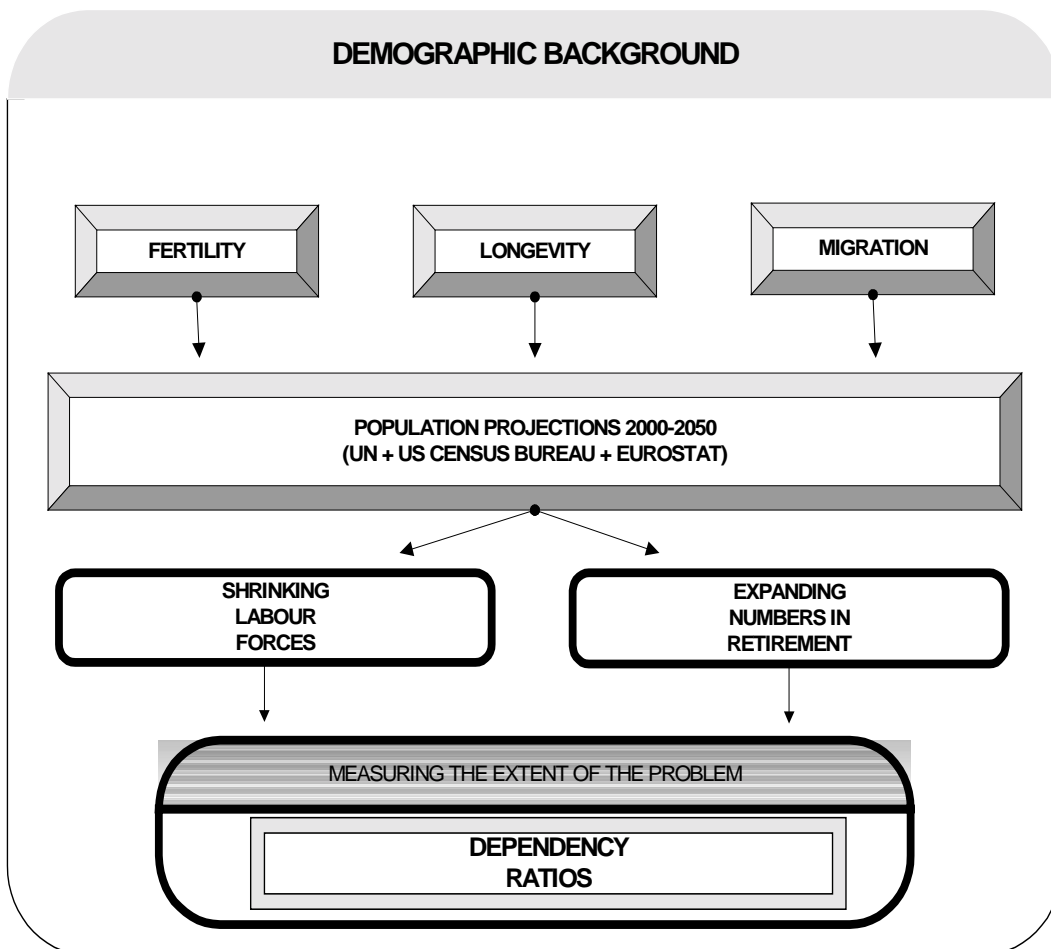
Compared with the demographic analysis included in Mc Morrow and Röger (1999), the one big change which has occurred in the intervening period has been the revised population projections for the US. On the basis of the evidence from the 2000 US census, the US is now facing a very different short and long run demographic outlook compared with the EU. While life expectancy developments and projections are still very similar in both areas, fertility rate trends and forecasts differ substantially, due to the recent recovery in US birth rates to 2.0 per woman (compared with 1.5 in the EU) and the expected further improvement to 2.2 over the coming decades (compared with a recovery to 1.7 in the EU). Differences in terms of fertility rates are further reinforced by migration trends, with the central projection of the US Census Bureau suggesting that 45-50 million of the nearly 130 million increase in the total US population over the period 2000-2050 will come from international migration flows, i.e. 35-40% of the total. This compares with a predicted 30 million increase in EU migration over the same period. Finally, in terms of total population numbers, it is interesting to note that the US has moved from having a total population of just half that of the EU in 1950 to an expected population in 2050 which, at 400 million, would be 40 million higher than in the EU¹. This outcome seems inevitable unless there is a radical shift in the relative fertility and migration trends described above.

¹ Excluding the impact of the forthcoming enlargement.

GRAPH 2 : DEMOGRAPHIC COMPARISON OF THE EU AND THE US



Source : Eurostat and US Census Bureau



1.2 MAIN ECONOMIC TRANSMISSION CHANNELS

The unprecedented nature of ageing raises serious questions as to its implications for the public finances, and in particular for the sustainability of the present old age PAYG (Pay-as-you-go) pension system; for private savings behaviour; for the evolution of labour productivity; and for the outlook for potential growth and living standards in general. In addition, the effects of ageing are not confined to the respective domestic economies, with the international dimension being crucial. Consequently, as well as the domestic changes in savings / investment balances, the regional and global effects must also be considered, as differences in the intensity and timing of the ageing phenomenon will provoke changes in relative interest rates, exchange rates and international capital movements.

Economically, ageing is expected to operate through the following main channels : expenditure pressures on the public finances; “life cycle” effects on private savings behaviour, as well as Ricardian equivalence effects operating through the deterioration in public savings²; labour supply implications; potential impact on capital accumulation; effects on total factor productivity; and finally the equilibrating role for interest rates and exchange rates and shifts in external balances. All of the latter factors are discussed briefly below using a partial equilibrium framework. While this approach is interesting and elucidating in terms of highlighting the key influences at work, this section should only be regarded as being an explanatory input for the general equilibrium analysis in section 3 where the crucial systemic effects of ageing, such as behavioural changes and shifts in financial market variables, are taken into account in determining the final economic impact of ageing.

Expenditure pressures on the public finances :

Public expenditure pressures are forecast to be intense in those areas of public budgets, such as health and pensions spending, which are linked to life cycle developments. Ageing is consequently expected to result in substantial increases in age-related public expenditures. Furthermore, and equally worrying if past experience is anything to go by, governments will have difficulty in keeping their pension and health care budgets to the, already rather large, increases which will emanate from purely demographic factors. Despite the relatively favourable demographics operating at present in terms of the public finances, health and pension expenditures as a % of GDP have been rising steadily over recent decades. In fact, the transfers to households category (i.e. social benefits), of which pensions and health are major components, has accounted for nearly two-thirds of the increase in the total government expenditure to GDP ratio in the EU since 1970. Pensions and health care expenditure combined represent roughly 1/3 of all EU government expenditure.

Demographic Change and savings behaviour :

Crucial to any analysis of the likely economic impact of an ageing population is its effect in terms of savings rates. A broad consensus exists in the empirical literature that population ageing, in the form of both falling birth rates and increases in life expectancy, plays a role in terms of long run savings rate developments. Under the life

² For the simulations carried out in section 3, since any increases in age-related public expenditure are fully financed via tax increases, Ricardian equivalence effects do not play a role, although an assumption of debt financing can be adopted for sensitivity analysis purposes.

cycle view, the savings rate would be expected to be high when a large proportion of the population is employed, with savings being built up to finance post-retirement consumption. Likewise, the savings rate should be lower when a large percentage of the population is very young or is above the retirement age. In addition, while the empirical literature generally confirms the existence of a negative association between changes in dependency ratios and changes in private savings, there is unfortunately no consensus regarding the strength of that link (see Box 1).

Labour Supply Implications :

Any assessment of the likely burden to be imposed due to ageing must take cognisance of the future shape of EU and world-wide labour markets. High unemployment combined with low activity rates, would imply high taxes and social security contributions. Such burdens imposed on the working population by the increase in EU dependency ratios would be likely to generate considerable disincentive effects in terms of labour supply and work effort. Labour market reforms have the potential to considerably relieve the economic pressure of ageing in the EU through unemployment reductions and the achievement of activity rates comparable to those in the US and Japan. However, such a favourable response from the labour market would, of course, only be forthcoming in the event of a comprehensive reform package, including taxation and social welfare reforms. In this regard eliminating the financial disincentives to remaining longer in the labour force and measures to increase the statutory as well as the effective retirement age could generate substantial gains, especially for Europe. As regards increases in the effective age of retirement, this could be achieved by changing key features of Member States' pension systems, especially the pressing need to ensure that pension systems become actuarially neutral.

Potential impact on capital accumulation :

Is the option available of reducing the impact of ageing on living standards through capital accumulation?. Savings and investment have a potentially important role to play in helping to offset the effects of rising dependency burdens, with greater levels of savings leading to additional productive investment and stronger long-run growth. However, this investment route to boosting output would appear unrealistic, as the most likely outcome, especially if one subscribes to the life cycle hypothesis, is for a fall in national savings which is largely demographically induced. If one accepts that greater levels of savings, converted into additional human and physical wealth holdings, increase the options available for coping with the adverse effects of ageing, then prudence demands action to boost national savings rates over the medium to long run, with action in terms of government savings / dissaving being the most effective avenue to be explored.

BOX 1: "LIFE-CYCLE" EFFECTS ON PRIVATE SAVINGS BEHAVIOUR³

Life-cycle (LCH) models of savings behaviour suggest that an important component in determining the aggregate savings rate is a population's demographic profile, with savings propensities and the overall dependency ratio expected to be negatively correlated. Inter-temporal considerations provide the intrinsic analytical underpinning of such models, with the objective of the average consumer being to even out consumption over a lifetime in which income fluctuates substantially depending on age, i.e. the notion of consumption smoothing. Under this view of the world, the savings rate would be expected to be high when a large proportion of the population is employed, with savings being built up to finance post-retirement consumption. Likewise, the savings rate should be lower when a large percentage of the population is very young or is over the retirement age.

While theoretically the link between aggregate savings rates and dependency ratios in LCH-type models is clear, unfortunately the empirical supporting evidence is more heterogeneous. In a mid-1990's review of the empirical evidence, Meredith (1995) concluded that the data source used impacts significantly on the results obtained, with studies based on microeconomic or macroeconomic, time-series or cross-section data, producing widely divergent estimates of the responsiveness of the savings ratio to changes in the dependency ratio. In overall terms, Meredith suggested that the forecasts of the life cycle model in relation to demographics and savings is generally supported by the evidence derived from aggregate data, with changes in the elderly dependency ratio having a greater effect on savings patterns compared with the youth dependency ratio (see Table A). A simple unweighted average of the estimated coefficients of all the studies shown in Table A suggests that the savings rate would fall by 0.75 and 0.52 of a percentage point for every 1 percentage point increase in the elderly and youth dependency ratios respectively. Effects on the aggregate savings rate of this order of magnitude, in the absence of changes to the other major determinants of household savings, would undoubtedly represent a significant response to the projected shifts in the demographic structure of industrialised areas such as the EU, Japan and the US, with even greater effects expected for developing countries.

However, it should be noted that while most econometric studies do discover a significant and numerically important association between demographic variables and aggregate savings rates, other studies using household survey evidence challenge that view and suggest that any effects on the savings rate may be negligible. In addition to this survey evidence, the results of studies such as that by Masson, Bayoumi and Samiei (1998)⁴, which derives both time-series and cross-section estimates, suggests that although demographics are important determinants of private savings rates, the size of the dependency ratio effect is lower than that found in the above series of studies quoted by Meredith, with a 1% point increase in the dependency ratio leading, according to Masson et al, to a reduction of only 0.14% in the private savings ratio of industrial countries. Turner et al (1998) in their paper on ageing sided with the Masson et al. view and incorporated a coefficient of 0.3 for their model simulations. Finally, Loayza et al. (2000) also suggested that the implied negative savings effects from dependency rate changes in developed economies are significantly lower than originally estimated at .22 (old age) and .07(youth). In deference therefore to the downward direction of the most recent evidence, and conscious of the extreme shifts in private savings ratios implied by the pre-1995 studies, it appears prudent to move to the lower end of the various estimates, with the present study assuming a negative coefficient of 0.2 (old age) and 0.1 (youth), for the EU, US and Japan. This represents a conservative view of likely developments which is justified given that higher coefficients would translate into lower capital accumulation and even lower potential growth rates than those assumed in the central scenario.

³ Concerning public savings, the model is used in the central scenario to estimate the effect of ageing pressures on public expenditure but it is assumed that increased expenditure is financed by increased levels of taxation. For example, in the case of pensions, any increase in expenditure is financed by increases in social security contributions which normally are assumed to have the same effect in ECFIN's ageing model as an increase in direct taxation but this assumption can be relaxed to allow for the savings element of social security contributions. The tax financing rule firstly, and most importantly, ensures that the public finances stay on a sustainable path over the simulation period and secondly it avoids having to adjust private savings rates for Ricardian equivalence effects, although such adjustments could be made if necessary.

⁴ This study on the international evidence regarding the determinants of private saving, concludes that income growth, real interest rates and demographic effects are important determinants of private savings rates. In addition, changes in the fiscal position of governments are found to be substantially offset, by an average of 60%, by changes in private savings behaviour. Population ageing would therefore appear to be an important determinant of, and impact negatively on, private savings rates.

Table A : Summary of Studies on Demographics and Private Savings

(Figures in parentheses are estimated t-statistics)

	EFFECT ON THE SAVINGS RATE OF A 1 % POINT RISE IN THE DEPENDENCY RATIO	
	YOUTH	ELDERLY
<i>AGGREGATE CROSS-SECTION STUDIES</i>		
1. Modigliani (1970)	-0.20 (3.7)	-0.88 (3.1)
2. Feldstein (1980)	-0.77 (3.9)	-1.21 (2.7)
3. Modigliani and Sterling (1983)	-0.13 (1.4)	-0.51 (4.3)
4. Horioka (1986)	-0.92 (4.2)	-1.61 (4.0)
5. Graham (1987)	-0.87 (2.9)	0.12 (0.3)
6. Koskela and Viren (1989)	-0.73 (1.7)	-0.76 (0.8)
7. OECD (1990)	...	-0.93 (2.4)
8. Horioka (1991)	-0.44 (1.7)	-1.09 (2.4)
<i>TIME-SERIES STUDIES</i>		
9. Shibuya (1987)	...	-0.34 (3.8)
10. Masson and Tryon (1990)	-1.10	-1.10
11. Horioka (1991)	-0.30 (5.1)	-1.13 (3.7)
12. Masson, Bayoumi and Samiei (1998)	-0.14* (4.4)	-0.14* (4.4)
13. Loayza, Schmidt-Hebbel & Serven (2000)	-0.07 (-0.70)	-0.22 (-1.42)
<i>SIMPLE UNWEIGHTED AVE. OF THE ESTIMATION RESULTS</i>		
	-0.52	-0.75
<i>HOUSEHOLD DATA STUDIES⁵</i>		
Hayashi, Ando and Ferris (1988) Bosworth, Burtless and Sabelhaus (1991) Auerbach and Kotlikoff (1992) Canari (1994) Borsch-Supan (1996)	These studies question the applicability of the life-cycle model on the basis of the observed savings behaviour of the elderly in household data. The coefficients on the old age and youth dependency ratios in these studies are "near zero".	

*Masson et al. calculate the coefficient for the overall dependency ratio since separating the latter ratio into its youth and old age components did not give results which were significantly different from each other.

Sources : Updated version of Meredith (1995) and OECD (1998)

⁵ Meredith (1995) concluded in relation to these household data studies "By using more recent and detailed information on the income and consumption of retired households, the analysis has shown that the savings rates for the elderly calculated in some household level studies may be misleading. It appears that the elderly do dissave, and that the rate of dissaving is very similar to that predicted by a life-cycle model of household behaviour". Meredith's scepticism on the results of household survey data is supported by Miles (1999) who stresses the role played by PAYG pension systems in the results obtained. Miles states "What the numerical examples and the empirical studies suggest is that failure to measure pension wealth correctly can have a major impact on estimates of saving, especially for the elderly.....in principle, mis-measurement of pension income could account for the striking discrepancy between what life cycle models imply about the age/saving relation and estimates of savings rates by age that are derived from looking solely at household data in isolation from information on the value of funds that back pensions. The reason is that for those contributing to a funded scheme, pension wealth conforms exactly to the simple life cycle pattern; it is steadily built up during the working life and is run down in retirement".

Effects on Total Factor Productivity :

One of the critical assumptions to be made in relation to assessing the long-term economic impact of demographic change is the extent to which increased labour efficiency can offset the reduction in the rate of growth of the labour supply. This is a highly complex issue and one which has received a lot of attention in the empirical literature. Since the empirical evidence linking ageing directly to productivity trends is far from convincing, with even doubts regarding whether the association or direction of any effect is positive or negative, it seems prudent to take a neutral position with regard to future technical progress in terms of any simulation work to be carried out. In fact this study assumes that the average rate of technical change experienced in all five of the world regions over the past decade persists over the simulation horizon to 2050.

Interest rate, exchange rate and balance of payments developments :

Savings and investment developments not only impact on potential growth but also on interest rates, exchange rates and international capital movements. In broad overall terms, when savings / investment imbalances emerge at the world-wide level, such tensions manifest themselves in real interest rate movements, whereas regionally-based strains result in shifts in exchange rates and net foreign asset positions.

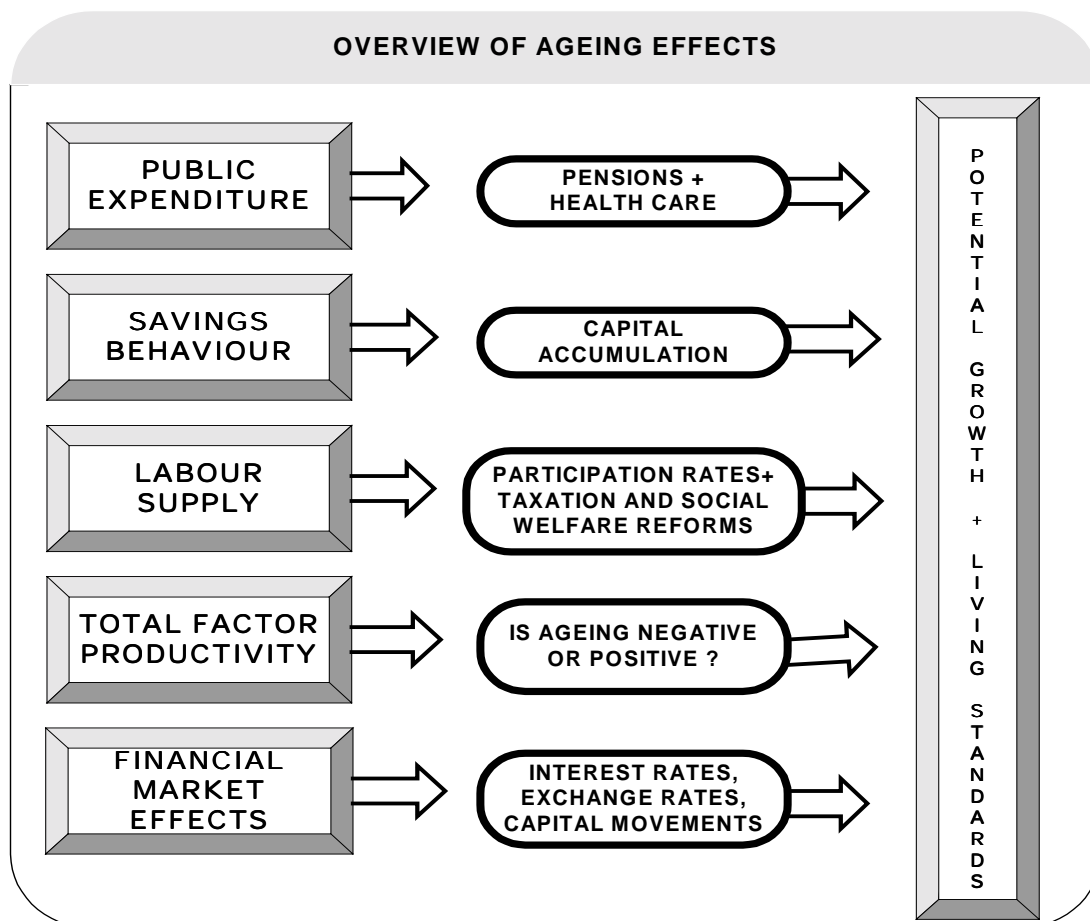
At the worldwide level, given the large differentials in terms of the relative timing and extent of the “greying” phenomenon, current account positions between the developed group of countries and the developing world will be prone to protracted swings, with the cumulative changes in net foreign asset positions (i.e. the external wealth or debt positions of countries) being potentially important. Trying to withstand these persistent swings in balance of payments positions would not be justifiable, or indeed possible, since they will not be driven by short term considerations such as changes in the relative cyclical positions of countries or in their relative competitiveness, but by fundamental shifts in domestic savings / investment balances.

Amongst the many likely, demographically induced, sources of savings / investment pressures over the coming decades, the following challenges stand out for particular attention:

- **NEGATIVE IMPACT ON PRIVATE AND PUBLIC SAVINGS:** These pressures will vary across countries, with the developed world likely to be the first affected, and across time, with countries such as Japan starting to age sooner than other developed regions like the EU and the US. These country differences will inevitably generate real exchange rate and current account tensions as external asset positions change dramatically and the flows of international investment income from net debtor to net creditor nations grow in importance.
- **NEGATIVE IMPACT ON OUTPUT GROWTH:** If, as expected, the labour market effects of ageing result in a slowdown in GDP growth, this in turn will ensure that less investment will be needed since the reduced pace of output growth should translate itself into a slowdown in the requisite rate of growth of the capital stock.
- **CHANGES IN THE RELATIVE SHARES IN WORLD OUTPUT OF THE DEVELOPED AND DEVELOPING COUNTRIES:** Given that the relative weights of the developed and developing groups of countries are likely to change over the next 50 years, with the developed world losing out in relative terms, large changes in global patterns of savings and investment should be expected. The developing countries, as a

block, for example, are likely to devote a higher proportion of their growing share of world output to investment, and indeed to supplement their “thirst” for funds by running current account deficits. The developed world, on the other hand, should, on average, see improvements in their current account positions, as savings grow relative to investment in the initial phase of the ageing phenomenon. This initial increase in savings however will be followed by a sharp downward movement in both savings and domestic investment trends. Investment will be negatively affected by the prospect of shrinking labour forces and by the fact that pension fund savings will increasingly be invested externally to exploit the relatively higher real rates of return. A growing gap is therefore likely to emerge in many countries between domestic production and consumption patterns.

All of the above 3 factors, and in particular the relative shifts in the respective positions of the various countries, will inevitably generate exchange rate and current account movements. Depending on how the global savings / investment balance develops, changes in worldwide real interest rates may materialise. Given the particular focus of the present paper on the financial market consequences of ageing, section 2 goes on to examine in more detail the open economy aspects of, age-related, savings and investment trends.



BOX 2: OVERVIEW OF THE BASIC THEORETICAL MECHANISMS IN THE AGEING MODEL

The model used for the analysis in this paper is a conventional neoclassical, overlapping generations, model. Households are divided into two groups, namely working age and pensioners. Since there is no bequest motive in the model, this implies that pensioners have a lower propensity to save than working age households (in fact, consistent with the life cycle hypothesis, pensioners dissave in order to end up with zero assets at the end of their life). Production is characterised by a neoclassical production function with constant returns to scale. This in turn implies that the marginal productivity for both capital and labour is declining. It is further assumed that regions/countries trade with each other and that there is perfect capital mobility between the more developed regions of the world, with a risk premium imposed on financial flows to developing countries which depends positively on their level of net foreign debt. This mechanism ensures that returns are equalised across the developed countries up to the expected real exchange rate changes.

In order to understand the basic effects of ageing within this theoretical framework, it is useful to proceed in steps and first consider a closed economy. In a second step the analysis is extended to an open economy environment.

THE EFFECTS OF AGEING IN A CLOSED ECONOMY: Ageing has three fundamental effects on the economy :

- Labour force declines relative to the total population.
- Investment needs, in the sense of providing capital for newly born workers, decline.
- The savings rate declines. (Note : while the first two factors are purely physical consequences of ageing, the third consequence depends on behavioural assumptions which are made in an overlapping generations context. However, empirical evidence tends to support this prediction of a declining savings rate).

While the reduction in the labour supply has an unambiguously negative effect on output per capita, it depends on the relative strength of the investment replacement effect and the savings rate effect as to how GDP per capita will eventually be affected.

There are two possible scenarios:

- **SCENARIO 1: STRONG DECLINE IN SAVINGS RATE :** Ageing leads to a very strong decline of the savings rate, namely a decline in private savings which does not allow for a sufficient amount of investment to take place which would at least stabilise the capital to labour ratio. In this case output per capita declines because the dependency ratio increases and the capital intensity of production falls. There is an offsetting effect coming from an increasing marginal product of capital, i.e. an increase in the real rate return on capital. However, this third effect would be insufficient to correct for the first two effects. The net effect would be a decline in GDP per capita associated with falling savings and investment rates and a rising interest rate. (Note : of course one would also have to assume a very low interest elasticity of savings in this scenario i.e. substantially less than 1 which means that interest rate movements provoke very small changes in savings⁶).
- **SCENARIO 2: MODEST DECLINE IN SAVINGS RATE :** Given recent empirical evidence and the majority of model simulation outcomes, this seems to be a more realistic scenario. "Modest" would be defined as a decline in the savings rate which is consistent with an increase in the capital to labour ratio. In this case, the increase in capital intensity would at least partly offset the decline in GDP per capita via an increase in the capital intensity of production. The net effect on GDP per capita is theoretically ambiguous (although the labour shortage effect tends to dominate the capital deepening effect in empirical simulation studies). The savings and investment rate would still be falling and interest rates would decline as well, reflecting the declining marginal product of capital. Real wages would, however, be higher, reflecting the increased capital intensity of production.

ADDITIONAL IMPLICATIONS FROM OPENING UP THE ECONOMY TO INTERNATIONAL TRADE AND CAPITAL FLOWS : Suppose ageing only occurs in the domestic economy which so far has been in internal and external equilibrium. For the analysis which follows, this section concentrates on the savings assumptions underlying scenario 2 described above (since this is also the model prediction).

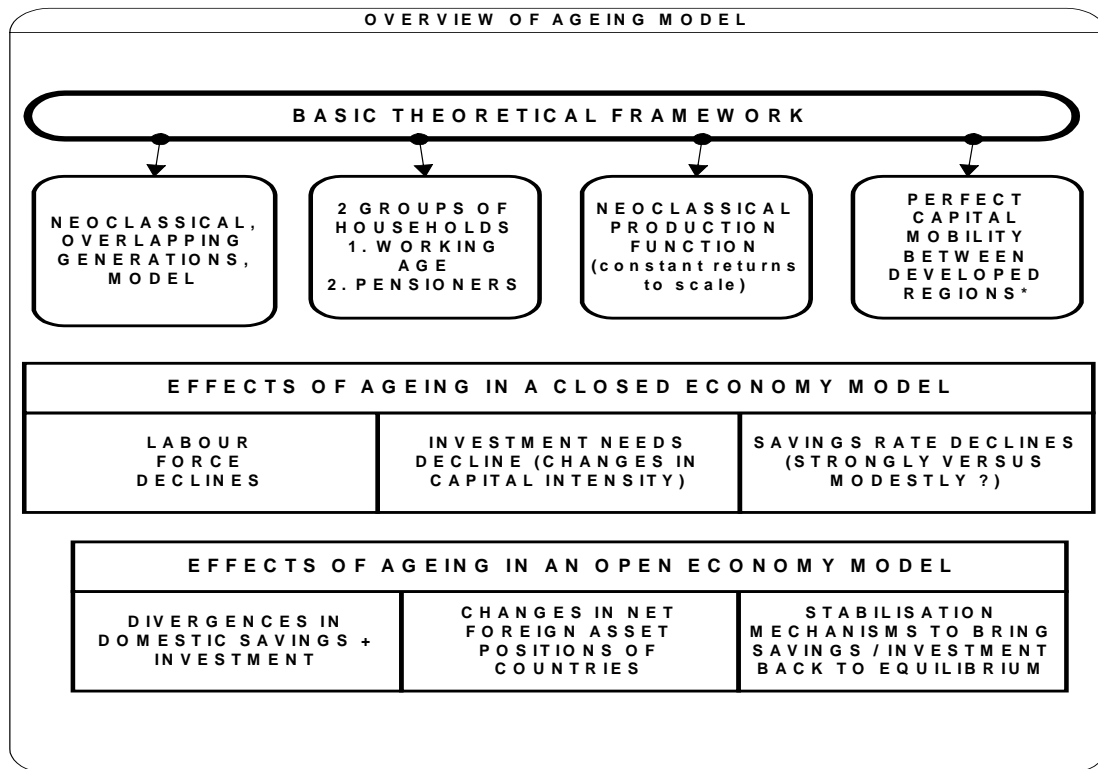
In this scenario, given the small decline in the savings rate relative to the decline in the labour force, there is excess saving. Savings can either be invested at home or abroad. Domestic investment is, however, confronted with a declining marginal product of capital because of the (expected) decline in the labour force. In these circumstances, capital will flow abroad until the marginal product between domestic and foreign capital is

⁶ Empirically the effect of interest rates on savings is ambiguous because the income and substitution effects of interest rate changes often tend to offset each other. With a low interest rate elasticity, the income effect (i.e. higher returns) outweighs the substitution effect (i.e. higher returns do not entice you to save more). The income effect appeared to be dominant in the US in the 1990's with higher rates of return leading to lower savings rates.

equalised⁷. The new equilibrium will therefore be characterised by an increase in the net foreign asset position of the domestic economy, a decline in GDP per capita (because of the capital outflow and the increased dependency ratio). Since our assumptions on savings have increased ex ante relative to investment needs in the domestic economy, savings and investment will be equalised worldwide via a reduction in interest rates (i.e. the decline in the supply of global savings is less than the decline in global investment). Capital intensity will be up worldwide with the fall in interest rates leading to an increase in investment and with more capital per worker leading to increases in labour productivity. How much capital will be invested domestically and abroad will depend crucially on the relative size of the domestic economy. Consider the extreme case of a very small economy which does not affect world interest rates. In this case all excess savings would be exported since the world interest rate would not change.

STABILISATION MECHANISMS : There are two stabilising factors at work. Firstly, capital outflows will not continue indefinitely since the latter will also lead to a decline in the marginal product of capital abroad (i.e. the external rate of return will start to fall). Secondly, there is a stabilising factor from the demand side. The increase in net foreign wealth will reduce the savings rate and therefore bring domestic savings and investment back into equilibrium (i.e. the wealth effect of the build up in foreign assets will have an effect on consumption patterns).

The two stabilising mechanisms discussed so far are independent of any exchange rate movement. In fact the discussion up until now implicitly assumes that domestic and foreign goods are perfect substitutes, i.e. they trade at the same price in equilibrium which implies unchanged real exchange rates. Alternatively one could assume that goods produced in different countries are imperfect substitutes. The ageing of country 1 would therefore imply a decline in the supply of country 1 goods and an (expected) increase in the relative price of country 1 goods. This would increase the attractiveness of country 1 as an investment location since investors would equate domestic and foreign returns taking into account the relative price change of domestic versus foreign goods. Consequently the domestic return could be lower by an amount equal to the expected change in relative prices, which means an increase in domestic capital intensity and therefore a smaller capital outflow. Thus the real exchange rate effect could be a third stabilising factor.



* Restricted capital flows to developing countries are assumed.

⁷ The choice is between investing domestically where the increase in capital intensity will partially offset the loss in living standards via an increase in labour productivity or investing abroad where the loss in living standards is partially offset via interest income on net foreign assets (GDP per capita V GNP per capita). The first option is favourable to workers (i.e. higher real wages) with the second favourable to pensioners (higher rates of return from their foreign investments). Consequently the income distribution consequences are enormous with perhaps governments increasingly attracted to taxing pension fund assets especially if those assets are predominantly invested abroad.

SECTION 2 : GLOBAL CAPITAL MARKET DEVELOPMENTS, CURRENT ACCOUNT IMBALANCES AND THE EVIDENCE FOR AGE-RELATED INTERNATIONAL CAPITAL FLOWS

According to the demographic projections described in section 1, the coming decades will witness large differences, at the individual country level, in both the timing and extent of the ageing phenomenon. On the basis of a no-policy change assumption, these demographic differences have the potential to result in slower rates of GDP and investment growth, lower public and private savings and large shifts in the respective shares of world output held by developed and developing countries. With such fundamental changes in the relative positions of countries in terms of savings / investment balances, this paper predicts that the world will increasingly witness both protracted swings in current account and net foreign asset positions over the coming decades as well as big changes in real interest rates and exchange rates. While section 3 will provide the models central predictions for the evolution of these “financial” market variables over the coming decades, the focus of the present section is mainly historical, with its primary purpose being to lay out the empirical evidence justifying the assumptions adopted for the simulations in the subsequent sections with regard to :

- Firstly, the degree and nature of global capital market integration and especially whether an assumption of limited, as opposed to full, worldwide capital market integration⁸ is appropriate or not (section 2.1); and
- Secondly, whether the evidence supports this papers central assertion that demographics is becoming a significant driver in terms of both the volume of external capital movements and in explaining the trend evolution of changes in the foreign wealth/debt positions of countries over the last 30 years (section 2.2) and in the future (section 2.3).

2.1 : EXTERNAL CAPITAL MOVEMENTS : AN HISTORICAL PERSPECTIVE

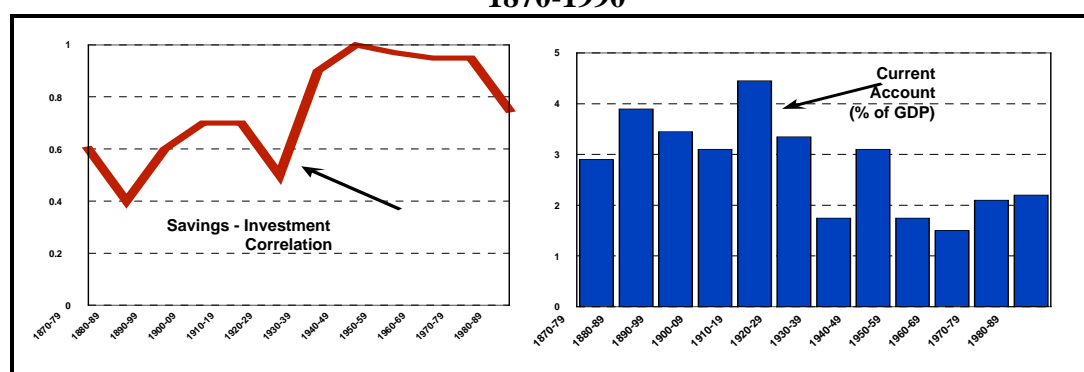
Well functioning international capital markets are crucial for global growth prospects. An efficient allocation of capital is essential not only for the economic convergence prospects of developing countries, in terms of capital accumulation and the diffusion of technological progress, but also for the risk diversification and specialisation strategies of developed economies and for income smoothing purposes in a situation of ageing populations. Controversy has consistently surrounded both the degree and nature of the present growth in the volume of international capital movements, with evidence that while capital mobility is at historically high levels, that the bulk of the increased flows are essentially a developed world phenomenon. With flows from developed to developing countries persisting at comparatively low levels, the question to be posed is whether we live in a type of closed, developed-world, economy, with relatively limited capital mobility to developing countries or in an open economy view of efficient international capital markets seeking out high-return investment locations around the world. While this is an area of considerable uncertainty, this section will try to show that while present flows to the developing

⁸ Capital market integration is defined in terms of an absence of crowding out of domestic investment by domestic savings patterns i.e. a low degree of correlation between domestic savings and investment trends. This definition also encompasses the concept of financial market openness which is measured using gross stocks of foreign assets and liabilities as a % of GDP for the respective countries.

economies as a group may be relatively small, the fact that individual countries within this group have been capable of attracting large amounts of capital inflows would suggest that the issue is not one of the efficiency of global capital markets but one of confidence in the macro-economic framework of the host economies. While capital mobility would appear to be a necessary condition for funding the income convergence prospects of the less-developed regions of the world, an open, growth-oriented, policy framework is what is needed to realise those ambitions.

2.1.1. GLOBAL TRENDS : 1870-2000 : HAS THE DEGREE AND NATURE OF CAPITAL MARKET INTEGRATION CHANGED OVER TIME ? A heated debate continues to rage regarding the present degree and nature of global capital market integration compared with historical periods. According to Obstfeld and Taylor (2002), an analysis of the data is suggestive of a U-shape in the evolution of international capital mobility since the late 19th century, with “a dramatic decline in capital mobility in the interwar period, and a very slow recovery thereafter”. This view of global capital mobility is largely based on evidence similar to that presented in graph 3 which shows both current account developments and the correlation between domestic saving and domestic investment for 12 major countries over the 120 year period 1870-1990. In a world of perfect capital mobility, one would expect to find that domestic savings and domestic investment are not systematically related, with savers investing in those countries offering the highest rate of return. As the graph appears to show however, consistent with the Feldstein-Horioka puzzle, domestic savings and domestic investment have been very highly correlated over the post-WWII period up until the end of the 1970’s. It is only since the 1980’s that there is evidence that international capital market integration has started to return to the level experienced at the start of the 20th century.

GRAPH 3 : CORRELATION BETWEEN DOMESTIC SAVING AND DOMESTIC INVESTMENT + CURRENT ACCOUNTS AS A % OF GDP FOR 12 MAJOR COUNTRIES 1870-1990⁹



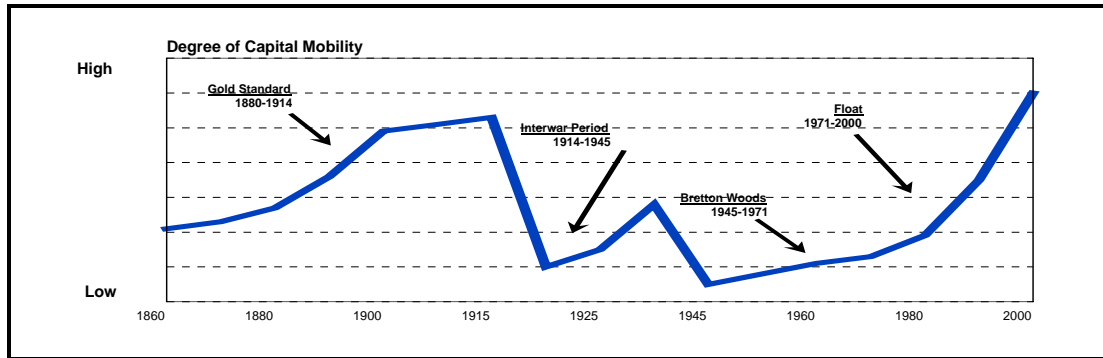
Source : Commission services based on Baldwin and Martin 1999.

The U-shaped pattern of global capital market integration has clearly been influenced to a significant extent by policy makers’ efforts over the century to deal with the classic macroeconomic policy trilemma for open economies whereby countries must relinquish at least one of the “impossible trinity” of an independent monetary policy, a fixed exchange rate or capital account convertibility (i.e. capital mobility). As shown in Graph 4, in the pre-1914 period, the Gold Standard stimulated international capital flows at the expense of foregoing the domestic monetary policy instrument.

⁹ Argentina, Australia, Canada, Denmark, France, Germany, Italy, Japan, Norway, Sweden, UK, US.

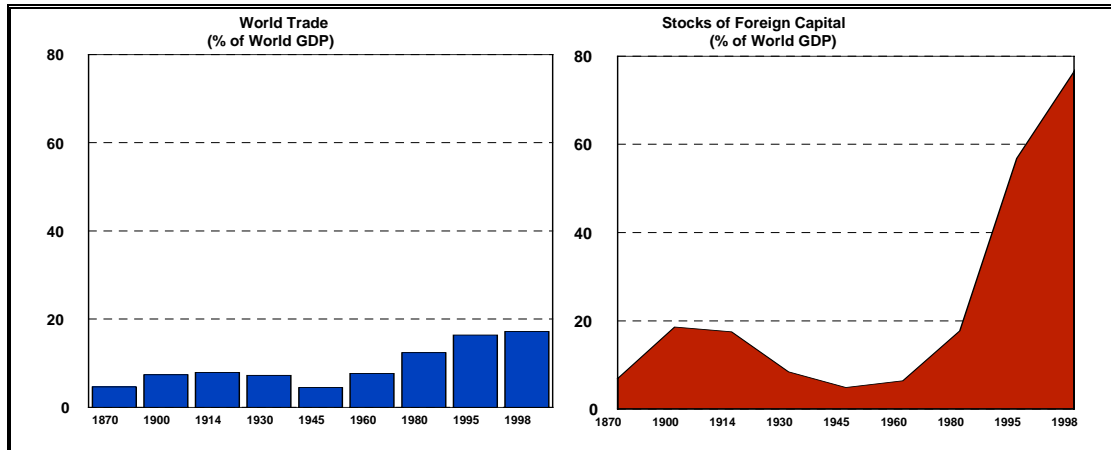
Following World War II, the Bretton Woods system went for a combination of fixed exchange rates and domestic monetary policy flexibility, with tightly controlled capital movements being an inevitable consequence of this regime choice. Finally, with the broad move to flexible exchange rates and liberalised capital accounts, following the collapse of the Bretton Woods regime, international capital movements have started to grow again. What the graph appears to suggest is that global capital mobility has now reached a level which is at its highest in 150 years. This view is corroborated by graph 5 which shows that the stock of world external assets was close to 80% of world GDP at the end of the 1990's. In addition this graph also shows a similar, but less pronounced, trend in the growth of world trade over the period in question.

GRAPH 4 : A STYLIZED VIEW OF CAPITAL MOBILITY IN MODERN HISTORY



Source : Obstfeld and Taylor (2002)

GRAPH 5 : GLOBALISATION : TRENDS IN WORLD TRADE AND HOLDINGS OF FOREIGN CAPITAL



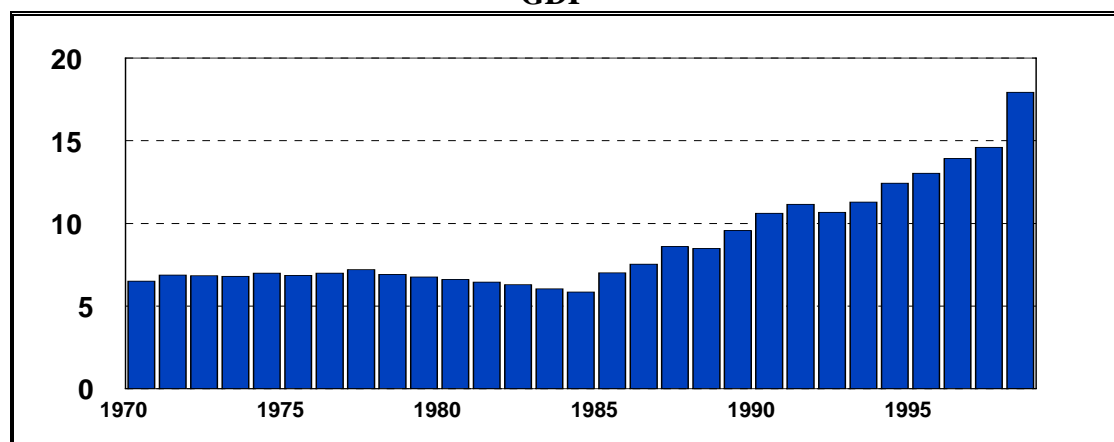
Sources : Crafts (2000), Maddison (2001)

While the present degree of global capital mobility would therefore appear to be at historically high levels, it is important to analyse the nature of the present flows and to understand the factors which differentiate the present period of capital market integration with that of the pre-World War 1, gold standard, period. This analysis is important in the context of predicting the geographical spread of any age-related increase in capital movements over the coming decades. While policy changes are clearly hastening the return to a pre-1914 type of global capital market, in the sense of freedom of capital movements, the nature of the financial flows would appear to be very different to those of the Gold Standard days. In particular, the volume of cross border flows is now being driven to a much greater extent by hedging and risk-

sharing between developed economies rather than by flows of savings from capital-rich countries to those less developed countries in need of development finance. As this section will show, increased hedging and risk-sharing activity is reflected in the sharp, parallel, increase in the gross assets and liabilities of the developed economies, with the reduced pace of development finance reflected in the shrinking net external asset position of the developed relative to developing countries.

While there are a large number of factors which can explain the differences in the nature of capital flows between now and the Gold Standard period, one undoubted explanation is that the present “globalisation” trend differs in a number of important respects compared with that of the late 19th and early 20th centuries. The current trend is characterised by lower rates of migration into developed countries, especially of unskilled workers; more trade, especially of the intra-industry type; a greater preponderance towards short-term capital movements and, finally, the growing importance of multinationals in terms of FDI flows (see graph 6). In a way, given the greater political difficulties presently attached to reproducing the large migration flows of the early 20th century, the growth in FDI flows can at least partially be seen as a type of substitute for labour flows. Furthermore, given continuing restrictions on migration and growing labour force shortages in the ageing developed world, this recent spectacular growth in the importance of FDI flows is set to continue and indeed intensify over the coming decades.

GRAPH 6 : GLOBAL FOREIGN DIRECT INVESTMENT STOCKS AS A % OF WORLD GDP*



* See graph 8 in Annex 3 for the associated FDI flows (as opposed to stocks) data.
Source : Lane and Milesi-Ferretti Dataset (2001)

Given these important changes in the nature of investment, trade and migration flows, it is hardly surprising that international financial markets have become more sophisticated in their operations. They have developed into much more than the intermediation conduits of the past simply used to channel an excess supply of domestic savings to meet a demand for investment funds abroad. In addition to this latter role of channelling savings into productive investment, an internationally competitive financial sector, with broad and deep capital markets at the global level, is also crucial for the efficient pricing and management of risks, for disciplining economic policies and for reducing financing costs. Effective execution of these functions ensures that developing countries also gain from globalised capital markets. More sophisticated risk management mechanisms in the developed economies has expanded the range of financing options available to investors, thereby partly

explaining the fact that capital flows to a number of specific developing countries, have increased significantly, especially in the 1990's. Without a pooling of risks many emerging markets would be considered excessively risky for individual investors.

Perceptions of relative risk are also a factor in explaining why past flows to developing countries have been very geographically concentrated, with a large share going to east Asia and China, and with over 90% of the total flows going to middle income countries (table 1), with outward-looking, growth-oriented policy frameworks, capable of offering a pool of relatively skilled labour to potential investors. These latter factors would appear to be more important influences on the investment location decisions of multinational companies, compared with other, often-quoted, issues such as low wage costs. These established trends suggest that developing countries, with credible, reform-oriented, policies can in turn reap the benefits of greater and more stable forms of financial flows such as that represented by FDI. In fact, in terms of the composition of total net flows to developing economies, by far the most significant development, especially during the 1990's, has been the increasing importance of FDI and equity flows, with official public assistance to these countries as well as highly volatile syndicated bank lending both declining as a share of the total. Table 1 shows the encouraging picture that FDI's share of total private sector flows to developing countries has now risen to 74% of the total in the year 2000 compared with a share of only 33% in 1970.

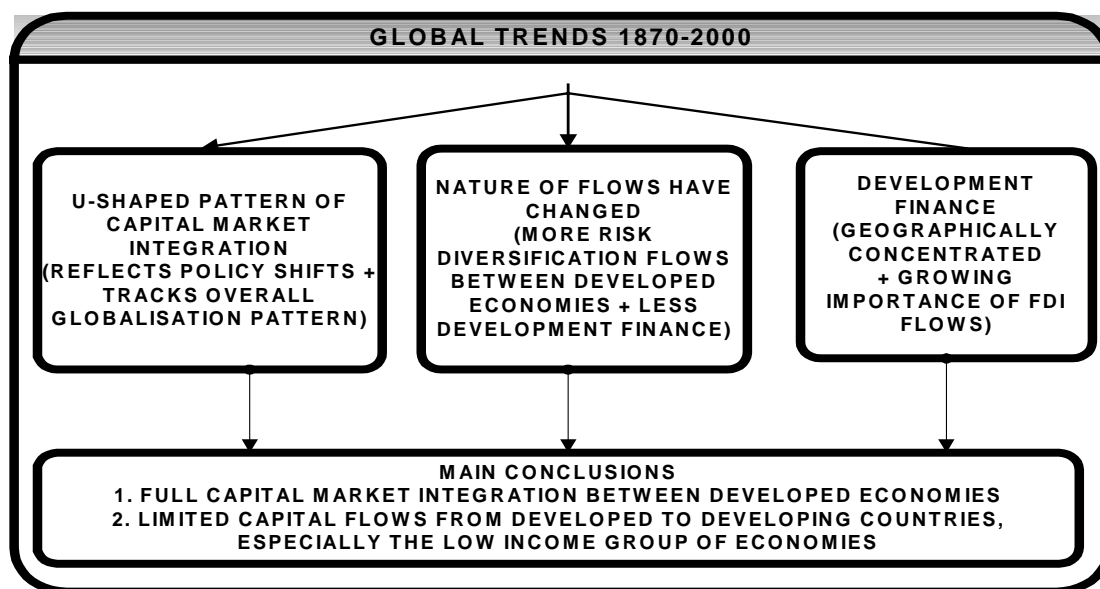
TABLE 1 : NET RESOURCE FLOWS TO DEVELOPING COUNTRIES – BILLIONS OF US DOLLARS + SHARE OF DEVELOPING COUNTRIES GDP*

	1970	1990	1995	1998	2000
TOTAL NET RESOURCE FLOWS (PUBLIC + PRIVATE SECTOR)					
ALL DEVELOPING COUNTRIES	11	99	260	337	261
(% SHARE OF GDP)	(1.5)	(2.2)	(4.5)	(5.5)	(4.0)
(% SHARE OF WORLD GDP)	(0.4)	(0.5)	(0.9)	(1.1)	(0.8)
MIDDLE INCOME COUNTRIES	8	65	213	298	236
(% SHARE OF GDP)	(1.5)	(1.8)	(4.4)	(5.7)	(4.3)
LOW INCOME COUNTRIES	3	34	47	39	25
(% SHARE OF GDP)	(2.0)	(3.8)	(4.9)	(4.2)	(2.4)
CHINA	NA	10	52	45	61
(% SHARE OF GDP)		(2.8)	(7.4)	(4.8)	(5.6)
NET PRIVATE SECTOR RESOURCE FLOWS					
ALL DEVELOPING COUNTRIES	6	44	206	283	226
(% OF TOTAL FLOWS)	(54.5)	(44.4)	(79.2)	(84.0)	(86.6)
MIDDLE INCOME COUNTRIES	5	37	181	268	221
(% OF TOTAL FLOWS)	(62.5)	(55.4)	(85.0)	(89.9)	(93.6)
LOW INCOME COUNTRIES	1	7	25	15	5
(% OF TOTAL FLOWS)	(25.0)	(20.6)	(53.2)	(38.5)	(20.0)
CHINA	NA	8	44	43	58
(% OF TOTAL FLOWS)		(80.0)	(84.6)	(95.6)	(95.1)
NET FDI FLOWS AS SHARE OF TOTAL NET PRIVATE RESOURCE FLOWS					
ALL DEVELOPING COUNTRIES	33.3	54.5	51.9	62.9	73.9

*In the year 2000 developing countries took roughly 16% of global FDI flows and less than 7% of total global capital market flows.

Source : World Development Indicators (2002), Global Development Finance (2002).

In overall terms, however, despite the evidence presented regarding some noteworthy increases in financial flows to specific countries in the 1990's, and the trend towards relatively stable forms of financing such as FDI, it must be underlined that capital movements to developing countries as a whole still appear relatively small compared with overall global flows and the supposedly high level of potential returns. While the volume of gross flows have risen substantially as a share of GDP, according to Table 1 overall net long run flows, which are crucial for growth and per capita income convergence, have remained subdued, especially for the low income developing countries where flows have also fluctuated strongly over short periods of time (e.g. from 4.9% of GDP in 1995 to only 2.4% of GDP in 2000). Surely, if global capital markets were truly integrated, the potential for large capital efficiency gains should be provoking much larger resource flows to these countries given the profit opportunities involved. While this latter point is undoubtedly true, it is however not yet clear from the literature whether these low levels of capital movements to developing countries are due to capital market imperfections or to an absence of incentives in terms of rate of return differentials. These differentials may be much smaller or even indeed non-existent when one correctly adjusts the profitability of investments in developing countries for labour productivity differences and relative risk premia¹⁰. While one can speculate regarding the underlying causes of the low degree of capital market integration for the developing economies as a group, for the purposes of the simulations in section 3, the evidence presented in 2.1.1 suggests that the correct assumption to adopt is one of restricted capital flows from developed to developing economies, with those restrictions especially strong for the low-income group of developing countries.



¹⁰For example, Lucas (1990) estimated, using a simple production function approach, that the implied marginal product of capital in India was about 58 times that of the US. Despite such large productivity differentials, Lucas stressed, that apart from international capital market failures, that differences in labour productivity, linked to higher levels of human capital investment in developed economies, could be a possible explanation for the paucity of resource flows in the face of such apparent profit opportunities. In fact he went on to emphasise that “correcting for human capital differentials reduces the predicted return ratios between very rich and very poor countries from about 58 to at least about 5, and possibly, if knowledge spillovers (i.e. the external effects of human capital) are local enough, to unity”. This line of research by Lucas is also a feature of the work of Clark (1987) and Lal (1991).

2.1.2 COUNTRY SPECIFIC DEVELOPMENTS : OVERVIEW OF CAPITAL MARKET INTEGRATION TRENDS FOR THE EU, US, JAPAN, FAST AGEING AND SLOW AGEING COUNTRIES : 1970-1998 : Following on from the developed / developing country breakdown used for the general analysis of global trends in 3.1.1, the present section assesses the specific performances of the five areas covered in the model, namely the EU, US, Japan and the slow and fast ageing countries. In terms of comparisons with the broader country breakdown used in 3.1.1, clearly the EU, US and Japan fall into the developed world grouping, with the slow ageing group overwhelmingly made up of low income developing economies. For the fast ageing group, while these countries are homogeneous with regard to future population trends, they are unfortunately very heterogeneous in income terms, with this group including a large number of high income OECD countries as well as a range of middle and low income developing economies, such as China, Russia and central and eastern European countries. Given this broad mix of countries, caution needs to be exercised in interpreting the results for the fast ageing group.

This section looks at two specific aspects of capital market integration, both of which are important in understanding the volume, nature and sustainability of the present pattern of worldwide capital movements :

- The first aspect is whether all 5 areas have experienced a similar trend to that at the global level of a strong upward movement in the degree of financial market openness over recent decades, using trends in the build-up of gross stocks of external assets and liabilities as the indicator ?. As discussed in some detail in Box 3, the analysis of the gross stocks data¹¹ concludes : firstly, that over the most recent period 1970-1998 that 4 of the 5 geographical areas covered in the model, with the notable exception of the slow ageing group of countries, have experienced a large increase in capital mobility (this is a similar conclusion to the analysis in 2.1.1 using the developed / developing world breakdown); secondly, that the EU, US and Japan have become increasingly dominant in terms of their shares of overall world assets and liabilities; thirdly, that there appears to be a strong ageing effect at play in the more than tripling of the Japanese external assets to GDP ratio in the 1980's; and fourthly, that the net resource flows from the "triad" (i.e. the EU, US and Japan) to the rest of the world has been declining over time (again confirming the view in 2.1.1 that capital market integration is becoming an increasingly developed world phenomenon with more risk diversification flows between developed economies and less development finance to developing countries). Finally, while the evidence points to the slow ageing countries being largely cut off from the worlds financial markets there are nevertheless some hopeful signs with regard to recent flows of foreign direct investment.

¹¹ This analysis of the gross stocks (and at the net level in 2.1.2) draws heavily on the "External Wealth of Nations" dataset created by Lane and Milesi-Ferretti (2001). This dataset is used for a large number of the graphs in section 2 (graphs which draw on complementary data sources are indicated in the text). This dataset covers the period 1970-1998 and classifies the external assets and liabilities of 66 industrial and developing countries into three main categories, foreign direct investment (FDI), portfolio equity and debt instruments. This dataset relies mainly on stock data, supplemented by cumulative flows data and with the portfolio equity and FDI flows data introduced with appropriate valuation adjustments. In order to split the non-FDI stocks into assets and liabilities, data for the international investment positions of the respective countries was used. It should be stressed that the overall financial flows and stocks data is somewhat problematic, with large discrepancies in the global current account position being a feature of developments for some decades now. For example, the annual discrepancy in the net external asset position at the worldwide level over the period 1970 to the late 1990's ranges from +1% to -8% of world GDP.

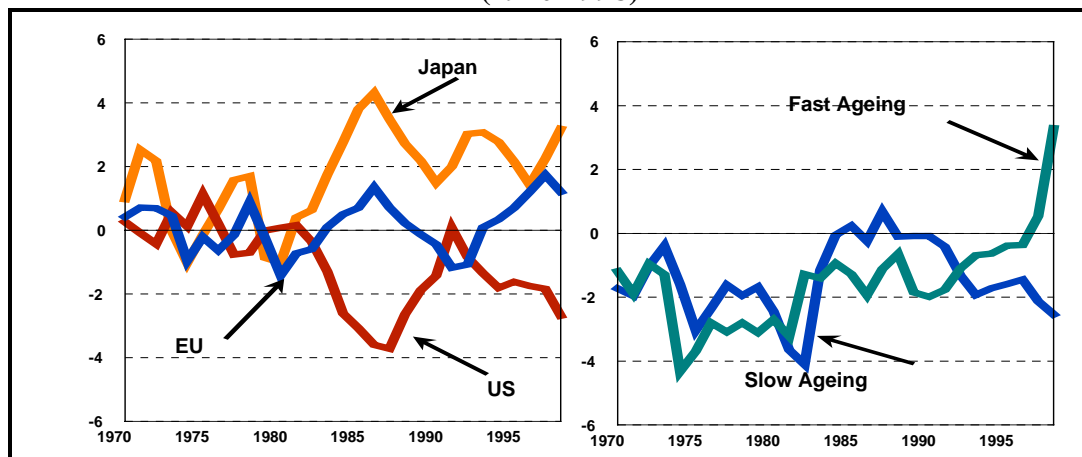
- The second aspect of integration, which is more important from the perspective of policy makers and for understanding the implications of ageing, is to look at the net, as opposed to the gross, external positions of the 5 areas over recent decades¹². Here the issue is one of imbalances in the savings / investment patterns of the respective areas, with capital market integration, in the sense of reduced crowding out of domestic investment by domestic savings patterns, being measured using data on net current account balances and on the build up of net stocks of external assets / liabilities over time by the different areas.

NET CURRENT ACCOUNT FLOWS AND NET STOCKS OF EXTERNAL ASSETS / LIABILITIES: In order to explore the issue of resource transfers to and from the different world areas and the implied differences in the relative attractiveness of countries/regions as investment locations, the following paragraphs examine the net current account flows and the build-up of net foreign asset / liability positions for the five geographical areas covered by the model over the period 1970-1998. While section 2.2 will look specifically at the role of demographics in explaining these trends, the text below focuses in particular on the issue of whether the more developed countries have been transferring an increasing amount of resources to the more developing parts of the world and if not, why not, given both the degree of catching up which clearly has yet to be achieved and the growing realisation in the financial markets that rates of return on foreign investment in the more developed areas of the world have, if anything, been declining over time (see Box 4).

NET CURRENT ACCOUNT FLOWS : Graph 7 shows the main trends for the current account positions of the 5 different areas over the period 1970-1998. In overall terms, what is particularly noteworthy is the persistence of large current account deficits/surpluses for a number of major industrialised regions. This is rightly considered to be one of the most striking international economic developments since the early 1980s. Over time these trends have led to the accumulation of sizeable net foreign assets in the case of Japan and net liabilities in the case of the US. These developments were preceded by fairly balanced current account positions throughout the 1970's. In the case of the EU, the overall trend over the period has been one of broad balance but with a recent tendency towards small surpluses. For the fast and slow ageing countries, both groups normally ran current account deficits over the last 30 years, but the trends are quite volatile, with the fast ageing countries beginning to register surpluses at the end of the period.

¹² Net flows of foreign capital into or out of a country imply a savings / investment imbalance in the respective country, with net outflows implying that domestic savings exceed domestic investment and with net inflows implying the opposite. These net flows between countries are summarised on the current account of the balance of payments, with current account deficits indicating the share of domestic investment which is financed by foreign savings and vice versa for current account surpluses. With the Feldstein-Horioka puzzle (1980) implying that there is a strong empirical correlation between domestic savings and domestic investment trends, at least up until the 1980's (which implies of course that domestic not foreign sources of savings are the primary financing method for domestic investment), the conventional view is that prolonged current account imbalances (i.e. a trend towards persistent net inflows or net outflows of foreign capital) are unlikely to endure over long periods of time, especially amongst large developed economies with similar economic structures (unless of course one is predicting a higher long run growth rate for one of the developed countries in question e.g. the US). Large current account imbalances can however persist, as this section shows, between developed and developing countries (with such flows justified by the potentially larger rates of return to be earned on investments in catching-up countries) and also to a lesser extent in the case of smaller developed economies. As argued later on in this section, the persistence of large current account deficits in the US and surpluses in Japan would appear to contradict or at least to call into question the Feldstein-Horioka view that savings and investment are normally highly correlated, with the analysis suggesting that ageing could provide a highly plausible explanation for such persistent trends. Ageing in fact is already leading to fundamental changes in the savings-investment balances of a small, but growing, number of rapidly ageing countries, with Japan the most notable example thus far.

**GRAPH 7 : CURRENT ACCOUNTS AS A % OF GDP¹³
(1970-1998)**



Source : Lane and Milesi-Ferretti Dataset (2001)

STOCKS OF NET FOREIGN ASSETS / LIABILITIES : A MEASURE OF THE EXTERNAL WEALTH / DEBT OF INDIVIDUAL COUNTRIES : In terms of net foreign asset developments, these are broadly equal to the cumulated current account flows over time and represent the crucial measurement variable for summarising a country's external wealth (i.e. creditor nation) or debt (i.e. debtor nation) position. Given the description of developments with regard to current account flows, it is not surprising that the Lane and Milesi-Ferretti dataset shows a build up of significant amounts of net foreign assets by Japan in recent decades¹⁴, mirrored by the growing external indebtedness of the US economy (graph 8). In Europe, changes in net foreign asset positions have been much more subdued, with a small positive balance of the order of 6 ½% of GDP in 1970 giving way to a small negative one at the end of the 1990's. Finally, in the case of the fast and slow ageing countries, both areas have been persistent debtors over the last 30 years¹⁵.

In terms of putting the extent of the transfers into greater perspective, it is interesting to show the net foreign asset data as a share of world GDP as opposed to as a share of the GDP of the respective areas (graph 9). The first thing which is noticeable from this graph is that in terms of world GDP, Japan has net external assets which are equivalent to about 5% of world GDP, with US liabilities equal to 8%. Consequently, the impression given in Graph 8 that the US's net external deficit was simply the mirror image of Japan's surplus is evidently not the complete story, with the US manifestly also receiving investment funds from other areas of the world over this period. Secondly, as shown in graph 7, net resource flows to the fast and slow ageing countries have generally been shrinking over time, with in fact the fast ageing countries recently becoming net suppliers to the global savings pool.

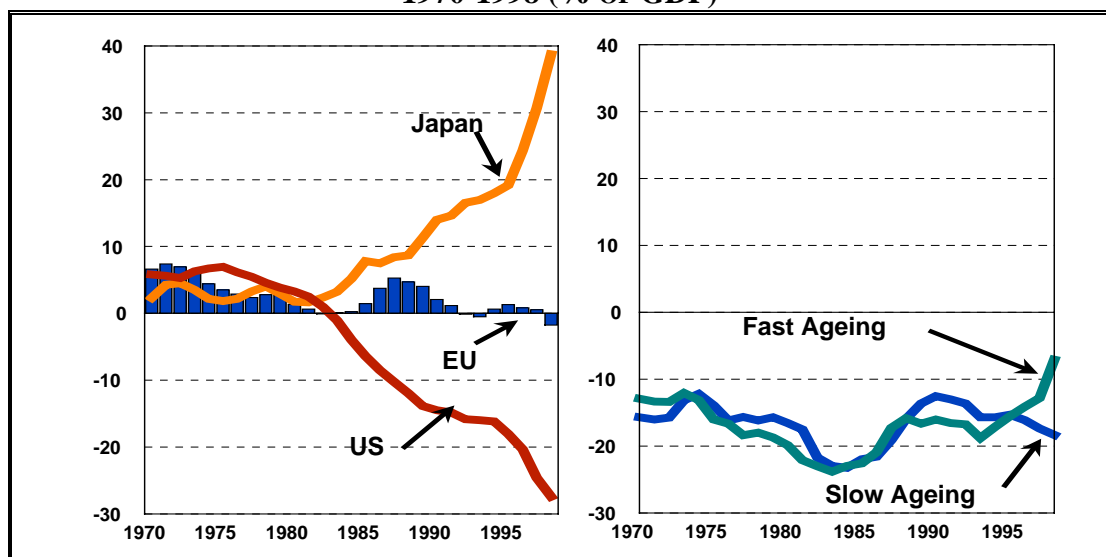
¹³ For consistency with the net stocks data presented later on, these current account flows are also taken from the Lane databank and consequently only go up to 1998. If one looks at the data for the intervening period 1998-2002, one sees that the trends up to 1998 for the EU and Japan have broadly persisted in recent years, with the trend towards deficits in the US being further reinforced. In fact, the average US current account deficit over the period 1999-2002 was nearly 4% of GDP which was more than double the average of the period 1995-1998.

¹⁴ Assuming that these Japanese assets are yielding normal rates of return, Japanese consumption patterns are now being partially insulated from the poor domestic output performance of the Japanese economy over the last decade.

¹⁵ For the fast ageing group, changes in net foreign assets have been very volatile, rising from -13% of GDP in 1970 to -23% in 1985 before recovering to -7% in 1998. The changes over time in the case of the slow ageing countries have also been volatile and the level of overall indebtedness has stayed high at between -15% to -20% of GDP.

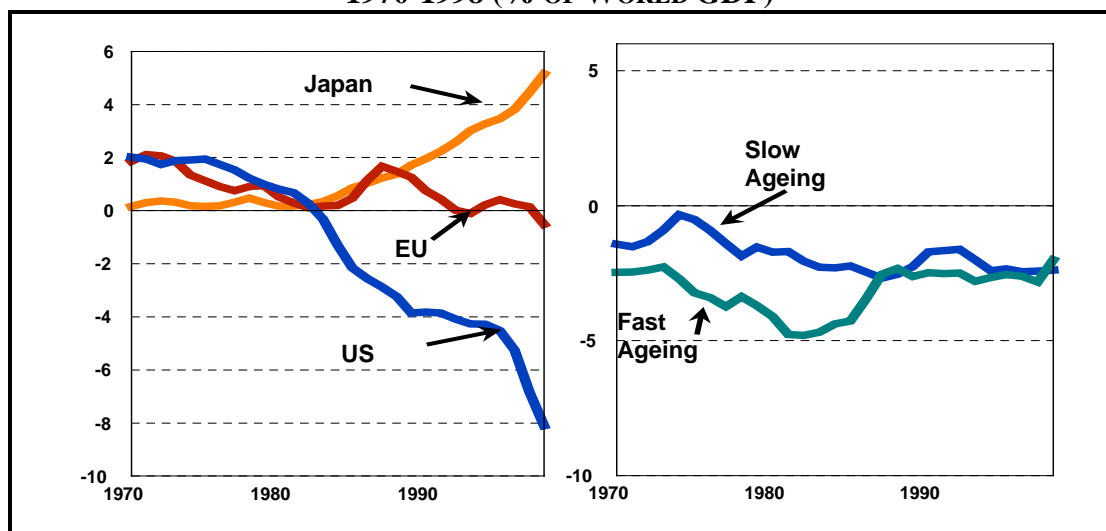
While great care is needed in interpreting these trends since the statistical discrepancy in the world total is considerable and if anything is growing over time, nevertheless there is no denying that the unprecedented extent of the divergences for the US and Japan represent a very significant change in the post-Bretton Woods pattern of international capital movements. In this context, while many developed countries have witnessed large increases in gross holdings of external capital stocks over time, these have normally been two-way movements with in fact, as Box 3 stresses, a close correlation between changes in the foreign asset and foreign liability positions of most countries. Much rarer have been large changes in net outflow or net inflow positions which tend to persist over time and which in the past have generally not exceeded the 5-10% of GDP range.

**GRAPH 8 : NET FOREIGN WEALTH POSITIONS
WEALTH (+) / DEBT (-) HOLDINGS
1970-1998 (% OF GDP)**



Source : Lane and Milesi-Ferretti Dataset (2001)

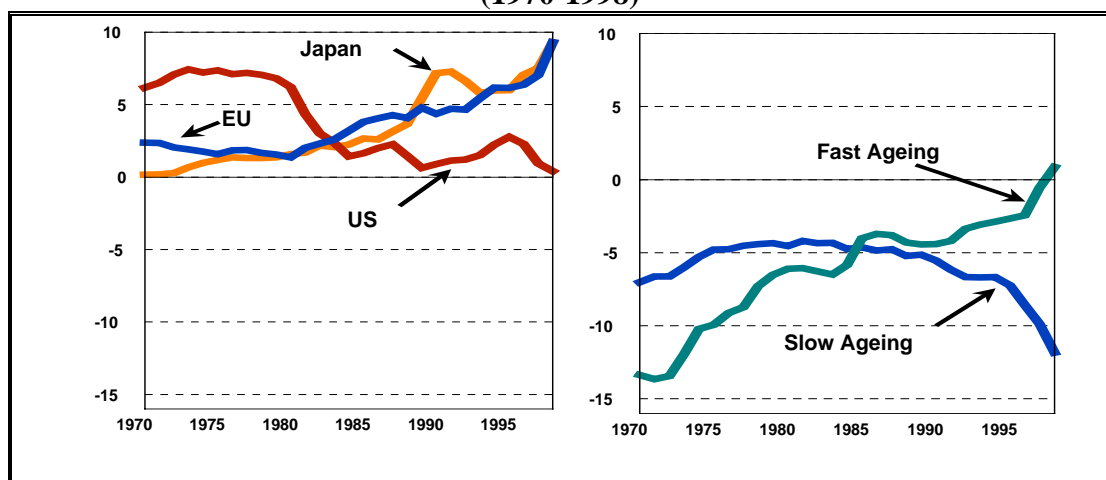
**GRAPH 9 : NET FOREIGN WEALTH POSITIONS
1970-1998 (% OF WORLD GDP)**



Source : Lane and Milesi-Ferretti Dataset (2001) and World Development Indicators (2002)

SPLITTING NET EXTERNAL WEALTH HOLDINGS INTO FDI AND OTHER CAPITAL MOVEMENTS : Given the statistical difficulties with the total wealth figures, it is useful to look at the breakdown of the net foreign asset positions into FDI and other capital. In terms of the decomposition of net cumulated flows, reasonably robust data series are available at the world level for net foreign direct investment (FDI), with comparable data going back over the decades. Net FDI data (outward less inward) shows that the EU, US and Japan have been persistent sources of net outward FDI movements over the decades and that the fast and slow ageing groups have, until recently, consistently been net recipients of such capital which is a pattern which is consistent with the catching-up thesis¹⁶ and also with the view that FDI is to an extent a substitute for migration flows (graph 10a). Finally, when one shows the net foreign asset position of the different areas excluding FDI, it is clear from the graph that the overall pattern of net foreign assets for all 5 areas are largely dictated by these non-FDI capital movements. In addition, there is a large degree of uncertainty as to the latter's determining factors since they include a wide variety of financial flows including portfolio investments in the form of both equities and bonds, other private and official capital flows, as well as bank and trade-related financing. In overall terms, while no firm conclusions can be drawn, it does appear that these non-FDI flows are strongly influenced by the perceptions of the financial markets regarding trend growth rate differentials between the respective world areas and the credibility of their respective policy frameworks. This is a theme which will be looked at in more detail in section 2.2.

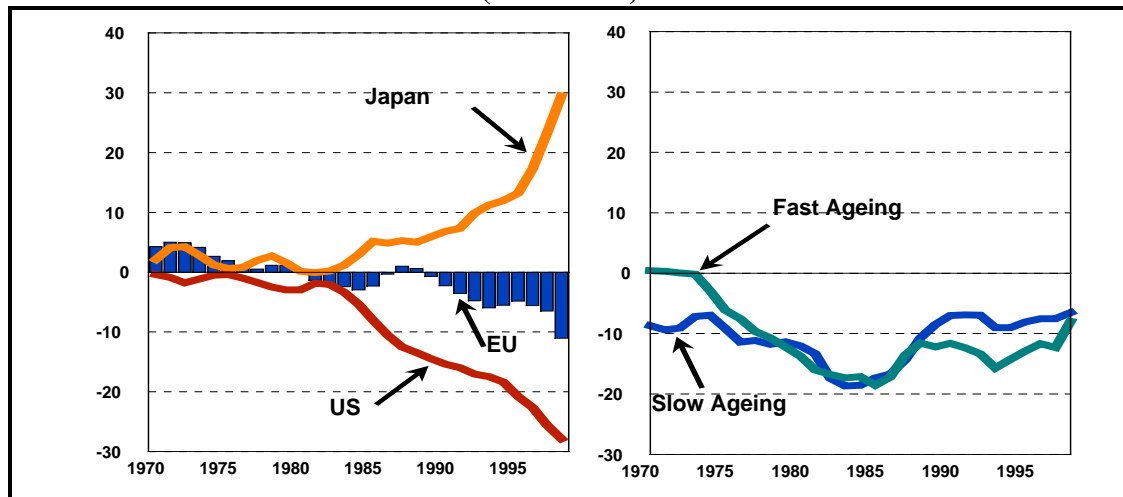
GRAPH 10A : NET FDI (FOREIGN DIRECT INVESTMENT) % OF GDP (1970-1998)



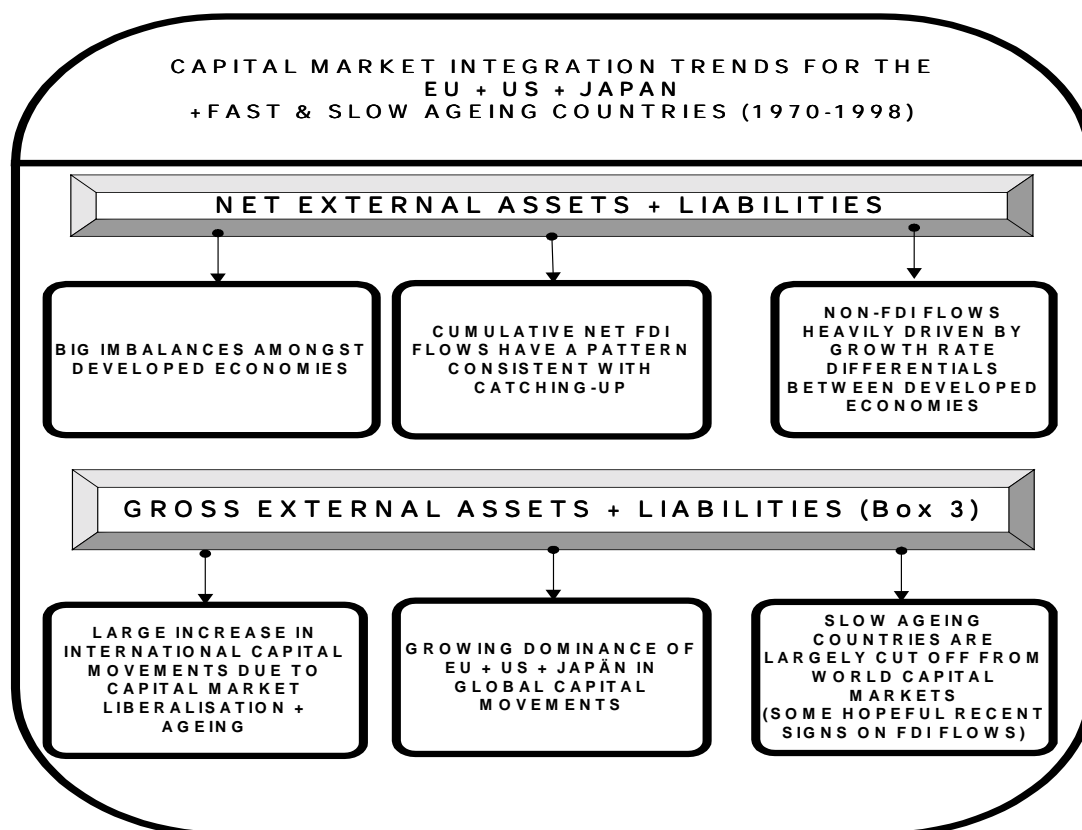
Source : Lane and Milesi-Ferretti Dataset (2001)

¹⁶ This process was historically initiated in, and is still predominantly a feature of, a range of manufacturing sectors. However, more recently, FDI flows are starting to extend into an expanding number of, low-skilled, service sectors such as data processing and "call centres", with the economics of such investments being made possible by the technological advancements and cost reductions emanating from the ICT revolution.

**GRAPH 10B : NET FOREIGN WEALTH EXCLUDING FDI (% OF GDP)
(1970-1998)**



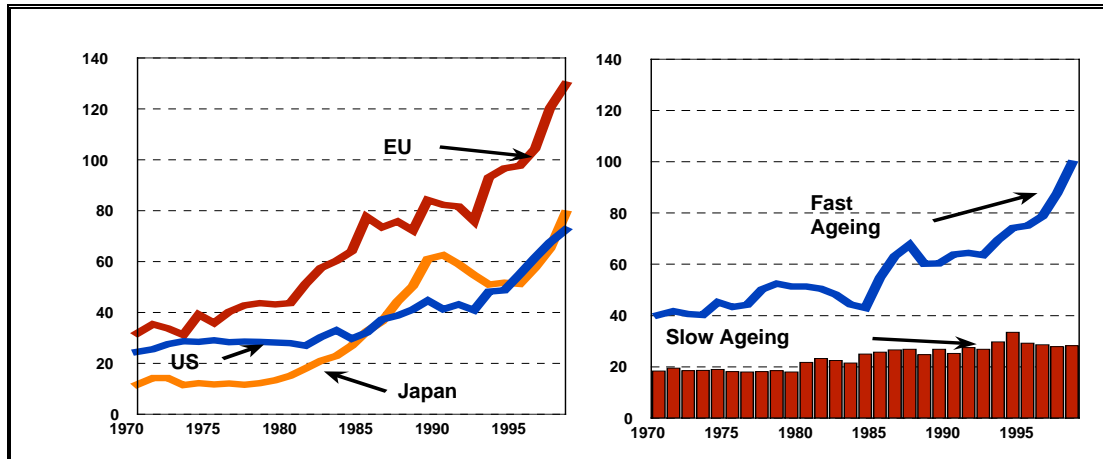
Source : Lane and Milesi-Ferretti Dataset (2001)



BOX 3 : GROSS CAPITAL MOVEMENTS : INDICATOR OF DEGREE OF CAPITAL MARKET OPENNESS FOR THE EU, US, JAPAN, FAST AND SLOW AGEING GROUPS OF COUNTRIES

Graph A shows the degree of external capital mobility achieved for the 5 areas covered by the model. Since the individual trends for both external assets and liabilities are similar and since the net positions are discussed in the main text, it is sufficient for illustrative purposes to confine the discussion to external assets. In overall terms, it is evident, with the notable exception of the slow ageing, developing, group of countries that the remaining areas of the world have all witnessed a sharp upward movement in the degree of their financial market openness since 1970, with stocks of external assets (and liabilities) constituting an increasingly vital source of global economic linkages. In addition the pace of change has clearly accelerated since the second half of the 1980's.

GRAPH A : TOTAL GROSS EXTERNAL ASSETS AS A % OF GDP : 1970-1998

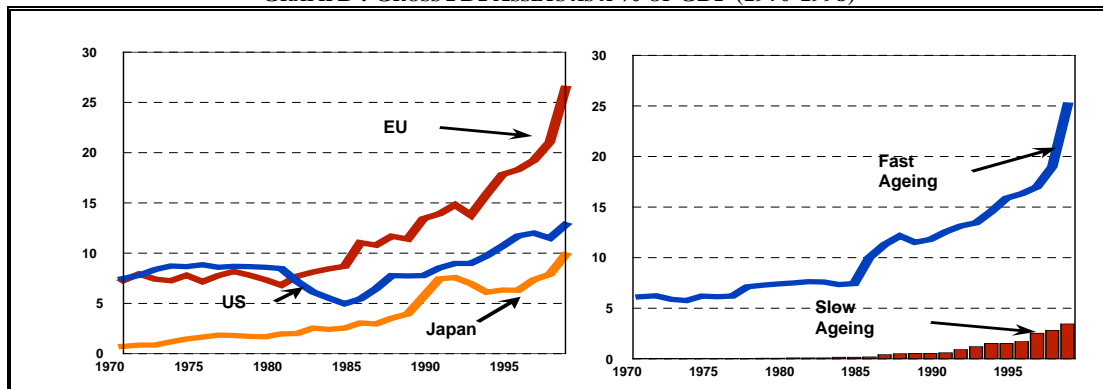


Source : Lane and Milesi-Ferretti Dataset (2001)

The difference in levels between the EU and the rest of the world is largely explained by the fact that the EU figures include both intra- and extra-EU asset holdings but even if one were to make reasonable assumptions for the breakdown between intra- and extra- EU stocks (using for example intra- and extra-EU trade as a proxy), the strong upward trend for the EU still persists. In the case of Japan, given the sharp relative deterioration in its old age dependency ratio from the 1970's onwards there appears to be little doubt that this factor was at play in the more than tripling in its external assets to GDP ratio in the 1980's. For the US, there has been a steady upward trend since the mid 1980's in its overall degree of financial market openness, with its absolute level now being very similar to that of Japan. The pattern and level of financial market integration for the fast ageing group differs markedly from that of the slow ageing countries. In the case of the former, their integration into the worlds financial system has progressed strongly since the mid 1980's. In contrast, the slow ageing countries persist in having low absolute levels of financial market integration and the trend over the last few decades is markedly less positive compared with the other areas covered by the model.

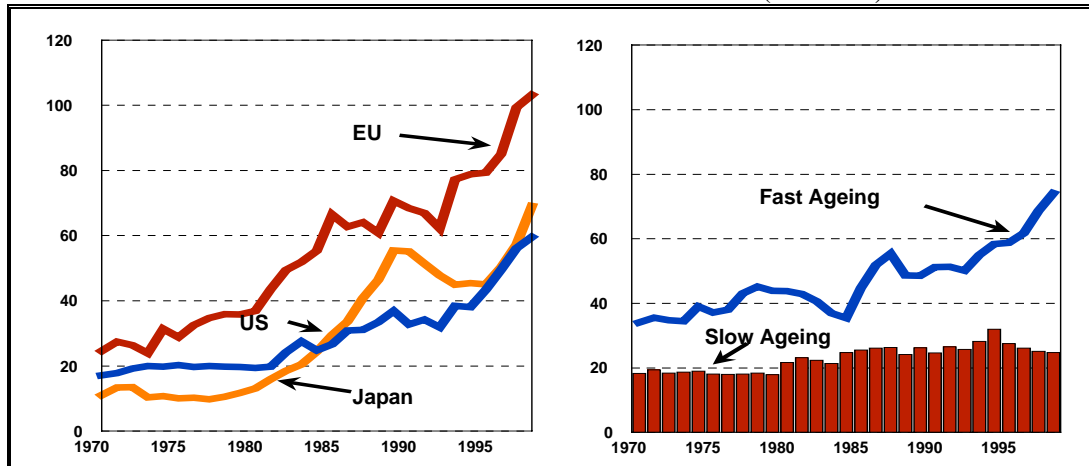
It is also possible to split the overall external assets held by the five areas into foreign direct investment (FDI) assets and non-FDI assets. The only significant difference between the trends for total assets and those for the individual components is that there is clear evidence of an upward movement in the importance of FDI flows to the slow ageing developing group of countries over the last 10-15 years.

GRAPH B : GROSS FDI ASSETS AS A % OF GDP (1970-1998)



Source : Lane and Milesi-Ferretti Dataset (2001)

GRAPH C : GROSS NON-FDI ASSETS AS A % OF GDP (1970-1998)

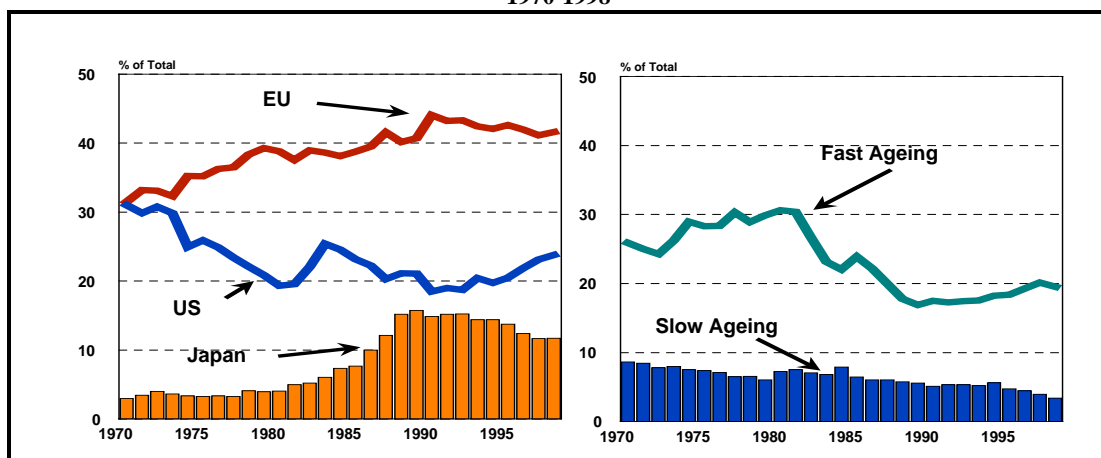


Source : Lane and Milesi-Ferretti Dataset (2001)

HOW DO THE INDIVIDUAL AREAS COMPARE RELATIVE TO THE WORLD AVERAGE ? : While the above graphs are illuminating regarding the individual performances of the five areas, it is also interesting to see how the five did in relative terms i.e. was the pace of financial market integration slower or faster than the world average. One way of measuring this is to show the shares of the different areas in total world assets and liabilities and to look at how these shares have developed over time. While one has to be careful interpreting these graphs since no adjustment is made for intra and extra-EU capital stocks, nevertheless the trends for the individual areas can be used as a broad measure of whether countries have kept pace with the growth rate of world assets and liabilities. Countries or areas with similar growth rates to that of the world as a whole show up as having a stable trend line over the period. These graphs display a number of interesting features :

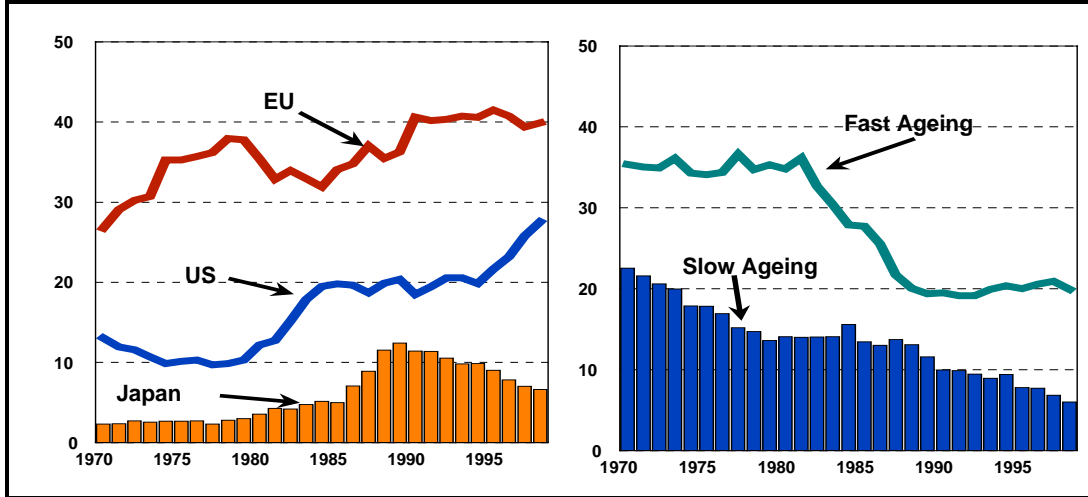
- Firstly, despite the caveats mentioned earlier, it is clear that EU capital market integration has grown over the period as a whole. The above average pace of integration experienced up until 1990 for both assets and liabilities appears however to have stabilised, and even declined slightly, over the last decade.
- Secondly, there is a marked acceleration in the trend for the share of the US in total world assets and liabilities from the mid to the late 1990's, with a similarly strong negative trend for Japan.
- Thirdly, while the previous part of this box showed that capital market integration has been increasing in the fast ageing countries, in relative terms it has not been keeping pace with the trends in the EU and the US, although there is evidence of stabilisation occurring in the 1990's.
- Finally, for the slow ageing group, the dismal absolute performance in terms of the pace of financial market integration shown earlier in graph A is shown in more stark terms with regard to its relative position, where a clear downward trend in its share of world assets and liabilities is evident since 1970, with no sign of this relative deterioration being arrested in the 1990's.

GRAPH D : TRENDS IN THE GEOGRAPHICAL OWNERSHIP OF TOTAL WORLD EXTERNAL ASSETS 1970-1998



Source : Lane and Milesi-Ferretti Dataset (2001)

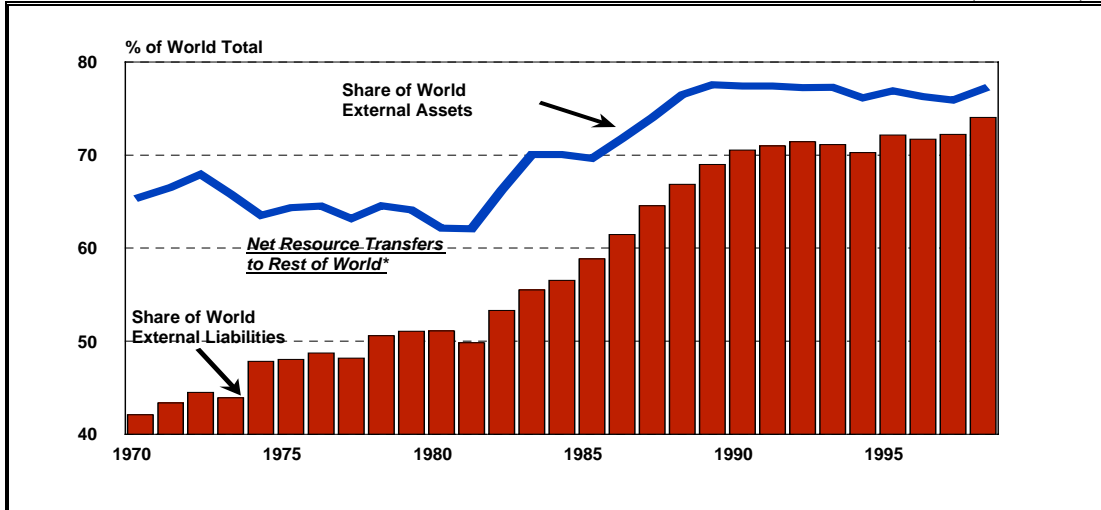
GRAPH E : TRENDS IN THE GEOGRAPHICAL BREAKDOWN OF TOTAL WORLD EXTERNAL LIABILITIES



Source : Lane and Milesi-Ferretti Dataset (2001)

GROWING DOMINANCE OF THE EU, US AND JAPAN IN TERMS OF SHARES OF TOTAL WORLD ASSETS AND LIABILITIES : Finally, as graph F shows, the dominance of the EU, US and Japan over the period since 1970 in terms of overall world external assets and liabilities has been reinforced over time with, for example, close to 80% of total world assets being held by the “triad” in the late 1990’s compared with less than 70% in 1970. While the dominance of the three areas has waned slightly in the case of FDI assets, nevertheless the EU, US and Japan still control between 70-75% of global FDI assets. Their growing dominance in terms of total world liabilities is even more striking, with their overall share rising from 42% to 74% of the total over the last 30 years. What the narrowing gap between assets and liabilities also shows is that the net resource flows from the “triad” to the rest of the world is shrinking over time. This is an issue which has been examined in some detail in 2.1.2. where the question was addressed as to why global capital market integration was to a large extent a developed world phenomenon, with the net transfer of resources from developed to developing economies relatively small and, in the case of non-FDI transfers, declining over time.

GRAPH F : SHARES OF WORLD EXTERNAL ASSETS + LIABILITIES HELD BY THE EU+US+JAPAN (1970-2000)



* Measured as the gap between assets and liabilities.

Source : Lane and Milesi-Ferretti Dataset (2001)

2.2 DEMOGRAPHICS AND FOREIGN CAPITAL FLOWS : HAVE AGE-RELATED CAPITAL MOVEMENTS BEEN A FEATURE OF RECENT DECADES ?

The growing imbalances in worldwide financial flows described in section 2.1. have been a major source of concern for international organisations and policy makers. The IMF seems to be especially worried (see IMF (2002)) and does not exclude the possibility that present external imbalances are the result of erroneous private sector decisions and financial excesses. This view is supported by the doubling of the average US current account deficit as a % of GDP over the period 1998-2002 compared with the previous 4 year period which suggests that cyclical elements are undoubtedly a significant part of the present story. Fears regarding the overall sustainability of the worldwide pattern of imbalances is also partly based on the observation that they have largely occurred between regions with relatively similar economic structures and levels of economic development. This pattern, as explained earlier, also appears to be in contrast to the pattern of imbalances between Europe on the one hand and their overseas colonies in the late 19th century, when development finance was the primary driver behind net capital flows.

However, as the analysis below will make clear, the contention of this paper is that while the present pattern of current account balances undoubtedly reflect cyclical excesses associated with the “bubble” like conditions in the US in the late 1990’s, there are strong grounds for believing that more structural, long term, forces are at work. These longer-term forces will ensure that existing imbalances will be slow to unwind over the coming decades. In fact, this section will show that despite their similarity, Europe, Japan and the US have undergone, and will continue to be faced with, quite different demographic, technological, labour market and fiscal trends. Therefore in our view the question is still open as to what extent these ‘sustained current account imbalances’ reflect genuine external disequilibria or whether they should be regarded as a normal international adjustment to permanent, country-specific, shocks.

This is the issue which we will now examine, where the central contention is that the strongly diverging demographic developments in Japan over recent decades allied to significant restrictions on capital flows to large parts of the developing world could have been major structural factors explaining the savings and investment divergences experienced worldwide over this period¹⁷. If this view is supported by the empirical evidence this would have deep implications for the volume, geographical destination and rates of return earned on external capital flows over the coming decades as more economies start to age in a manner similar to that of Japan.

¹⁷ As predicted by standard life cycle models the current account balance of countries which are ageing relatively faster compared to the world average are likely to be in surplus, since the savings rate in these countries falls less rapidly than the domestic investment requirements. Given the fact that divergent demographic trends tend also to be rather prolonged one would therefore expect to see a build-up of foreign assets over extended periods of time. There are of course other possible factors explaining capital exports from Japan and more recently Europe to the US, such as, for example, sustained differences in labour force participation rates, with strong increases in the US participation rate compared with rather stable trends in Japan and Europe. However, other influences, especially the process of technological convergence (assuming that this process has not, as some commentators have suggested, come to an end in the second half of the 1990’s) and divergent fiscal developments between Europe, Japan and the US (at least in the case of Japan), point in the opposite direction. The analysis in this section, on the basis of the net stocks of wealth / debt for the 5 areas tries to evaluate the relative importance of the different factors, especially the demographic determinants, and come to some conclusions regarding the likely evolution of net foreign assets over the coming decades.

EXPLAINING THE HISTORICAL BEHAVIOUR OF NET FOREIGN ASSETS : A MODEL-BASED ANALYSIS OF TRENDS IN NET FOREIGN ASSET POSITIONS IN THE EU, US, JAPAN, FAST AND SLOW AGEING COUNTRIES (1970-1998) : The changes experienced in the net external wealth holdings of the different areas over recent decades are due to a large array of cyclical and structural factors, many of which are difficult to quantify, especially for the second half of the 1990's when the bubble conditions in the US clearly played a large role. Despite this uncertainty, there is a large degree of acceptance in the literature¹⁸ that there are a number of key structural determinants of changes in external wealth positions, with these variables directly affecting savings and investment patterns in the respective countries and in turn relative current account movements. According to this mainstream research work, future changes in external wealth/debt positions are largely determined by shifts in the relative position of countries with respect to output per capita, government debt and demographic changes¹⁹. In addition, as the text below shows, and as laid out in more detail in Röger (2003), the assumptions one makes regarding the degree of global capital market integration and relative differences in the generosity of public pension systems are also felt to be important factors in explaining the long run pattern of international capital movements :

- **GDP PER CAPITA**²⁰ : Relative changes in GDP per capita are positively related with movements of the net foreign asset position of developed economies, with growing prosperity leading both to increases in the domestic savings rate and to foreign investment opportunities becoming relatively more attractive due to the potentially higher rates of return²¹. The opposite effect is often found in developing economies, with increases in living standards typically, in the initial phases of development, leading to higher external borrowing due to an easing in the credit restrictions which a large proportion of these countries are faced with.

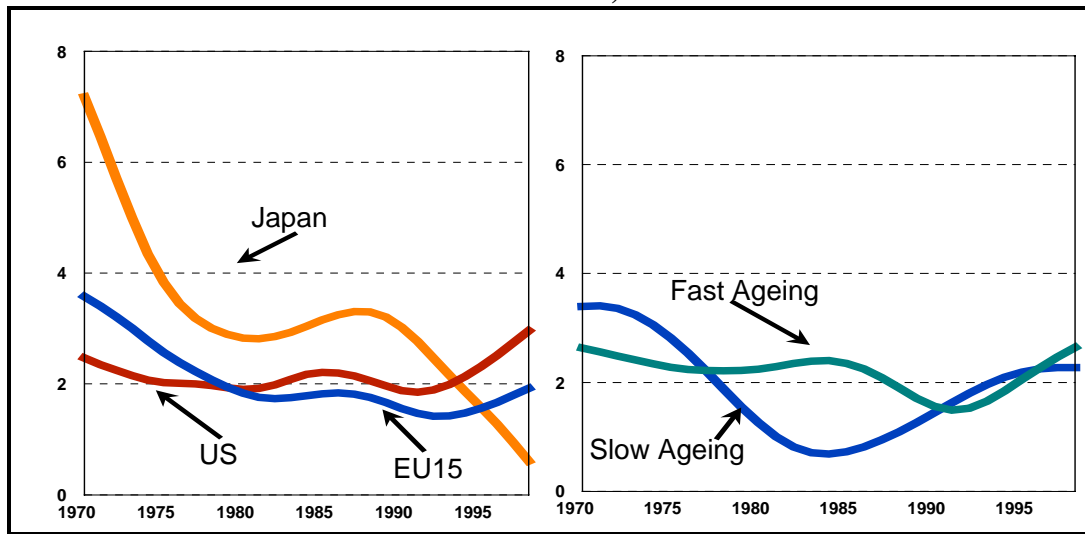
¹⁸ Taylor (1994), Higgins (1998), Herbertsson and Zoega (1999) and Lane and Milesi-Ferretti (2001).

¹⁹ Common, as opposed to relative, movements of the latter variables should not however impact on net foreign asset positions and would instead be expected to be reflected in movements in global real interest rates.

²⁰ The growing trend, per capita, growth rate differentials shown in the graph in favour of the US compared with the EU and Japan are a source of concern to policy makers in the latter countries since this more recent pattern casts doubt on the continuance of the post-World War II process of catching-up with the US. In addition, while technological convergence was the standard paradigm in empirical international growth research, the IT revolution which occurred in the US in the 1990s casts some doubt on the convergence hypothesis, especially since the acceleration in TFP growth in the US was accompanied by negative TFP growth in Japan. As discussed later on in this section, expected technological divergence between the US and the rest of the world could be another reason justifying a sustained US current account imbalance. Finally, as section 3 will show, these worries are compounded by ageing which is expected to widen the existing GDP per capita growth rate differentials even further. Policy makers can take some residual comfort from the fact that in GNP per capita terms (i.e. income as opposed to output) the relative deterioration in living standards will not be as severe given that EU and Japanese citizens will earn higher rates of return on their foreign investments than they would have done if this investment had taken place domestically and consequently the deterioration in welfare terms (i.e. consumption per capita) will not be as severe as for output.

²¹ In other words, domestic investment becomes progressively less profitable as capital productivity tends to decline as economies grow wealthier.

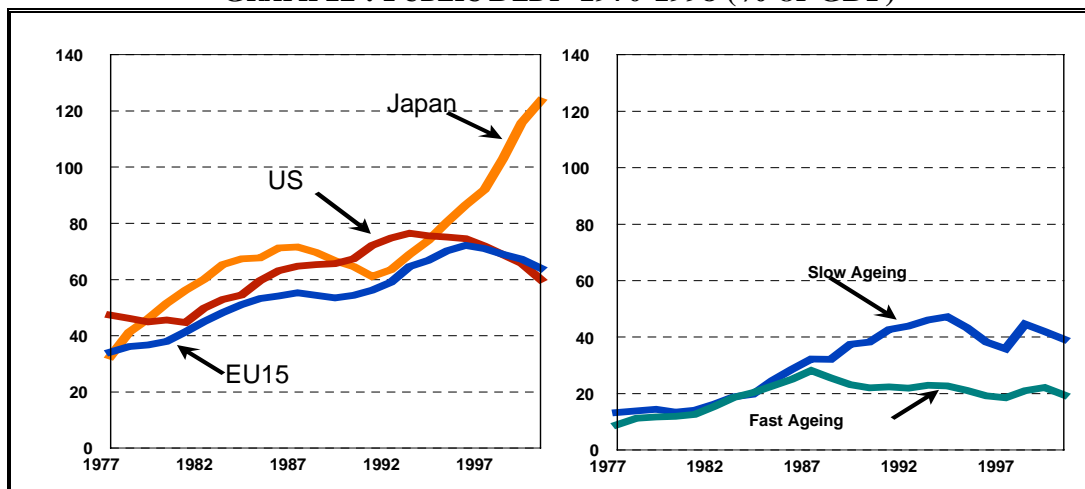
GRAPH 11 : TREND GDP PER CAPITA GROWTH RATES : 1970-1998 (ANNUAL % CHANGE)



Source : University of Groningen and the Conference Board, GGDC Total Economy Database, 2002, Commission Services

- **DEBT** : In terms of relative changes in the debt levels of countries, in the absence of full Ricardian equivalence, both developed and developing countries tend to exhibit a negative relationship, with higher levels of debt associated with lower levels of net foreign assets.

GRAPH 12 : PUBLIC DEBT 1970-1998 (% OF GDP)

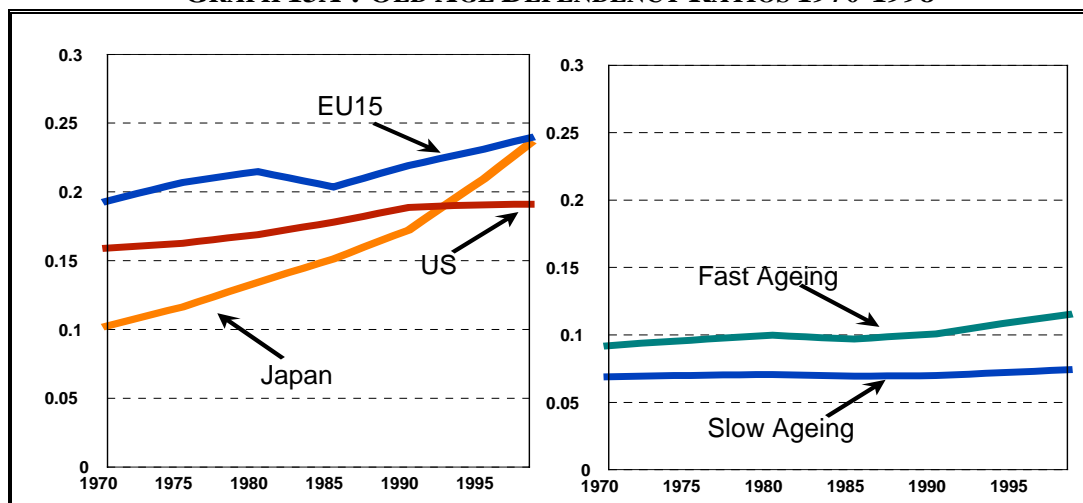


Source : Commission Services, World Development Indicators (2002)

- **DEMOGRAPHIC VARIABLES** : Demographic factors are also a significant determinant of changes in net foreign asset positions, with the nature of the relationship being similar for both developing and developed economies. For example, there is a positive relationship between expected changes in the old age dependency ratio and the level of accumulated net external assets, with workers saving more in anticipation of longer retirement durations and investing less domestically due to the lower demand for replacement investment in conditions where populations are growing more slowly or actually falling in size. With the prospect of shrinking labour forces leading to reductions in the productive capacity of economies over the coming decades, future retirees in those countries

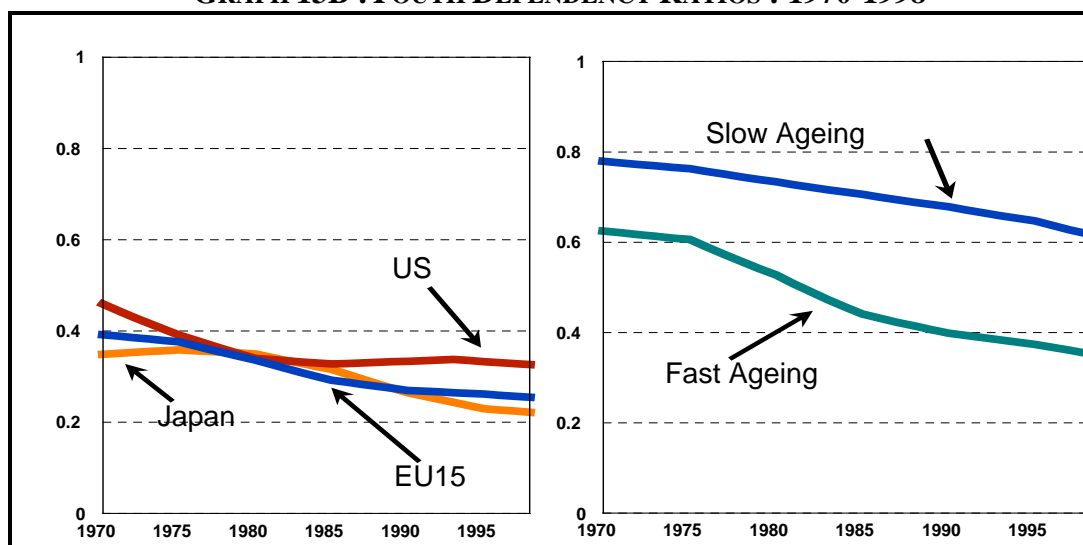
most affected will become increasingly dependent on the income stream from their accumulated foreign assets in order to supplement their domestic sources of income. On the other hand, changes in the youth dependency ratio are negatively related to changes in the net external asset position of countries, with high youth ratios tending to reduce domestic savings rates and often leading to increases in domestic investment in areas of an economy's social infrastructure such as education and housing²².

GRAPH 13A : OLD AGE DEPENDENCY RATIOS 1970-1998



Source : Eurostat, US Census Bureau and UN

GRAPH 13B : YOUTH DEPENDENCY RATIOS : 1970-1998



Source : Eurostat, US Census Bureau and UN

RELATIVE GENEROSITY OF PUBLIC PENSION SYSTEMS + DEGREE OF GLOBAL CAPITAL MARKET INTEGRATION : As well as the above three factors, it is the contention of this paper that historical developments in net foreign asset positions (in

²² According to Lane and Milesi-Ferretti (2001), "The relation between net foreign assets and demographic structure also accords with the thrust of the theoretical literature : a decline in the net foreign assets occurs if there is an increase in the population shares of younger age cohorts, whereas the net foreign asset position responds positively to an increase in the share of workers nearing retirement, with a maximum effect for the 50-54 age group. It is also interesting to note that the over-65 age group exerts a negative effect, consistent with the running down of net foreign assets".

terms of both levels and geographical destination) also require an understanding of issues such as differences in the systems for financing pension income across countries and assumptions regarding the degree of global capital market integration :

- Differences in pension financing systems, especially in terms of the breakdown between PAYG and funding and also with regard to the relative generosity of the public part of the system, are all factors with a potentially strong impact on savings and investment patterns in the respective countries. Regarding the degree of generosity of the public PAYG systems in the different areas, while accurate comparative data on pension income replacement rates are difficult to come by, it is nevertheless widely accepted in the literature that the EU's public pension system is relatively generous compared with other areas of the world and that the share of EU retirement income coming from the build-up of private pension assets is substantially lower²³ compared with the US and to a lesser extent Japan where more traditional forms of savings such as bank deposits appear to play a large role.
- Turning to global capital market integration, it appears from section 2.1 that a model assumption of full worldwide integration is unrealistic given the empirical evidence that the slow ageing group of countries (with close to 60% of the world's total population in 2000) have made very little progress in recent decades in increasing their degree of financial market openness. An assumption of limited worldwide capital mobility²⁴ has the important implication that as age-related capital movements start to grow in the developed world in future decades, the choice of investment locations will be largely limited to other developed economies and the fast ageing group of countries.

RELATIVE IMPORTANCE OF THE DIFFERENT STRUCTURAL DETERMINANTS : From the discussion above regarding the different determinants, it is clear that individual countries and groups of countries have features which bear heavily on the trends for net external capital movements. For example, while over the period as a whole there have been large changes in old age and youth dependency ratios in all of the five areas, in relative terms the most striking change has been in Japan's old age dependency ratio which more than doubled, compared with more modest developments elsewhere. Japan also stands out in terms of relative changes in public debt levels and negative changes in trend per capita growth rates. The EU differs in terms of the relative generosity of its public PAYG pension system and the associated small share of pension income which is privately funded. The striking feature for the US is its significant and expanding growth rate differential compared with other developed countries, with for example the EU's catching-up process over the 1960's and 1970's starting to falter in the early to mid 1980's and with Japan starting to diverge in the 1990's. Finally, the most noticeable features for the fast and slow ageing countries are the absence of any significant catching-up over the period as a whole, especially with the US, and the highly erratic pattern of trend growth rates for the slow ageing group. In addition, the limited integration of the slow ageing countries into the world's financial system impacted not only on the countries

²³ This EU average position does not however apply to a number of individual EU member states, especially the UK and the Netherlands both of which have large privately held pension fund assets.

²⁴ Restrictions on global capital mobility were introduced by imposing differential risk premia on both the fast and slow ageing countries, with the highest premia for the latter group.

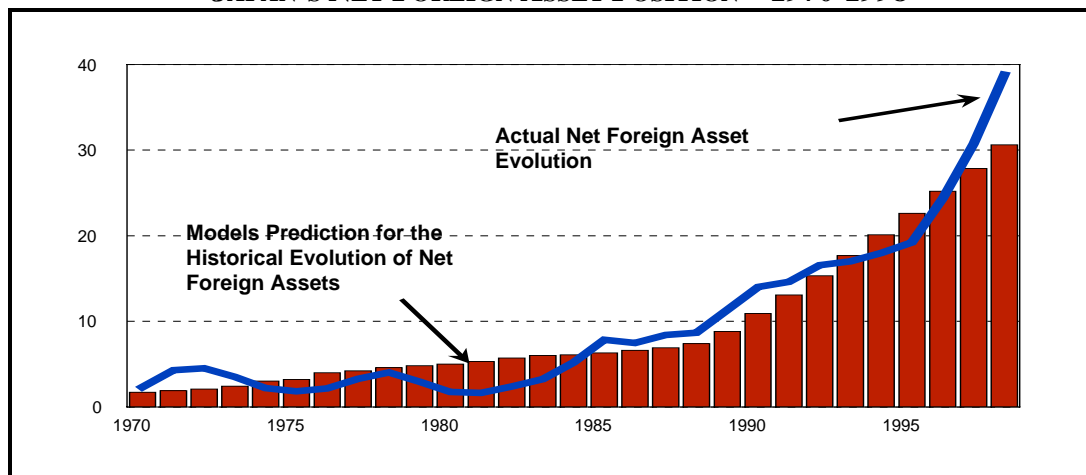
themselves but also had the effect of limiting the volume, and the rate of return potential, of external capital flows from the rest of the world.

While the previous paragraph has described the main country-specific factors which have determined the underlying changes in the net foreign asset positions of the respective areas over recent decades, a model based analysis is needed to decipher the relative importance of the different factors. At the outset of such a model based analysis it is important to stress that disentangling the individual effects of the different factors on net external asset positions is problematic, with this process further complicated by the fact that some of the factors such as relative changes in per capita income (and the implicit rate of return differentials which underpin such changes) are closely intertwined with the ageing phenomenon itself. However, it is possible with the life cycle model used in this paper to roughly isolate the impact of the different factors on the savings / investment and current account positions of countries since the early 1970s²⁵.

For example, in the case of the demographic changes, the model was used to assess what proportion of the current account changes could be attributed to demographic factors in the 5 areas over the last 30 years. This analysis was carried out by “shocking” the ageing model with the life expectancy and birth rate changes which actually occurred over the period. On the basis of these demographic changes and using low coefficients for the effect of dependency ratio changes on private savings, and a constant capital to output ratio to capture the investment effects, the model was able to roughly isolate the age related component of the current account positions of the respective areas. In fact it turns out that the demographic factors alone would have overpredicted the changes in net foreign asset positions around the world over this period. Given this result, clearly other factors were working to dampen the effect of population changes on capital movements. Consequently, in order to get a more accurate fit for the historical developments, it was essential to also allow for the non-demographic determinants discussed earlier, namely GDP per capita, debt, pension system differences and restricted capital movements to developing economies. When these variables were included in the simulations, the model was able to broadly replicate the changes in the net foreign asset positions of the five areas over the period 1970-1998, with Graph 14 for Japan showing the good tracking performance of the model (see Röger, 2003, for the complete analysis of the 5 areas).

²⁵ It should be underlined that changes in demographic factors are not only important in terms of determining medium-to-long run balance of payments developments. They are also, via their effects on the net foreign asset positions of countries, an important long-run determinant of changes in real exchange rates. According to Lane and Milesi-Ferretti (2000), “international investment income flows associated with, non-zero, net foreign asset positions require some degree of real exchange rate adjustment in the long run”, with the key question to be answered being “whether countries that receive net payments from abroad (because they are net external creditors) tend to have more appreciated real exchange rates and, conversely, whether countries that make net payments abroad (because they are net debtors) have more depreciated real exchange rates”. On the basis of both cross-section and time series empirical evidence, Lane and Milesi-Ferretti conclude that there is a significant response of the real exchange rate to changes in the net external asset position of countries, with both variables predicted to move together over the long-run.

**GRAPH 14 : HISTORICAL TRACKING ABILITY OF ECFIN'S AGEING MODEL
JAPAN'S NET FOREIGN ASSET POSITION – 1970-1998**



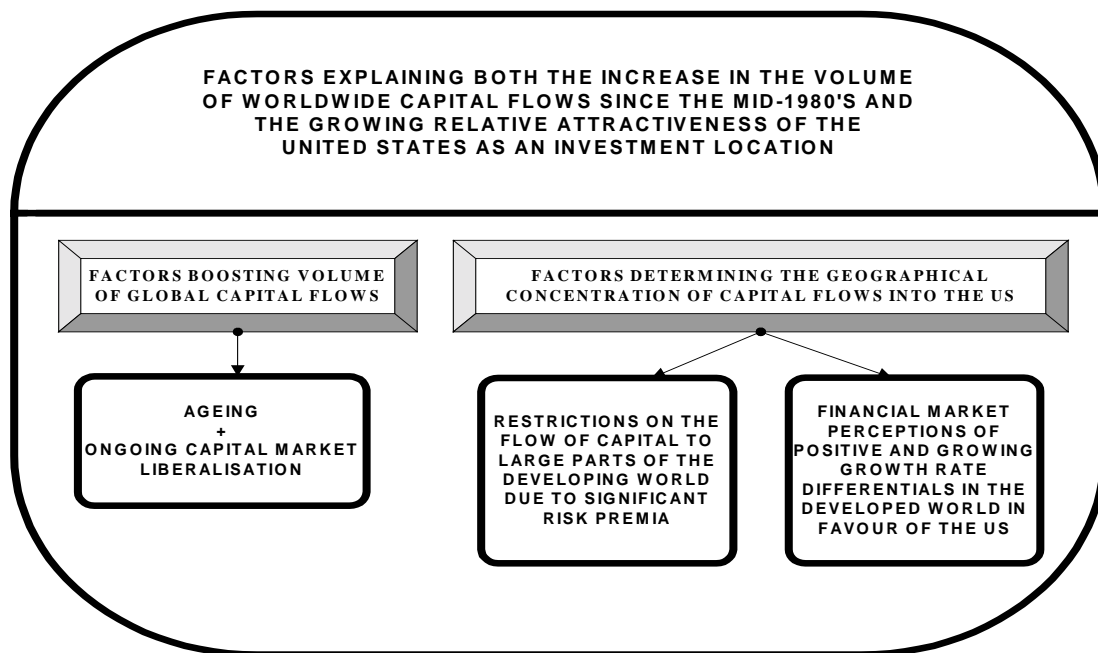
As discussed in more detail in Box 4, it turns out that of the five factors analysed, it was demographics, growth rate differentials and the assumption regarding capital mobility which were the crucial determinants in explaining the trend evolution of net foreign asset positions of the five areas and the associated current account imbalances. Firstly, ageing and capital market liberalisation led to a sharp increase in the volume of worldwide capital flows over recent decades and secondly, the nature of capital liberalisation (i.e. it was largely a developed world phenomenon) allied to growing growth rate differentials within the developed world in favour of the US, explains the geographical concentration of those capital movements into the US. These two conclusions are illustrated very clearly in the model simulations described in Box 4. For example when the ageing model was run with an assumption of full global capital mobility, and taking into account all the other relative differences in terms of growth, debt, pension systems and demographics between the respective areas, the result was a prediction for the period 1970-1998 of positive net foreign asset positions for the EU, the US and Japan (i.e. persistent current account surpluses), with substantial debt positions for the fast and slow ageing countries (i.e. persistent current account deficits). Compared with what actually happened, the big differences in international investment patterns were :

- Firstly, the slow ageing countries experienced actual net capital inflows from the rest of the world which were only one-tenth of that which the model would have predicted on the assumption that capital markets were fully open at the world level, and
- Secondly, the US experienced significant current account deficits over this period as opposed to the prediction of the model of small surpluses.

As discussed in Box 4 these model prediction errors were, in the case of the slow ageing group, fully driven by the assumption of full capital mobility and in the case of the US, it was the combination of restricted capital movements to the slow ageing group allied to the US's growing relative attractiveness as an investment location compared with other developed economies which explains the sharp differences between the actual outturn and the model prediction.

To summarise, therefore, in terms of isolating the crucial determinants of current account changes globally over the last 30 years, the key conclusions of this model-based analysis are as follows :

- Firstly, demographic developments have become an increasingly important determinant of changes in global current accounts over the last 15-20 years.
- Secondly, significant restrictions on capital movements to large areas of the developing world impacted strongly on the volume and the geographical destination of external capital flows.
- Finally, with restrictions on global capital movements and with a widening in growth rate differentials in the developed world in favour of the US, a disproportionate share of the additional age-related capital flows were absorbed by the US. This growing tendency towards current account deficits in the US was exacerbated in the second half of the 1990's by the perceptions of the financial markets that growth rate differentials had widened even further in favour of the US.



2.3 : FUTURE TRENDS IN INTERNATIONAL CAPITAL MOVEMENTS

The results from the historical analysis in 2.2 of current account and net foreign asset developments will form the empirical basis for this papers central scenario regarding future age-related changes in financial flows over the coming 50 years. Because of the persistence of demographic trends, it is unlikely that a major reversal of current trends will occur in the immediate future. In this context, it is the recent trends in Japan which need to be most carefully scrutinised since it is the first of the developed economies to be significantly affected by ageing and since it is 10-15 years ahead of the others in terms of timing. While the growing savings-investment imbalances in Japan in the second half of the 1990's were to an extent affected by the “bubble” conditions in the US, on the basis of the change over 1985-1995, it is clear that trends have been influenced significantly by the ageing of the population and by the associated build-up of foreign assets to fund retirement income. This trend for Japan is particularly important for the EU and for a number of the fast ageing economies

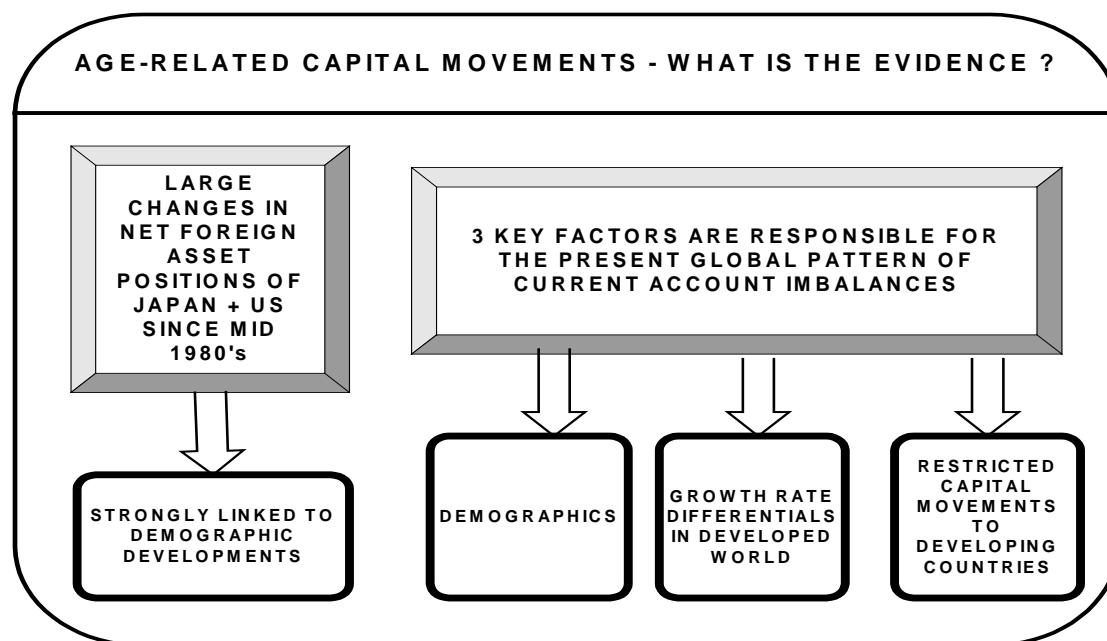
over the coming decades since, based on an index of the old age dependency ratio, major demographic changes started to occur in Japan in the early 1970s, with the overall increase in the ratio over the period 1970-2000 being of an equivalent percentage size to that which is expected to occur in the EU and other countries over the coming decades.

Movements in the current account and the associated private savings and investment changes that occurred in Japan can therefore give an indication of what can be expected to occur in other ageing economies, especially if, like Japan, these countries fail to make the necessary policy adjustments to counteract the effect of ageing on potential growth rates. A combination of a faltering growth process (which was undoubtedly bubble induced / age-related) allied to a lack of enthusiasm for reform has proven to be an exceptionally negative cocktail for Japan over the last decade. Japan is a particularly potent reminder to other ageing developed economies of the need to adopt an ambitious reform agenda in the face of ageing, with a growth-oriented policy framework essential if these economies are to avoid a similar mixture of subdued domestic investment growth rates and large and increasing outflows of capital. While there is already some evidence of a lowering of EU investment rates in recent years, given the relatively more generous PAYG pension system in Europe and the historically lower savings propensity compared with Japan, the extent of future capital flows are likely to be of a smaller order of magnitude in the EU. In terms of timing, despite the fact that not much ageing has taken place so far in the EU, economic theory would nevertheless suggest that adjustments to savings, investment and capital flows occur already in the initial phase of the ageing process. While signs of the latter effects are only slowly beginning to emerge in the EU, this trend is nevertheless expected to strengthen in the coming years and decades.

Finally, at the global level, given that the government debt and productivity assumptions underlying the central scenario in section 3 are for broad stability relative to the 2000 level and that policy measures aimed at changing pension systems and deepening global capital market integration are excluded, the key underlying determinant of the future financial flow predictions given in Section 3 are the demographic changes which are expected to occur over this period. If the latest population projections prove accurate and if the historical links between changes in net foreign asset positions and their structural determinants hold in future decades, it is clear that substantial changes are in prospect over the period 2000-2050 for the wealth/debt positions of the different countries and regions around the globe. In addition, with the ageing-induced pressure for a widening of growth rate differentials amongst the developed economies and an absence of truly globalised capital markets, the US is likely to experience a protracted period of current account deficits²⁶ with the opposite trend for the EU and Japan. In addition, to the extent that the slow ageing group of countries fail to enact the confidence building measures necessary to create an environment conducive to large foreign capital inflows, the type of bubble-like conditions experienced in Japan in the late 1980's and the US in the second half of

²⁶ This is not to imply that there will not be a correction of the current US deficit position but it does suggest that once the cyclical aspects have been addressed the underlying structural position will remain negative. This is due to the fact that even with only a proportion of the "new" economy story remaining in tact, with an absence of alternative investment locations, due to the EU and Japan facing uncertain growth prospects and with the slow ageing group essentially cut off from the world's capital markets due to excessive risk premia attaching to investing in these countries, the US current account will not correct as much as some commentators are predicting.

the 1990's and the downward pressure on rates of return could become more persistent concerns for global policy makers²⁷.



²⁷ Borsch-Supan, Ludwig and Winter (2001), in their analysis of the effects of fundamental pension reform on capital markets in Germany, underline the importance of international diversification to rates of return "Our simulations suggest that the decrease in the rate of return on capital, which results from secular shifts in the capital-labor ratio associated with an ageing population and retirement saving, is less about 1 percentage points by 2050 and only if all capital is invested exclusively in Germany. However, capital markets these days are anything but closed national markets and the return on capital can be improved substantially by international diversification....Moreover, the decrease in the return to capital due to a fundamental pension reform is only 0.2% points if capital is freely mobile within the countries of the EU versus 1% point if Germany is modelled as a closed economy. This suggests that closed economy overlapping-generations models overestimate the transitional burden of such a fundamental pension reform."

BOX 4 : TRACKING THE TREND EVOLUTION OF NET FOREIGN ASSETS : GLOBAL CAPITAL MARKET RESTRICTIONS AND THE GROWING CONCENTRATION OF CAPITAL FLOWS INTO THE US

As explained in the main text there was a large increase in the volume of capital movements over the last number of decades driven by growing capital market liberalisation and more recently by a sharp increase in age-related international capital flows. The purpose of this box is two-fold, firstly, to highlight the importance of the capital mobility assumption in determining both the quantity and geographical destination of those flows and secondly, to examine in more detail why there was such a concentration of capital flows into the US.

The question to be addressed is whether the combination of a life cycle model (such as the one used for the simulations in this paper) allied to various capital mobility assumptions can account for the observed trend evolution of net foreign assets among the various regions of the world over the last 30 years, taking into account the relative magnitude of the demographic, growth, debt and pension system differences which existed in the five areas covered by the model. In broad terms, the model needs to explain why external imbalances between Europe, Japan and the US have continuously widened in recent decades, reaching unprecedented levels, and why the fast and slow ageing rest of the world regions have shown very little change over time in terms of the evolution of their trend external position, despite being permanently indebted over this period. In particular how important a role can an assumption of full capital mobility or one based on restricted capital movements play in understanding these developments.

FULL CAPITAL MOBILITY ASSUMPTION : Can the broad patterns for the respective areas be explained using an assumption of perfect worldwide capital mobility ? The first thing to stress is that the demographic projections imply that over a long transition period, stretching over decades, there will be changes in the relative size of national labour forces as well as differences in the propensity to consume. Because of higher labour force growth, the marginal product of one additional unit of capital invested in a slow ageing country will decline less than in a fast ageing country. Under free capital mobility, this induces capital outflows to slow ageing countries until rates of return are equalised. The extent to which capital exports occur depends on savings behaviour in the fast and slow ageing regions. Various factors (discussed in section 1 of this paper) influence the aggregate savings rate. Though the net result is likely to be a decline in the savings rate in ageing countries, capital outflows can nevertheless be substantial because of both lower replacement investment needs in fast ageing regions and due to the investment opportunities offered by slow ageing regions. Apart from the magnitude of capital outflows the duration of external imbalances is also an important issue given the extreme persistence in labour force growth rate differentials between the fast and slow ageing regions of the world.

Consequently, with an assumption of full capital mobility, a clear pattern of international investment emerges, with the industrialised regions of the world exporting capital to developing countries and with the demographic changes dominating the evolution of net foreign asset positions in the five regions. However, both for Europe and Japan, foreign asset accumulation is dampened in the 1970's and 1980's because of higher total factor productivity growth. In addition, the peak of net foreign assets in Japan is substantially lower than that predicted by the demographic change because of the high government debt in that country. However, as explained in the main text, if the model is run with an assumption of perfect capital mobility and taking into account all the structural determinants discussed in section 2.2, both the magnitude and timing of capital flows across the five regions is grossly at odds with the observed evolution. The model clearly overpredicts the accumulation of foreign assets in Japan and Europe and it predicts a small positive net foreign asset position in the US in contrast to the observed large net liability position. These capital exports from the EU, US and Japan would in turn need to be absorbed by an increase in the net liabilities of the fast and, more importantly the, slow ageing countries in the rest of the world. According to the model, with full capital mobility, the net liabilities of the slow ageing group would grow strongly as a share of GDP, with foreign indebtedness reaching a level of about 120% in 1998, which in fact is nearly 10 times the actual level of foreign debt accumulated over the last 30 years.

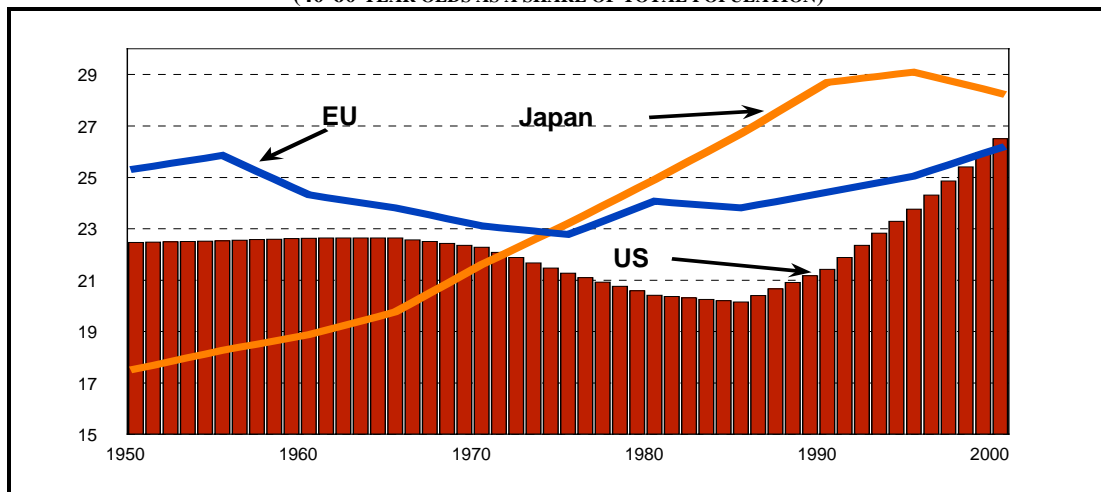
RESTRICTED CAPITAL MOBILITY ASSUMPTION : The poor results using the full capital mobility assumption explains why imposing restrictions on international capital flows between the developed and the developing worlds (especially the slow ageing group of developing countries, with the model imposing restrictions which are ten times higher than for the fast ageing countries²⁸) greatly improves the ability of the model to explain the historical pattern of net foreign assets. Firstly, liabilities in the fast ageing and slow ageing groups are now stabilised close to their actual levels and secondly, with capital restrictions in place for the latter two groups this also dampens the overall volume of net foreign asset accumulation in the EU, US and Japan. However, while the net external surpluses of the latter areas are lower than in a scenario of full capital mobility, the lower volume of worldwide capital flows must nevertheless to a large extent be balanced within the more developed group of

²⁸ The observed low volatility of net foreign assets in both the fast ageing and slow ageing countries suggests the existence of trading frictions for international financial transactions in these countries. Restrictions for international capital flows seem to be larger in the slow ageing countries, given the strong over-prediction of the model for net liabilities for the slow ageing countries. We therefore assume strong capital market imperfections for the slow ageing group and only mild frictions for fast ageing countries. Concretely, it is assumed that a worsening of the net foreign asset position of 1% leads to an increase in the risk premium of 0.4% in the slow ageing and of only 0.04% in the fast ageing countries.

countries, with the result that the US (with its more favourable relative growth rates compared with other developed economies and with those differentials perceived to widen over time) absorbs an increasing proportion of the net savings from Japan and to a lesser extent the EU and some of the fast ageing developing countries and emerges in an overall net debtor position.

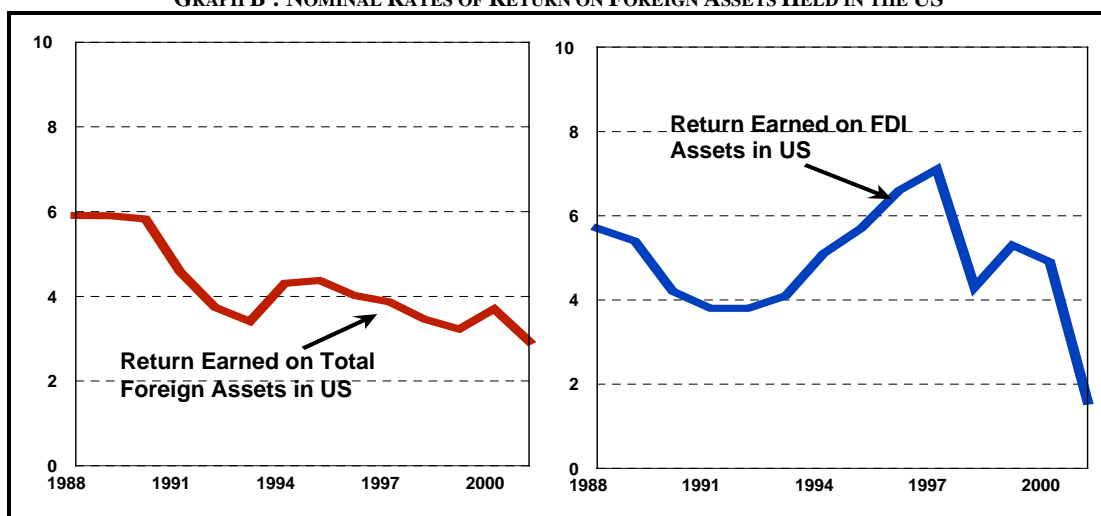
INTERNATIONAL NET DEBTOR POSITION OF THE US OCCURRED AT A TIME OF FAVOURABLE DOMESTIC SAVINGS CONDITIONS AND FALLING REAL RATES OF RETURN ON FOREIGN INVESTMENTS IN THE US : To summarise the main conclusions so far, the combination of global capital market restrictions, divergences in per capita income growth rates between the more developed economies and financial market perceptions of growing differentials due to the “new economy” story, the US has experienced a large transfer of resources from the rest of the world over the 1990’s, culminating with it attracting between 60-70% of the available worldwide pool of savings (i.e. non-domestic savings flows) in the late 1990’s. This was also occurring at a time when its own domestic savings position should have been relatively strong due to its internal demographics, with the share of the high-saving age cohort (40-60 year olds) in the total US population being on a steady upward path throughout the 1990’s (graph A). The channelling of such a large proportion of the worlds resources to the US was also a little surprising given not only the catching-up opportunities provided by a large number of developing countries but also the fact that relatively low and declining nominal rates of return were being earned by foreign investors on both their FDI and total assets. As graph B shows, nominal rates of return on US assets over the last 10-15 years have on average been surprisingly low and have been falling over time for total assets and, apart from an upward movement in the mid-1990’s, have been declining also for FDI assets²⁹.

GRAPH A : SHARE OF PRIME-SAVERS AGE GROUP IN THE TOTAL POPULATION (40-60 YEAR OLDS AS A SHARE OF TOTAL POPULATION)



Source : Eurostat, US Census Bureau and UN

GRAPH B : NOMINAL RATES OF RETURN ON FOREIGN ASSETS HELD IN THE US

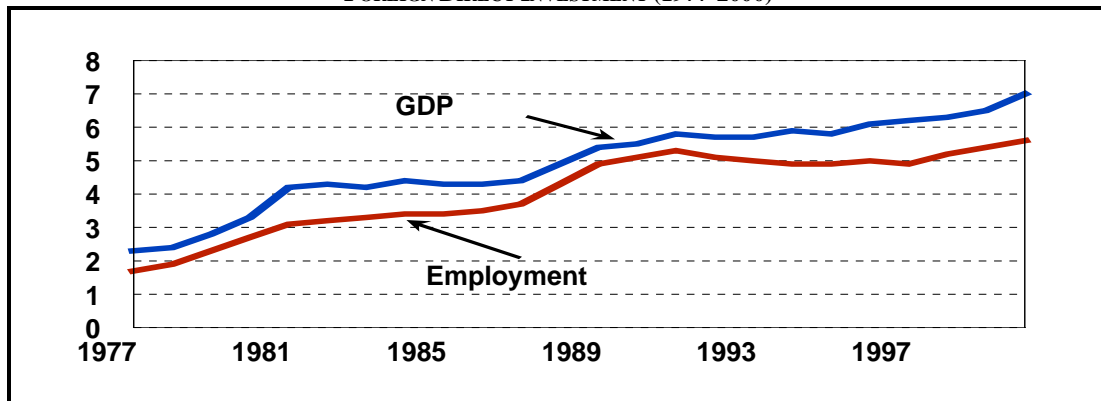


Source : US Bureau of Economic Analysis, Survey of Current Business, Mataloni (2000)

²⁹ These rates of return for foreign investors on US assets compare with the achievement of consistently higher rates of return for US investments abroad, with the result that the investment income balance on the US current account has surprisingly not gone into deficit despite the large deterioration in the US’s international investment position.

However, despite having firstly a higher proportion of 40-60 year olds which should have boosted domestic savings and secondly despite falling rates of return, there was a steady upward trend in FDI and non-FDI inflows into the US over the last 10-15 years. In the specific case of FDI flows, these now constitute an important proportion of US economic activity, with these investments directly responsible for a sizeable and growing share of private sector US GDP and employment levels (graph C). Data for the year 2000 also show that 73% of this FDI-produced US output emanated from EU and Japanese firms³⁰. Of course a large element of the explanation for these developed world flows to the US, especially in the second half of the 1990's was the widely held perception in financial markets that information and communication technologies (ICT) would transform the US trend growth rate. This trend break was expected to put it on a higher growth path relative to the rest of the developed world, which when combined with the credibility of the US regulatory framework made it a highly desirable investment location. The prospect of comparatively high, stable, returns in the US proved to be a strong magnet for investment funds even compared with the opportunities provided by a number of dynamic, but more volatile, emerging markets. However, it should be underlined that a number of the latter markets also received a significant amount of resources, with the examples of China³¹ in particular and East Asia in general suggesting that the worlds financial community was anxious to achieve a more internationally diversified investment portfolio. However, the extent of this diversification process should be kept in perspective as the discussion in section 2.1.1 regarding the geographical concentration of these flows suggests and also because the domestic absorption capacity of these countries is often an important restraining influence, at least in the initial stages.

GRAPH C : SHARE OF US GDP AND US EMPLOYMENT PRODUCED BY FOREIGN DIRECT INVESTMENT (1977-2000)



Source : Survey of Current Business, Zeile (2002)

Finally, while many aspects of the “new” economy story are now being re-evaluated, nevertheless the experience of the 1990's clearly demonstrates the importance of a credible, growth-oriented, framework in attracting international investment funds. In addition, in a situation of ageing-induced increases in external capital flows and with ongoing restrictions on such flows to developing economies, the 1990's also point to the dangers of future reductions in rates of return and bubble conditions emerging in the event that a particular country's relative growth position is perceived to change. The frequency of such situations is likely to increase in the future, as the effects of ageing will induce significant changes in the relative growth potential of the existing developed world economies, and on the assumption of ongoing restrictions on capital movements to the slow ageing group of countries, the number of investment locations will be restricted to other developed economies and to a small number of relatively stable, but also fast ageing, emerging markets.

³⁰ In terms of the breakdown between EU and Japanese firms, the EU accounts for over 80% of the total of 73% i.e. EU firms produced 59% of all FDI-produced US output in the year 2000, with Japan producing 14%.. A similar % breakdown is evident for employment levels in US affiliates of EU and Japanese companies.

³¹ China in 2002 became the single largest recipient of FDI flows worldwide, pushing the US into second place.

SECTION 3 : GLOBAL AGEING SCENARIO 2000-2050

3.1 MODEL ASSUMPTIONS

The earlier sections have given a description of past and expected future population changes as well as a partial equilibrium analysis of the channels via which ageing is likely to impact, including a detailed assessment of the implications for external capital movements. The present section synthesises this information, using ECFIN's general equilibrium ageing model, and presents its central view of the global economic and financial market impact of ageing populations over the next 50 years. In terms of the overall effect of ageing, figures for both potential output and income per capita (i.e. living standards - GDP growth rates adjusted for changes in trend population) need to be considered since there are significant differences between both these economic performance indicators for the different world regions covered by the ageing model.

As explained earlier, the general equilibrium approach overcomes the key limitation of the static analysis presented in previous sections, with the latter approach failing to take account of systemic, dynamic, forces which will undoubtedly kick into action once ageing starts to impact on the economic systems of the respective countries. In fact, estimating the effects of ageing using a general equilibrium framework overcomes three major sources of problems.

- Firstly, policy adjustments are inevitable in order to avoid the development of unsustainable private or public sector imbalances.
- Secondly, the emergence of tensions in an economy is normally followed by corrective, general equilibrium, feedback effects such as changes in interest rates or exchange rates; in the level and composition of savings; in the behaviour of consumers and investors; and even, in certain circumstances, in changes in the rate of technical progress.
- Finally, as underlined by the analysis in section 2, global interdependencies ensure that changes in the relative current account and net foreign asset positions of countries / geographical zones need to be adequately modelled in order to assess the impact of an ageing process which is not occurring at uniform speeds or intensity across the different countries or regions of the world.

It should be stressed at the outset that while the central ageing scenario, covering the period 2000-2050, allows for the above-mentioned feedback effects and global interdependencies, it excludes the possibility of specific, offsetting, policy adjustments (with these policy scenarios being dealt with in section 4). However, the emergence of unsustainable debt or deficit positions is avoided in this no-policy change view by debt rules in the model and, in the case of the EU, by an assumption of broad respect for the Stability and Growth Pact (SGP), with the result that any age-related public expenditure increases are 100% tax financed. A second important assumption underlying this no-policy change simulation is that the basic theoretical framework is provided by the life cycle approach, although simulation results using alternative savings rate assumptions (e.g. bequest or buffer-stock models of savings behaviour) show that differences only relate to the degree rather than the direction of

change³². Finally, with regard to the basic parameters of the ageing model, while no historical precedents exist for the demographic changes which are forecast to occur over the coming decades, it was nevertheless considered important, given the unusually large degree of future uncertainties, that the model could replicate the broad stylised facts of the historical experience over the period 1970-2000.

3.2 KEY RESULTS

LIVING STANDARDS (GDP PER CAPITA) AND POTENTIAL GROWTH RATES : The overall economic impact of ageing over the period 2000-2050 will be to reduce the level of GDP per capita (i.e. living standards) significantly in the EU, the US and Japan (by 19, 13 and 22 percent respectively) compared with a baseline scenario of no change in population trends (see graph 15). In terms of translating these level effects into changes in the growth rates of GDP per capita, ageing is expected to reduce the annual average rate of growth, relative to the baseline (which in the model is set equal to the average experienced over the 1990's), by around 0.4 of a percentage point in the case of the EU and Japan and by around a ¼ of a percentage point in the US³³. Regarding the fast ageing countries, declines of less than a ¼ of a percentage point are also predicted, with little change expected in the growth of living standards for the slow ageing group. This pattern of change in living standards globally is largely dictated by underlying productivity and dependency ratio developments. In this regard, the failure of the slow ageing countries to capitalise on their more favourable demographics, in the form of a rapid catching-up in income per head, reflects the no-policy change nature of the present simulation and the ongoing relatively poor average productivity performance of these countries. Consequently, the central scenario does not predict a rapid process of income convergence for this group of countries since it is essentially a no policy change scenario, with the productivity trends of recent decades being extrapolated forward. However, this is

³² The results presented in this section suffer from 2 main sources of uncertainty, firstly regarding the population projections (where recourse can be made to the pessimistic and optimistic variants as well as the central scenario) and secondly the general issue of model uncertainty. A number of different models (life cycle, bequest, buffer-stock) can be used to try to fit the historical data. These models are also crucial in assessing how consumers will react to the type of policy measures which governments will put in place to overcome the economic consequences of ageing. In this context, in additional simulation work carried out for the analysis in this paper, the ageing model was run using :

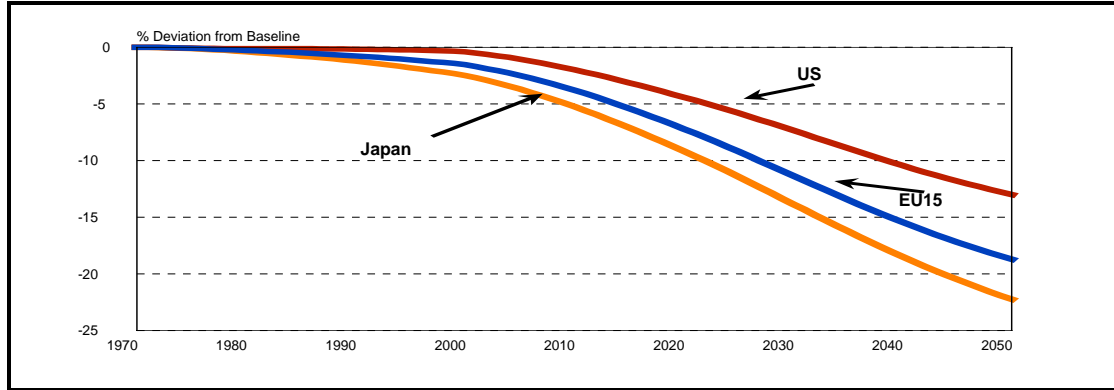
- firstly, an extreme form of the life cycle model, where consumers are expected to exhibit perfect forward looking behaviour and to set in place an optimal planning strategy for handling the consequences of ageing; and
- secondly, what is termed a myopic / Keynesian view of the world, where working age households do not adjust their savings behaviour in the light of the looming ageing crisis.

These two views of the world were simulated since they represent in effect the opposite ends of a spectrum of possible outcomes which includes, somewhere along the continuum, the "buffer stock" and "bequest" theories of savings. In other words the most likely effect of ageing on the EU and world economies would probably lie somewhere in the middle (i.e. a weighted average of the two extreme cases) since as explained in Box 1, there is a strong case for suggesting that the life cycle view is limited in certain respects. It was because of the uncertainties attaching to the life cycle view that it was decided to do a series of simulations which would try to encompass the wide spectrum of consumption theories which presently exist in the mainstream economic literature. While simulations have been run using other theoretical specifications, such as for example the "bequest" motive, the results fell into the middle of the range provided by the life cycle and "Keynesian" models. The conclusion of these simulations, in terms of growth rates, is that ageing is expected to reduce the annual average rate of growth in living standards (i.e. GDP per capita) in the EU over the next 50 years, relative to the baseline, by between 0.3 and 0.5 of a percentage point, depending on which of the two models one finds the most credible, with the Keynesian specification giving the most pessimistic assessment. The most significant point to emerge from these simulation exercises is the fact that whichever consumption theory one adopts, it is clear that there will be significant negative growth implications from the ageing of EU populations. Given the greater degree of theoretical and empirical support for the life cycle view, this is the specification which has been used for all of the simulations presented in the present paper. It is also the view of the authors that with longer life expectancy and with financial market liberalisation ensuring that more and more people can borrow on the basis of their lifetime wealth (i.e. the proportion of liquidity constrained households is falling over time) economic agents will increasingly be living in a life cycle world.

³³ In the case of Japanese living standards, the decline in the growth rate of GNP per capita is 25% less than that of GDP per capita due to the cushioning effect of income from their foreign investments.

not to imply that income convergence in the slow ageing group will not occur at a more rapid pace, it simply states that this process is contingent on the introduction of significant policy adjustments in the countries concerned (see section 4 for an analysis of a global income convergence scenario).

GRAPH 15 : IMPACT OF AGEING ON THE LEVEL OF LIVING STANDARDS (GDP PER CAPITA) IN THE EU, US AND JAPAN



With regard to the development of actual potential output in the various areas, the effects are much greater compared with changes in living standards. This divergence between the two indicators reflects the influence of differences in the outlook for the growth of the overall population and especially with regard to the population of working age which has an important effect on the relative productive capacity of economies (graphs 17a/17b). In overall terms, in the case of the EU and Japan, the fall in average potential growth rates over the next 50 years is roughly double that of the decline in living standards, with the EU's and Japan's underlying potential growth expected to fall by 0.8 and 1 percentage point respectively compared with the average growth rates achieved in the 1990's. In absolute terms, the EU's potential growth rate over the period 2000-2050 is expected to fall to 1.3 percent, with the Japanese potential growth rate falling even more, to an annual average of only 0.9%. The EU will witness individual years at the end of the simulation period with potential growth rates of slightly below 1%, with Japan experiencing growth rates substantially below 1%, as shown in Graph 16.

GRAPH 16 : IMPACT OF AGEING ON POTENTIAL GROWTH RATES IN THE EU, THE US AND JAPAN (ANNUAL % CHANGE)

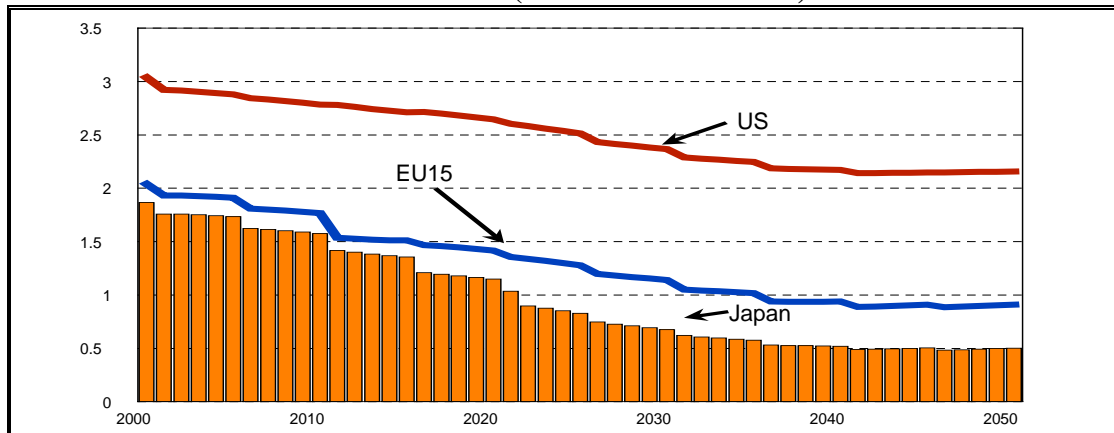
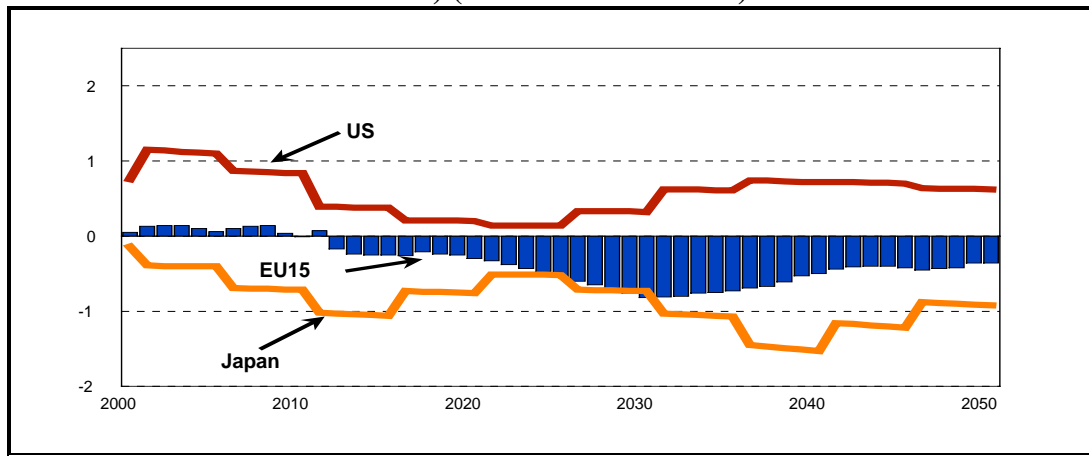


TABLE 2 : CENTRAL AGEING SCENARIO : AVERAGE GROWTH RATES OF POTENTIAL OUTPUT OVER THE PERIOD 2000-2050

	EU15	US	JAPAN	FAST AGEING	SLOW AGEING	WORLD
POTENTIAL OUTPUT	1.3	2.5	0.9	2.1	3.2	2.4

Regarding the US, relatively healthy annual average growth rates of 2½% are predicted over the next 50 years, driven by continuing growth in the population of working age compared with declines in the latter for the EU and Japan. While this average US growth rate is lower than that achieved over the 1990's, it still compares very favourably with rates of 1¼% and less than 1% expected for the EU and Japan respectively. In fact, only the slow ageing countries are forecast to grow at a faster pace (i.e. 3¼%), with the fast ageing group predicted to grow by only about 2% on an annual average basis. At the overall world level, the effect of ageing will be to reduce average potential growth rates over the next 50 years by ½ a percentage point compared with the average of the 1990's (i.e. from 3% to 2½%)³⁴. Since the model assumes that there are no changes in TFP growth rates compared with the 1990's³⁵, changes in potential growth rates between the various world regions are explained by changes in the demographic outlook and the knock-on effects of the latter on labour markets and on capital intensity³⁶.

GRAPH 17A : POPULATION OF WORKING AGE IN THE EU, US AND JAPAN (2000-2050) (ANNUAL % CHANGE)



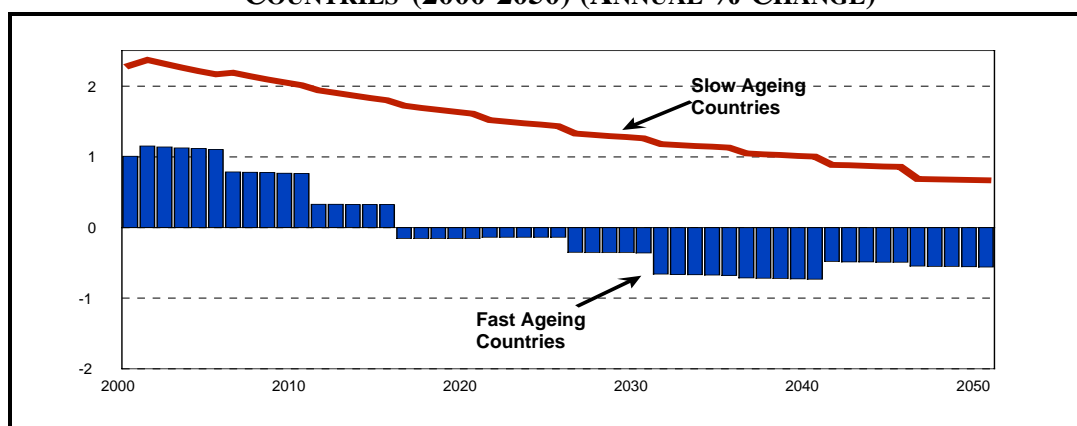
Source : Eurostat, US Census Bureau and UN

³⁴ With more sluggish growth in the developed world and little global income convergence, such a relatively low rate of world potential growth is not unexpected given global interdependencies.

³⁵ Differences in TFP growth rates for all of the 5 areas in the 1990's are very small, ranging from 0 to a ¼ of a % point. Large persistent differences in TFP growth rates over long periods of time would be unrealistic, with long-run convergence a more credible assumption.

³⁶ Effects on capital intensity are likely to occur due to changes in savings and investment behaviour, with further changes being possible in the event of a partial shift to funding due to alterations to the proportion of the overall change in savings which is invested abroad or is invested in the EU's domestic capital stock. These changes in capital intensity however only affect labour productivity in the model and not TFP which is assumed to remain unchanged.

GRAPH 17B : POPULATION OF WORKING AGE IN THE FAST AND SLOW AGEING COUNTRIES (2000-2050) (ANNUAL % CHANGE)



Source : UN

DECOMPOSITION OF GROWTH INTO ITS VARIOUS COMPONENTS : In terms of the decomposition of potential growth into its employment, capital stock and total factor productivity components, the essential figures are shown in Table 3. Given that the central scenario is carried out using a neutral assumption with regard to technical progress over the time horizon of the simulation, the effects of ageing manifest themselves in terms of changes to employment and the capital stock. In overall terms, roughly 60-70% of the decline in average growth rates in the EU, US and Japan are expected to result from developments in employment, with the remainder emanating from changes to the capital stock.

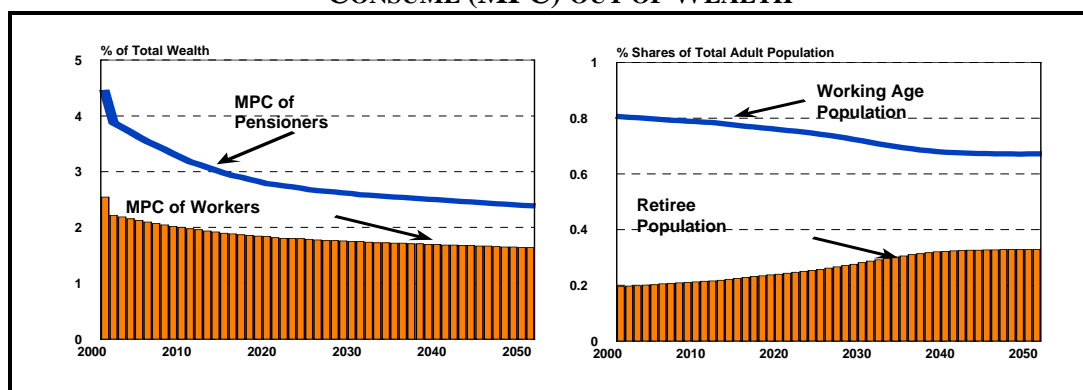
TABLE 3 : CENTRAL AGEING SCENARIO : CONTRIBUTIONS TO AVERAGE POTENTIAL GROWTH RATES OVER THE PERIOD 2000-2050

	EU15	US	JAPAN
Employment	-0.4	0.3	-0.5
Capital Stock	0.6	1.0	0.5
TFP	1.1	1.2	0.9
Total Potential Growth	1.3	2.5	0.9

SAVINGS AND INVESTMENT : Private savings rates are expected to fall slightly in the EU and in the US and by substantially more, but from much higher absolute levels, in the case of Japan. In the EU, as explained in section 1, while a large range of factors will be at play in terms of determining future changes in private savings, graph 18 looks at what will happen to two of the most important determinants, namely the marginal propensity to save of workers and pensioners and the relative shares of the latter groups in the EU's overall adult population (i.e. total population excluding the 0-14 age cohort). If the savings pattern of consumers was to comply with the life cycle hypothesis, ageing populations would be expected to result in an increase in the marginal propensity to save (MPS) of both workers and pensioners out of both total household wealth and current disposable labour / pension income in the initial phase of the shock and to settle down over time but to a higher steady state level. This in fact is what happens in the life cycle simulation as shown in Graph 18. Firstly, pensioners have a much higher marginal propensity to consume (MPC) out of wealth

compared with workers which reflects the normal dissaving pattern one would expect in retirement and the fact that they have a much shorter time horizon in which to exhaust their resources. For pensioners and workers the graph indicates that both reduce the speed with which they draw down their stock of wealth since both groups realise that their assets will now have to be spread over a longer time span³⁷.

GRAPH 18 : POPULATION AGEING AND THE EU'S MARGINAL PROPENSITY TO CONSUME (MPC) OUT OF WEALTH



Source : Eurostat, Own Calculations

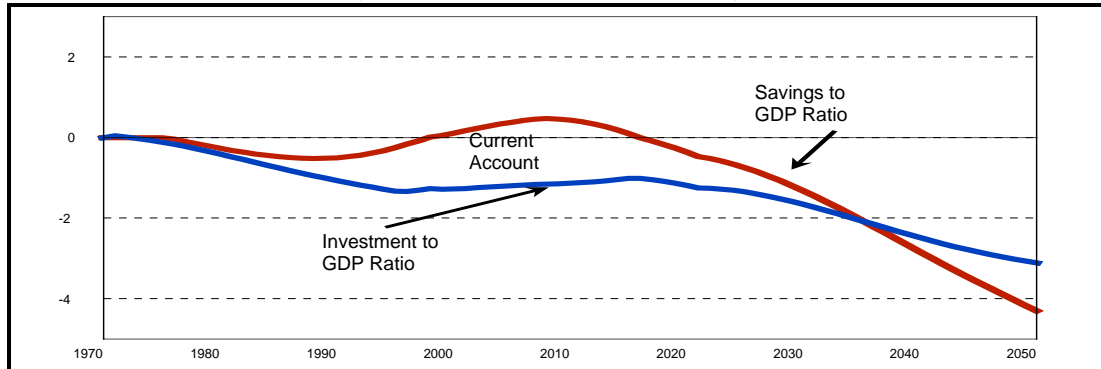
However, while the MPS for both workers and pensioners will rise in response to the expectation of a longer duration in retirement (i.e. higher life expectancy), the overall effect of this behaviour in terms of private sector savings as a % of GDP will depend on the relative shares of workers and pensioners in the total adult population since the MPS of pensioners is substantially lower than that of workers (in fact it is negative) and the share of retirees will rise steadily over the next 50 years. This dramatic change in the composition of the adult population is also shown in the Graph, with the shares of the working / retiree populations changing from an 80% / 20% breakdown in 2000 to 67% / 33% in 2050. As a result of the degree of change in the structure of the population and the dissaving pattern of retirees, while the aggregate propensity to save (i.e. the combined savings rate of workers and retirees) will rise in the EU over the coming decades, the actual level of savings relative to GDP falls. This is shown in Graph 19 for the EU, with the recent age-related rise in the savings ratio coming to an end in about 10 years time, followed by a relatively sharp downward movement in the ratio from then onwards until 2050. In terms of investment, with smaller labour forces to equip and declining GDP growth rates³⁸, the

³⁷ Another interesting feature of Graph 18 is the fact that the increase in the savings rate of workers is so small, especially when one considers that workers are faced with the prospect of having to fund a significantly larger number of years in retirement. Perhaps part of the explanation is due to the other influences on savings which are at work, most notably the real interest rate and income growth rate effects. However, it is probably more likely that the real reason for this muted response of workers to the ageing crisis is the fact that for the bulk of workers in the EU (at least in terms of the EU as a whole since individual country differences are large), they will in effect be forced to save for their retirement in the coming decades via much higher social security contributions (SSC's) which they will automatically have to pay into the public pension system to keep it solvent. When Graph 18 is adjusted for the additional SSC's which workers will mandatorily have to pay to finance the higher public pension expenditure, then the household savings rate for workers increases dramatically to reflect the higher cost associated with retirement income provision in an ageing world. This issue of replacing a mandatory PAYG system for a regime based on voluntary contributions to privately run pension funds is an issue of fundamental importance to future savings and growth trends and is a subject which is addressed in greater detail later on in the paper.

³⁸ Unlike the 1960-2000 period, this reduction in growth is due to labour force changes rather than productivity. The labour force effects are partly offset by changes in the capital-output ratio (i.e. capital intensity) since the predicted fall in the real interest rate should lead to an increase in investment. A potentially negative factor for investment could be the shift to services production which is generally less capital intensive compared with industry. In addition, even allowing for "broadband", it is difficult to envisage equivalently large demands over the coming decades, compared with the past, for new public infrastructure investments.

model predicts, following an initial small increase, that the investment to GDP ratio will start to fall over the period 2015-2020, with the cross-over point with the savings ratio occurring 15-20 years later, at which stage the EU moves back into deficit on its current account.

**GRAPH 19 : AGE-RELATED EU SAVINGS AND INVESTMENT RATIOS
(CHANGE RELATIVE TO 1970)³⁹**



THE ISSUE OF TOTAL FACTOR PRODUCTIVITY : While the central scenario for the EU assumes no change in the contribution of TFP to growth over the simulation period compared with the historical pattern, nevertheless it is important to underline the possibility that productivity growth could be adversely affected. These productivity concerns reflect the significantly weaker investment performance described earlier; evidence from income-age profiles which suggests that the marginal productivity of workers tends to start to decline in their early to mid 50's; and worries that enthusiasm for reform and overall levels of dynamism and innovation in an economy may be detrimentally affected by having an ageing labour force⁴⁰. As Table 4 shows, the median population ages for the five areas in the model change significantly over the coming decades and look particularly worrisome for the EU as they suggest an increase of 11 years from 38 at present to 49 in 2050. While the median age of the Japanese economy will rise even more to reach 53 at the end of the simulation period, it is striking that the median age for the US will still be below 40 in 2050.

Combination of ageing workforce + ageing capital stock : While it is accepted that linking ageing to productivity changes is open to serious dispute, given the extent of the ageing of the population which is forecast to occur in the EU and of the differences between the EU and the other developed economies, the possibility of a link between ageing and productivity needs to be brought to the attention of policy makers. When this ageing of the labour force is combined with the much slower rates of capital accumulation which are expected to occur, leading in turn to an increase in the mean age of the capital stock, the outlook for growth could be significantly worse than the average growth rate of 1.3% assumed in the central scenario. An increase in

³⁹ This graph shows only the change in the age-related component of savings and investment relative to their share of GDP in 1970. For the historical period 1970-2000, there are therefore differences with the actual changes in both the savings-to-GDP and the investment-to-GDP ratios. The investment to GDP ratio cannot fall as much as the savings/GDP ratio since we assume capital intensity is increasing.

⁴⁰ This view is corroborated on the basis of results from the London Business School's "Global Entrepreneurship Monitor" which covers 29 countries around the world (2 ½ billion people in total) and suggests that older societies tend to be less entrepreneurial, with evidence that the majority of "entrepreneurially active adults" are aged between 25 and 44.

the average age of the capital stock in an economy is generally considered to be negative for labour productivity since continuing investment in new equipment is essential for incorporating labour-embodied technical progress into the production process. By way of illustration, if one links changes in technical progress to changes in the average age of the capital stock (i.e. “vintage” effects⁴¹), the potential growth rate of the EU over the period 2000 to 2050 falls even further to an annual average rate of 0.9% versus the 1.3% assumed in the central scenario.

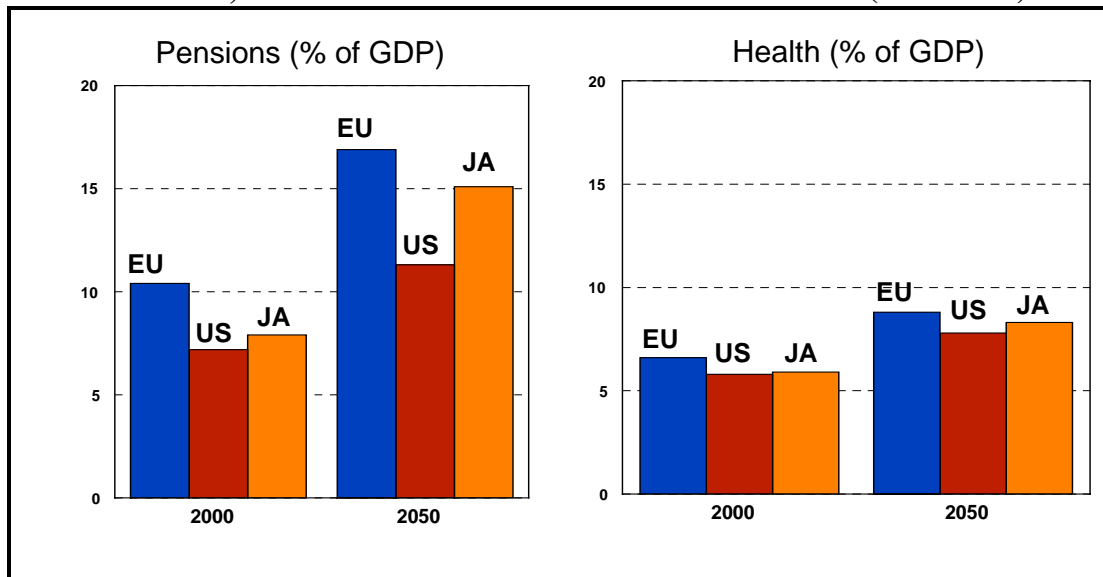
TABLE 4 : MEDIAN POPULATION AGES : 2000 AND 2050

	EU15	US	JAPAN	FAST AGEING	SLOW AGEING
2000	38	36	41	34	21
2050	49	39	53	46	31

Source : UN and US Census Bureau

PUBLIC EXPENDITURE IMPLICATIONS : Regarding the fiscal implications, the model only allows for the pure demographic effects and assumes a substantial deterioration in age-related public expenditure in all areas of the world, including in the slow and fast ageing groups of countries. In the case of the EU, the US and Japan, the central scenario points to an increase in public pensions expenditure of 6½, 4 and 7¼ percent of GDP respectively. With regard to public health expenditure, broadly similar % points increases ranging from 2-2½ % of GDP are predicted for the EU, US and Japan but it must be stressed again that these estimates do not allow for any non-demographic cost pressures⁴².

GRAPH 20 : PUBLIC EXPENDITURE IMPLICATIONS OF AGEING POPULATIONS IN THE EU, US AND JAPAN : PENSIONS AND HEALTH CARE (2000-2050)



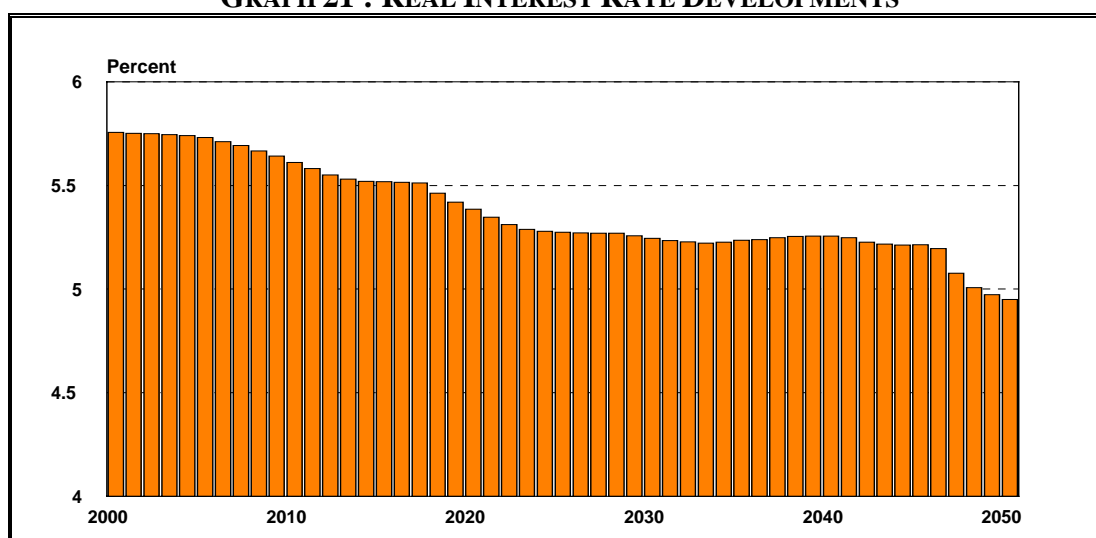
⁴¹ Vintage models are a methodology for linking changes in technical progress to changes in the average age of the capital stock.

⁴² Health expenditure estimates are determined exogenously on the basis of the expected changes in the demographic structures of the various geographical regions. In addition, allowance is made for differences in terms of income elasticities and age-specific health expenditure profiles for the different areas. It should be underlined that the uncertainties with regard to health care expenditures are much greater compared with pension expenditures.

FINANCIAL MARKET IMPLICATIONS : As a result of the changes to savings and investment at the global level, worldwide real interest rates (used as a proxy for real rates of return) are expected to fall over the next 50 years by roughly $\frac{3}{4}$ of a % point from $5\frac{3}{4}\%$ at present to 5% in 2050 (graph 21). Interest rates will be determined by whether investment or savings (i.e. demand or supply) falls more. With global growth rates falling relative to the average of the 1990's, global investment will fall more than the fall in global savings and interest rates will fall. While most commentators accept that both investment and savings are likely to fall over the coming decades establishing which will fall the most is essentially an empirical issue⁴³.

With regard to real exchange rate movements, due to the significant changes in net foreign asset positions over the period, and on the assumption that traded goods are imperfect substitutes, the model would predict real appreciations for both the Yen and the Euro and a depreciation of the US dollar over the coming decades. In the central scenario, however, for simplicity, an assumption is made which keeps real exchange rates constant at their 2000 levels over the time horizon of the simulations. This assumption is justified since the number of possible additional factors (i.e. other than the pure ageing / demographic effects) are enormous and these other factors often tend to offset each other.

GRAPH 21 : REAL INTEREST RATE DEVELOPMENTS



⁴³ Whether real interest rates fall or rise will depend on the relative strength of the effects of reduced labour force growth (on investment) and a lower private savings rate:

Labour Force Effects : Reduced labour force growth leads to lower output growth, which in turn results in a decline in the proportion of GDP which needs to be directed towards investment as the required capital stock is proportionately lower. In addition, reduced labour force growth would be expected to lead to an increase in the capital intensity of economies, with this resulting in a fall in the marginal productivity of capital and the directly linked real interest rate.

Private savings effects : On the basis of the life cycle hypothesis, ageing populations would be expected to result in a lowering of the private savings rate, due to the change in the structure of the population towards a greater share for the low saving / dissaving pensioner population. Most empirical studies support the contention of a negative relationship between dependency ratios and private savings rates. If this is true then ageing should result in a lower savings rate and a scarcity-induced increase in both the marginal productivity of capital and real interest rates.

In this central scenario, the empirics are pointing to the dominance of the labour force effects, with real interest rates predicted to fall from from $5\frac{3}{4}$ to 5% over the next 50 years.

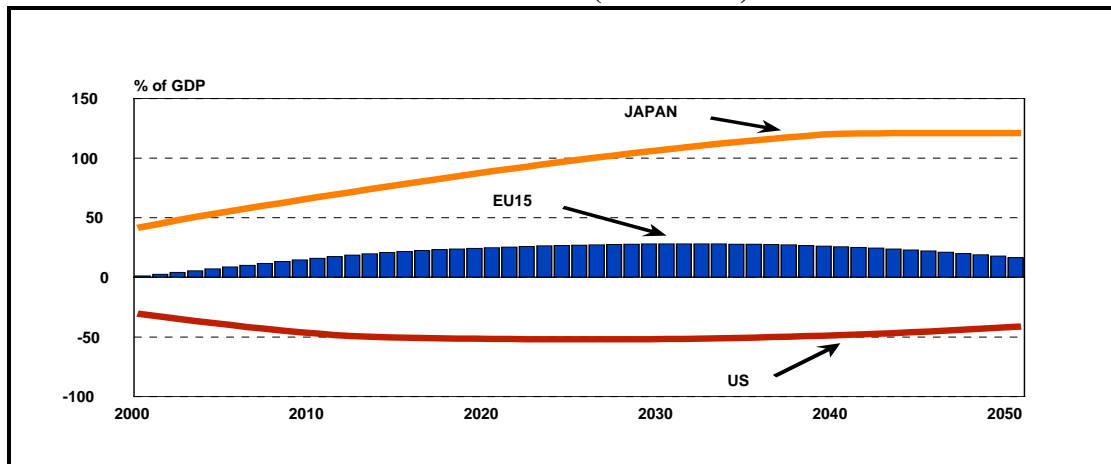
With regard to global capital movements, Graph 22 shows the future pattern of net foreign asset developments for the EU, US and Japan. It is important to stress that these projections only take account of the age-related effects on growth and on savings and investment in the respective areas, with many other possible influences such as relative changes in debt levels, productivity or short-run cyclical influences not being allowed for. In addition, movements in current account and net foreign asset positions over time are sensitive not only to relative differences in dependency ratios but also to assumptions regarding the generosity of the respective public pension systems and the degree of global capital market integration. Since it is assumed in the central scenario that the generosity of the EU's PAYG pension system does not change over the next 50 years, this is an important determinant of the change in the EU's net foreign asset position over this period⁴⁴, compared with other world areas which are relatively more dependent on funded pension schemes and other sources of retirement income financing. In addition, given that the future projections for net foreign assets are heavily influenced by past trends and especially given the widespread evidence that global capital movements have been overwhelmingly a developed world phenomenon over recent decades⁴⁵, the US is expected to remain an important location for any future foreign investments out of the EU and Japan. This view is underpinned by the fact that over the next 50 years, US potential growth rates will remain relatively high compared with the recent historical US experience and substantially higher than that of other developed regions of the world such as Japan and the EU⁴⁶.

⁴⁴This is an important point to bear in mind in the pension reform scenarios discussed in section 4 where a reduction in the generosity of the EU's PAYG system is shown to have very significant effects on the evolution of the EU's net foreign asset position, especially in the absence of an improvement in the growth and investment environment in the EU.

⁴⁵For example, according to the UNCTAD World Investment Report (2001), over the period 1998-2000, 75% of global FDI inflows and 85% of outflows were between the EU, US and Japan. A similar picture emerges with regard to stocks of FDI, with the EU, US and Japan accounting for roughly 60% and 80% of inward and outward FDI stocks worldwide respectively.

⁴⁶Net foreign asset (NFA) developments for all areas in the model are sustainable. There are no instabilities, although the model predicts that NFA positions need a considerable period of time over which to stabilise, with this slow stabilisation process especially evident in the case of Japan. This pattern however is not surprising given the extent of the demographic changes being envisaged, with stock variables such as NFA's invariably taking time to settle down and return to more "historically normal" positions after such a large shock. However, in terms of flows (i.e. the current account balance), the stability constraint is more clearcut since it is not possible for countries to run large current account surpluses or deficits for long periods of time and corrections are therefore inevitable. In this context, while Japan's NFA position continues to rise for some decades, in fact its current account as a % of GDP would reach its peak around 2010-2015 and move steadily downwards over the subsequent period to 2050. In addition, these projected changes in current accounts / NFA's over this period only take account of the age-related effects on growth and on savings and investment in the respective areas, with many other possible influences such as relative changes in debt levels, productivity or short-run cyclical influences not being allowed for. The above discussion is not in contradiction however with the widespread view that the present level of current account imbalances globally are unsustainable. Clearly the cyclical divergences created by the bubble conditions in the US over the second half of the 1990's have to be corrected. However, in terms of underlying current account developments, there are sound reasons for believing that the divergences in current account positions in the US and Japan which had emerged over the period from the early 1980's to the mid-1990's are to a significant extent structural in origin (i.e. ageing related). They are therefore sustainable over the coming years and even decades, with for example the model estimating that of the present Japanese current account surplus of 2 1/2-3% of GDP, perhaps 1-1 1/2% could be related to ageing.

GRAPH 22 : AGE-RELATED NET FOREIGN ASSET DEVELOPMENTS (2000-2050)



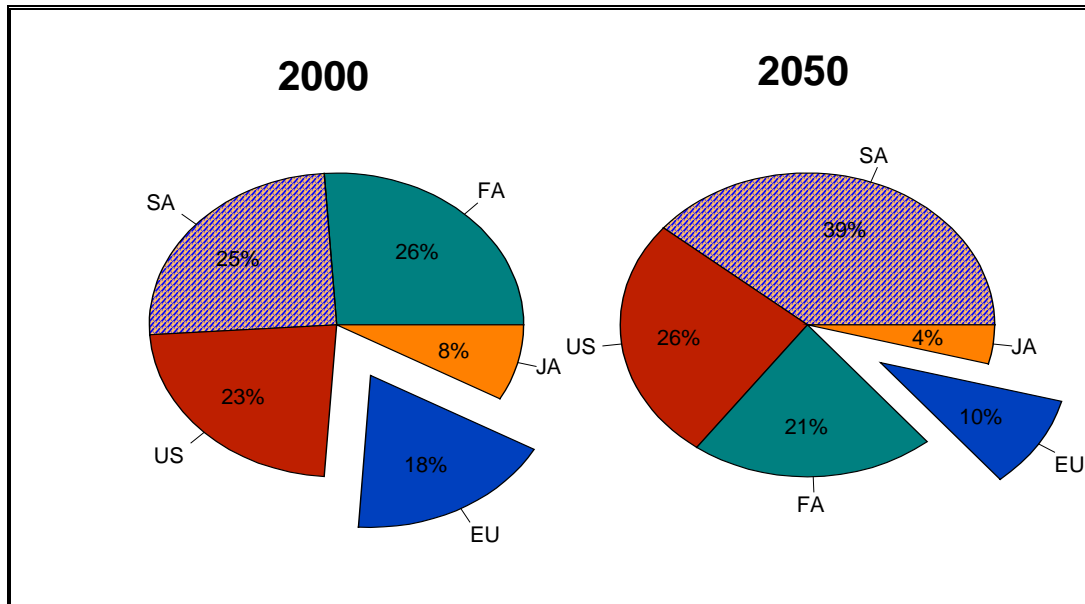
Regarding the possibility of a movement of EU assets to emerging markets, this of course will occur to a certain extent, especially to middle income countries with a ready supply of relatively skilled labour. However, the central scenarios' underlying thesis is that this group of countries, especially the slow ageing economies, will not experience dramatically increased inflows of funds until fundamental market reforms are introduced, including addressing some basic regulatory and governance deficiencies. Furthermore, when the model was run under an assumption that the slow ageing group of countries converge at a faster pace, with for example a growth rate which is roughly 1½ percentage points higher than that assumed in the central scenario (see section 4 for details), while the geographical distribution of the EU's financial flows and the rate of return both change somewhat, the model results suggest that the underlying implications for EU living standards do not change dramatically. Any gains in terms of higher rates of return would to a large extent be offset by the productivity and real wage effects of less investment in the EU's domestic capital stock. This is shown by the growing divergence between the GDP and GNP per capita income measures.

GLOBAL OUTPUT DISTRIBUTION : What are the implications of the above mentioned growth scenarios for the global distribution of output over the coming decades. Graph 23 shows the position in 2000 and in 2050, with the most important developments being :

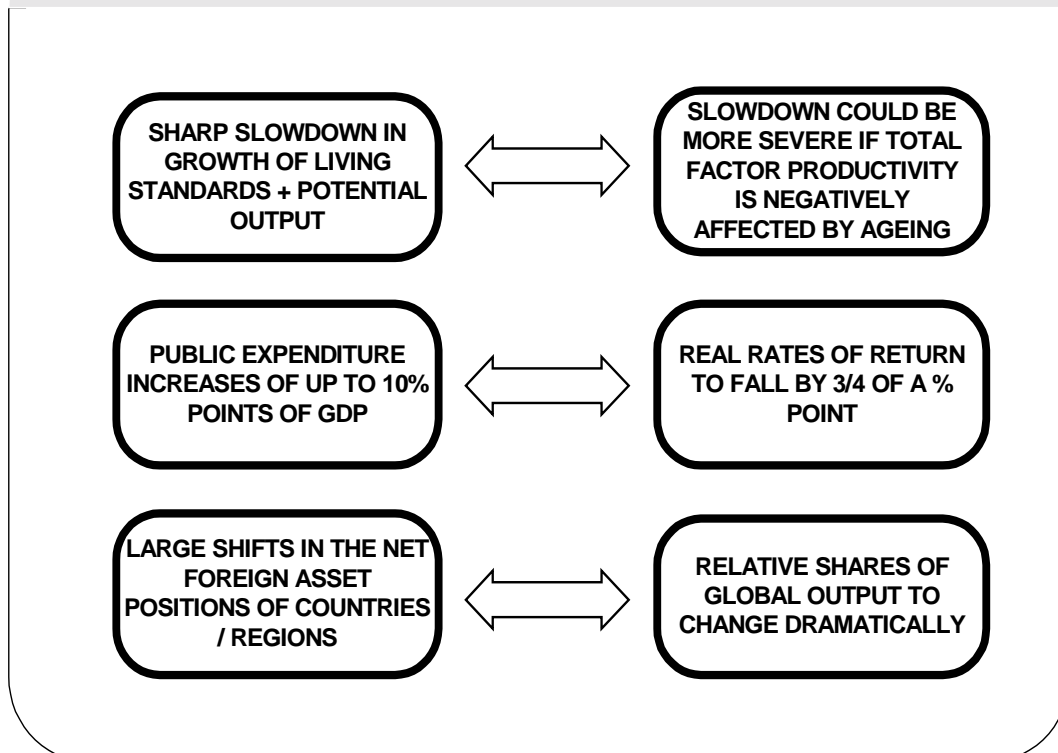
- Firstly, the growth in the relative shares for the fast ageing and especially the slow ageing groups of countries. In the specific case of the slow ageing group, which sees its share of world output increasing from 25% in 2000 to 39% in 2050, the main driving factor is demographic developments as opposed to any underlying productivity improvements.
- Secondly, the US enjoys a continuing increase in its share of world production which contrasts sharply with the relative performance of the EU and Japan, both of which are expected to witness a significant decline in their relative economic importance in the world over the coming decades. In the case of the EU, its share of world output falls from 18% at present to 10% in 2050, with Japan's relative share being halved from 8% at the moment to 4% at the end of the simulation

period. Finally, it is worth remembering that in 1970, the EU produced 25% of global output compared with 23% for the US. While the US has been able to retain its share over the last 30 years and is expected to continue to do so over the next 50 years, the EU has already witnessed a steady erosion in its share of global output, a trend which is forecast to continue over the coming decades.

GRAPH 23 : PERCENTAGE SHARES OF THE EU, US, JAPAN, FAST AGEING AND SLOW AGEING COUNTRIES IN GLOBAL GDP IN 2000 AND 2050



GLOBAL AGEING SCENARIO : KEY POINTS



BOX 5: COMPARISON OF GROWTH RATES OF GDP, POPULATION AND LIVING STANDARDS FOR THE PERIOD 1950-2000 WITH THAT OF THE MODEL'S CENTRAL SCENARIO FOR 2000-2050

1950-2000 : Table A gives a very broad summary of economic and demographic developments in the five areas over the period 1950-2000. The table presents a breakdown of potential growth rates into their employment and labour productivity components⁴⁷ and also gives the population and GDP per capita growth rates (with the latter being the best measure for taking both demographics and productivity into account).

- In terms of potential growth rates, Japan stands out for particular attention with an average growth rate of 6% for the period as a whole, compared with growth rates of 3 ½% in both the EU and the US and 4-4½% in the fast and slow ageing countries.
- In terms of living standards (GDP per capita)⁴⁸, which adjusts the potential GDP figures for changes in population growth rates, the overall picture is one of dramatic improvements in Japanese standards of living. Graph A shows that from very low absolute levels in 1950, which at \$1925 were equivalent to just 20% of that of the US at that time, Japan in the subsequent 40 years converged to 80% of the US level before starting to deteriorate in relative terms in the 1990's. While the income convergence achieved by the EU over the same period was not as spectacular, the EU's starting position in 1950 was much better than that of Japan and therefore the EU countries had on average much less ground to catch up with the US. In 1950 EU living standards were roughly 50% of those of the US and by the early 1980's this had reached 70%-75%, with the EU falling back somewhat in recent decades and especially over the second half of the 1990's to now have a standard of living which is roughly 2/3 of that of America⁴⁹. For the fast and slow ageing countries, absolute standards of living are still very low compared with the US and the developed world in general. In addition in terms of convergence over the last 50 years the overall conclusion is mixed. For example, some improvement was experienced over the period as a whole for the fast ageing countries, with as graph A indicates, most of this occurring over the most recent decades. As for the slow ageing countries, no income convergence occurred over the period.
- In overall terms, table A would appear to support the view that the income convergence process is often a slow and uneven affair, with success in this area being conditional on rates of capital accumulation and employment growth and, at a wider level, on appropriate and efficient policy making institutions. This view is borne out by the growth and convergence processes experienced by Japan and the EU over past decades, with the latter suggesting that standards of living in an economy ultimately depend much more on the economic policies pursued than on population trends. In fact, an inverse relationship is evident over the period in question between population changes and improvements in living standards, with the EU and Japan having the lowest relative population growth rates over the last 50 years and the highest rates of growth in terms of living standards⁵⁰.

TABLE A : AVERAGE ANNUAL GROWTH RATES 1950-2000

	EMPLOYMENT	PRODUCTIVITY	POTENTIAL GDP	POPULATION	GDP PER CAPITA
EU15	0.5	2.9	3.4	0.5	2.9
US	1.6	1.9	3.5	1.2	2.3
JAPAN	1.3	4.7	6.0	0.8	5.2
FAST AGEING	2.0	2.1	4.1	1.4	2.7
SLOW AGEING	2.2	2.2	4.4	2.2	2.2
WORLD	1.9	2.0	3.9	1.7	2.3

Source : GGDC Total Economy Database, UN, own estimates.

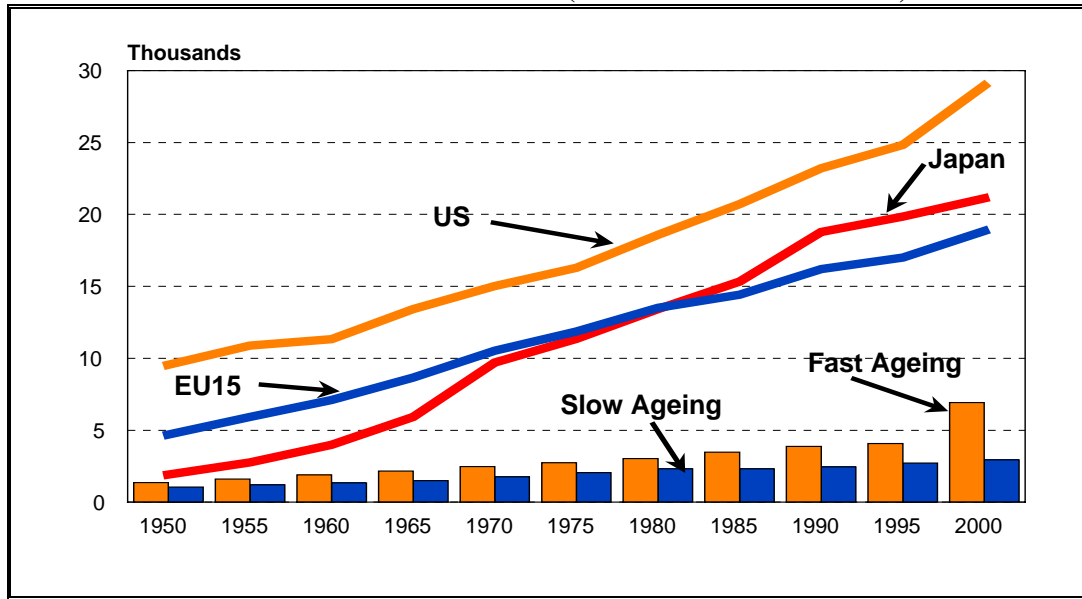
⁴⁷ Labour productivity can be further decomposed into the contribution from capital accumulation (i.e. the amount of capital stock per worker) and that from total factor productivity (i.e. the level of technology in the economy). Over the decades there has been a clear downward movement in rates of capital formation globally and during the 1970's a structural break in the growth rate of technical progress. Are developments in the second half of the 1990's in the US suggestive of a turnaround in TFP growth rates ? Other interesting issues for discussion, from the perspective of ageing, include whether ageing has a negative or positive effect on TFP and whether TFP is partly dependent on investment (i.e. vintage effects).

⁴⁸ While not identical due to dependency ratio changes, the growth rates of labour productivity and GDP per capita are very similar over time.

⁴⁹ Most of the present differences between the EU and the US are due to differences on the labour input side, with productivity per hour worked in the EU in the late 1990's being of the order of 90-95% of US levels.

⁵⁰ However, it is important in this context to differentiate between populations which are growing more slowly (i.e. lower fertility rates) and populations which are growing older (i.e. higher life expectancy). It is a key issue for analysts to decipher if smaller, but relatively older, labour forces in the future can be equally good at generating the efficiency gains as previous generations. In addition a further complication is in assessing the influence of a more highly educated labour force over time, with each new cohort of workers tending on average to be better educated than the retiring cohort.

GRAPH A : REAL GDP PER CAPITA IN PPP (THOUSANDS OF US DOLLARS) 1950-2000



Source : University of Groningen and the Conference Board, GGDC Total Economy Database, 2002

2000-2050 : The most striking aspect of Table B, which gives the potential growth, population and living standards projections of the model for the period 2000-2050, is the sharp deterioration in economic prospects for the next 50 years compared with the preceding half century. At the world level, potential rates of growth are expected to fall by 1 ½ percentage points, the population growth rate will be halved and rates of growth in standards of living will decline by ¾ of a percentage point. In addition the performances of the different areas will change significantly, with Japan and the EU the big losers in terms of changes in living standards. However, since the analysis for the period 1950-2000 stresses the importance of policies rather than demographics in determining growth rates in living standards, the figures presented in table B should be kept in context. This is especially the case since those forecasts are based on an assumption of no change in present policies, with section 4 presenting a range of policy options which can be pursued by the different areas to address their underlying growth and per capita income challenges.

In terms of the specific simulations carried out in this paper, it is important to underline that the models baseline figures reflect the situation experienced in the respective areas over the period 1990-2000 and not the overall period 1950-2000. This is significant since the trend in the growth rate of living standards over the period 1950-2000 was clearly downward due to steady declines over the period as a whole in terms of rates of capital accumulation (i.e. less savings and investment) and a slowdown in TFP growth rates. Consequently, when one compares the next 50 years relative to the 1990's, as stated in the main text, one realises that the EU and Japan are expected to experience a 0.4 percentage point decline in the growth of their living standards, not the 1 ½ and 4 percentage points decline if one compares with the 1950-2000 period as a whole. For the other 3 areas, relative to the 1990's, the model predicts a decline of 0.2 in the growth rate of living standards in the US and the fast ageing countries, with virtually no change in the case of the slow ageing group of countries. On the assumption that TFP growth rates are not affected by ageing, these changes in the living standards of the 5 areas will result from the employment and capital accumulation effects associated with the effects of ageing on dependency ratios and savings behaviour. The big unknown is what will happen to total factor productivity – is it likely to be affected by ageing or indeed by rates of capital accumulation ?. Despite the TFP uncertainties, what is already clear is that if there are no changes in policies that the post World War II trend for the EU and Japan of income convergence to US levels, which appears to have stalled or even gone into reverse in more recent periods, will deteriorate even more over the coming decades.

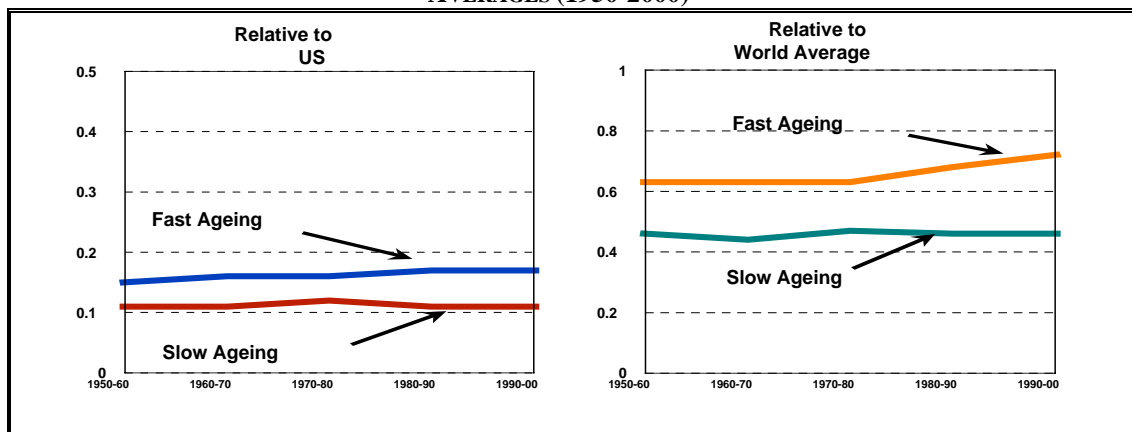
TABLE B : CENTRAL SCENARIO : AVERAGE ANNUAL GROWTH RATES 2000-2050

	POTENTIAL GDP	POPULATION	GDP PER CAPITA
EU15	1.3	-0.1	1.4
US	2.5	0.7	1.8
JAPAN	0.9	-0.3	1.2
FAST AGEING	2.1	0.2	1.9
SLOW AGEING	3.2	1.2	2.0
WORLD	2.4	0.9	1.5

Source : Eurostat, US Census Bureau and UN

Finally, in terms of the discussion on international capital flows, section 2 has shown that a large proportion of such flows occur between the more developed economies, with the US by far the biggest net recipient, and that there is a correspondingly low level of capital transfers to the fast and, especially, the slow ageing countries. This pattern of global capital movements seems somewhat unusual given the development potential which clearly exists in the fast and slow ageing countries. Graph A showed the income per capita figures for the five areas in absolute terms as well as the huge investment opportunities which still exist in the fast and slow ageing countries, with GDP per capita only 10-15% of the levels of those in the more developed regions of the world. In addition, as stated earlier, the degree of convergence over the last 50 years has been very poor. This slow progress is shown in graph B which gives the relative performance of both groups of countries against both the US and the world average. As is clearly indicated, following some small degree of progress in income convergence in the 1970's, the slow ageing group has seen a stalling of this process over the last two decades, with growth rates in GDP per capita only broadly keeping pace with the growth in living standards elsewhere in the world. The fast ageing countries as a group have done a lot better, with the progress of China over the recent period clearly influencing the results. The fast ageing countries have also gained slightly relative to the US and more significantly relative to the average for the world as a whole⁵¹. The recent experience of the fast ageing countries, as well as the longer run trends established by Japan and the EU, give hope to all developing countries that they too can achieve similar convergence patterns if appropriate policies are consistently pursued over time.

GRAPH B : DEGREE OF CONVERGENCE IN INCOME PER CAPITA RELATIVE TO US AND WORLD AVERAGES (1950-2000)



Source : University of Groningen and the Conference Board, GGDC Total Economy Database, 2002

⁵¹ This is a group average for the fast ageing countries and trends for individual members, especially the high income OECD countries, China and the east Asian countries are very different to those of other constituent members such as Russia and the central and eastern European countries. As explained earlier, the slow ageing group is, on the other hand, broadly homogeneous in terms of population and income levels, with the majority of countries in this group being, low income, developing countries.

SECTION 4 : POLICY RESPONSE : HOW CAN THE EU AND THE WORLD AS A WHOLE EFFECTIVELY DEAL WITH THE CHALLENGES OF AGEING

The world economy is predicted to grow at an annual average rate of 2½% over the period 2000-2050, which is 1½ percentage points lower compared with the average for 1950-2000. All areas of the world will be negatively affected, with Japan expected to be particularly impacted with its average growth rate collapsing from 6% for the period 1950-2000 to less than 1% over the coming 50 years, with such a low rate of growth even comparing poorly relative to the average for the dismal 1990's. In terms of changes in living standards, relative to the situation which existed in the 1990's, the EU and Japan are predicted to experience annual average declines in the growth rate of GDP per capita of the order of 0.4%. This is double the deterioration predicted for the US and the fast ageing countries, with little change expected for the slow ageing group. Combined with this rather dismal real economy picture, the financial market effects are likely to be very significant, with sections 2 and 3 predicting that the next 50 years will witness large increases in age-related capital flows leading to current account imbalances, periodic bubble conditions, declines in real rates of return for investors and growing strains at the worldwide level in terms of income convergence which, on the basis of current trends, has the potential to undermine the present highly beneficial globalisation process.

As this section of the paper will argue, the negative effects of these trends can to a large extent be avoided by a two pronged policy strategy :

- firstly, those developed world economies particularly affected by ageing need to take the necessary measures to offset the negative effects of this phenomenon on their potential growth rates and in so doing help to reduce their domestic savings-investment imbalances⁵²; whilst,
- secondly, the world needs more not less globalisation which in essence implies that the present reach of the international capital markets must be extended to encompass those areas of the developing world which are at present largely cut off, most notably in the case of the slow ageing group of countries which presently account for nearly 60% of the worlds population and in 2050 will account for 70%. To achieve this the developed world must be prepared to engage more actively with these countries, with a willingness to accept the short run transitional problems associated with such an engagement process. More importantly, the developing countries themselves must show a willingness to adopt the confidence enhancing measures necessary to allow this process of resource transfers to be initiated in the first place. In essence the developing countries must grasp the opportunity which presently exists for funding their income convergence ambitions by setting in place the regulatory changes necessary to bolster the credibility of their macro policy frameworks.

Regarding the second aspect of this reform agenda, its not a question that capital flows to developing economies are not occurring, with the 1990's witnessing a welcome return to relatively large capital movements, its just that the extent of the flows are small as a share of total world capital flows and in relation to the potential for catching-up which exists in these countries. The problem of course for financial markets is the uncertainty attached to lending to these countries, with the attraction of

⁵² For example, the net outflows of capital can be reduced due to the emergence of greater investment opportunities at home.

stable, if low, rates of return in a developed economy such as the US being obvious, especially if one compares these rates of return both to those to be achieved in other developed economies and with the volatility of returns in emerging markets. While these latter markets clearly hold enormous potential, until the credibility of their macroeconomic frameworks are beyond question, the present trend towards a type of closed, developed world, capital market will continue over the coming decades despite the risks of lower rates of return from such a pattern of external capital flows. However, a number of developing countries, most notably China and some east Asian economies, offer a large degree of hope that other developing countries will adopt a similar path of growth-oriented reforms. If this process is managed effectively by the various global institutions then the world can move to a situation of declining income disparities at the world level whilst at the same time witnessing increasing global rates of return, with the developing countries providing an attractive alternative investment location for the growing pool of retirement savings from the ageing developed world. If this “best case” scenario can be realised, both the developed and developing world will gain and the process of globalisation will avoid the reversals experienced with the last great globalisation phase in the late 19th and early 20th centuries, since as these reversals have shown globalisation is far from being an inevitable process, with the present situation of ageing populations strongly putting forward the case for more not less worldwide integration.

On the basis of the above discussion, ageing manifestly constitutes a global policy challenge with country differences, to a large extent, being those of degree and timing rather than the overall direction of change. It is not the purpose of this paper to concentrate on the global policy implications, with the focus instead on the following two issues :

- Firstly, section 4.1, using the example of the EU, will look at the type of policy reform agenda which the “ageing” developed world should be adopting to offset the negative effects of ageing in terms of growth and living standards. Other secondary objectives, such as budgetary sustainability, income distribution and financial market issues will also be assessed.
- Secondly, section 4.2, drawing on the analysis in section 2 of this paper, will try to demonstrate the benefits which truly globalised financial markets could provide to the developed and developing worlds in the context of more efficiently handling the predicted large increase in capital flows which ageing will induce over the coming decades. The objective will be to show that a two-way symbiotic partnership between the developed and developing economies holds many mutually attractive benefits, including a more rationale allocation of scarce capital resources as well as higher global rates of return on investments and a more sustainable globalisation pattern based on income convergence.

4.1 DEALING WITH AGEING – WHAT SHOULD BE THE FOCUS OF EU POLICY REFORMS

How should the EU respond to the standard of living and potential growth rate reductions which ageing is likely to bring ?. The central scenario presented in section 3 shows that the EU will be badly affected by ageing and that at a global level it is the second most vulnerable area of the world after Japan, although the degree to which individual EU Member States are affected varies widely. Ageing populations will induce dramatic changes in EU potential growth rates, in standards of living, in age-

related public expenditures, in financial market flows and in specific monetary variables both in the EU and globally. Despite the fact that the extent of the policy challenge posed by ageing may differ across countries, it is clear that a majority of the EU's Member States are facing the prospect of a substantial reduction in their potential growth rates and consequently a large package of macro and structural policy actions will be needed to cushion the impact on average EU living standards. Since this is a potentially immense policy agenda the present paper will firstly present a short overview of the main policy avenues open to governments before focussing in on a number of specific areas for action, such as labour market, pension system and productivity enhancing reforms.

BROAD OVERVIEW OF ECONOMIC POLICY SOLUTIONS

In the context of the EU's overall policy strategy, based on achieving high and sustainable rates of growth via a stability-oriented policy framework, addressing the negative economic growth implications of ageing will require a multi-faceted policy response aimed at achieving the following three key objectives :

- **A : ACTION TO EXPAND THE EFFECTIVE LABOUR SUPPLY** : Policies to increase the workforce and to reduce non-cyclical unemployment would be an appropriate response to the adverse demographic developments and would bring a triple gain : an increase in potential output; a reduction in public expenditure on the elderly, due to the slower rate of increase in the effective dependency ratio; and higher tax revenues. Possible actions in this area⁵³ are: firstly, extending the working lifetime beyond the present effective retirement age of less than 60, at least to the statutorily imposed limit of 65 or even to go further by linking the statutory age to changes in life expectancy; and secondly, labour market reforms aimed at raising participation rates and tackling structural unemployment.
- **B : BOOSTING SAVINGS AND CAPITAL ACCUMULATION** : Savings and investment have a potentially important role to play in helping to offset the effects of rising dependency burdens, with higher savings leading to lower real interest rates, higher productive investment and stronger long-run growth. This is particularly important on the public sector side through adherence to the provisions of the stability and growth pact. If a policy of budgetary consolidation continues to be actively pursued in the EU, not only will national savings benefit but a sounder fiscal position will ensure more favourable debt dynamics when the public sector spending pressures from ageing start to emerge (see Box 6)⁵⁴.
- **C: STRUCTURAL REFORM INITIATIVES AIMED AT OFFSETTING THE EFFECTS OF AGEING VIA PRODUCTIVITY IMPROVEMENTS** : The EU has made progress over the last number of decades in putting in place the essential macro policy strategies which are most often linked in the literature with the reaping of substantial

⁵³ While immigration would of course help it is not considered to be a specific policy target.

⁵⁴ According to Floden (2002), on the basis of optimal taxation theory "public debts should be reduced before the baby-boom generation retires". He finds that "if debts are maintained at the current levels that welfare may be reduced substantially in countries with a large public sector or a large demographic change. Furthermore, since population ageing will be less dramatic in the US than in Europe, capital will move from Europe to the US. These capital movements will facilitate the US demographic transition but aggravate the transition in most European countries."

dynamic gains such as a stable macroeconomic environment (i.e. EMU) and an open trading environment, both internally (i.e. the single market programme) and externally through the World Trade Organisation (WTO). The challenge now for EU policy makers, given the risk of both an age-related productivity slowdown and the fact that the living standards of EU citizens will become relatively more dependent on productivity gains, is to exploit the openness and low inflation benefits of the present framework by quickening the pace of structural reform, along the lines of the Lisbon agenda. Action to improve the functioning and competitiveness of the EU's product, labour and capital markets, allied to specific regulatory reforms, will be needed to foster a culture of entrepreneurship and innovation crucial to the successful exploitation of any gains to emanate from more specific age-related reforms in the labour market and pension areas.

As the results of the simulations carried out later in this section will show, all the above measures would individually, and collectively, act to counteract the projected slowdown in the growth of EU living standards.

ASSESSING THE RELATIVE POTENCY OF REFORMS USING REAL ECONOMY AND FINANCIAL MARKET CRITERIA

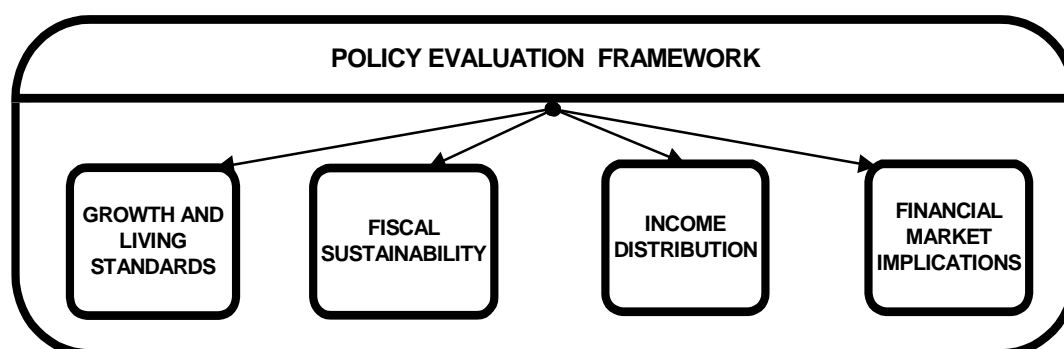
Ageing populations will induce dramatic changes in many aspects of the EU economy. While the most fundamental policy issue is the projected collapse in potential growth rates, with other issues often being simply an indirect manifestation of this latter problem, policy makers have in the past excessively focused their policy assessments on a very narrow agenda, most notably on the need to address the fiscal implications of ageing. This paper attempts to extend the analysis of the relative potency of the various policy proposals by using multiple evaluation criteria which aim to assess both the effectiveness of the different policy measures in meeting key economic policy objectives whilst simultaneously looking at their political sustainability and financial market effects. In overall terms the following, four-pronged, evaluation strategy is adopted in order to assess the implications of the various reform proposals in terms of:

- firstly, boosting economic growth and living standards;
- secondly, ensuring fiscal sustainability⁵⁵;
- thirdly, understanding the income distribution effects⁵⁶;
- and finally, assessing the financial market implications.

⁵⁵ Given that health expenditure is simply generated in the model using age-specific expenditure profiles, with the growth in spending linked to productivity developments in the respective economies, the budgetary differences between the various simulations in this section compared with the central scenario are consequently mainly due to changes in public pension expenditures.

⁵⁶ Income distribution is measured by calculating the change in the living standards (i.e. consumption per capita) of the working age population compared with pensioners - in effect a measure of the political sustainability of any reform initiatives. This measure of distributional fairness tries to take both perspectives into account - namely in terms of avoiding further increases in the burden of taxation on workers (i.e. the sustainability issue) and in terms of avoiding large income losses for pensioners (i.e. the adequacy issue).

A knowledge of all four aspects is important for policy makers in making an informed judgement as to the relative merit of the various proposals.



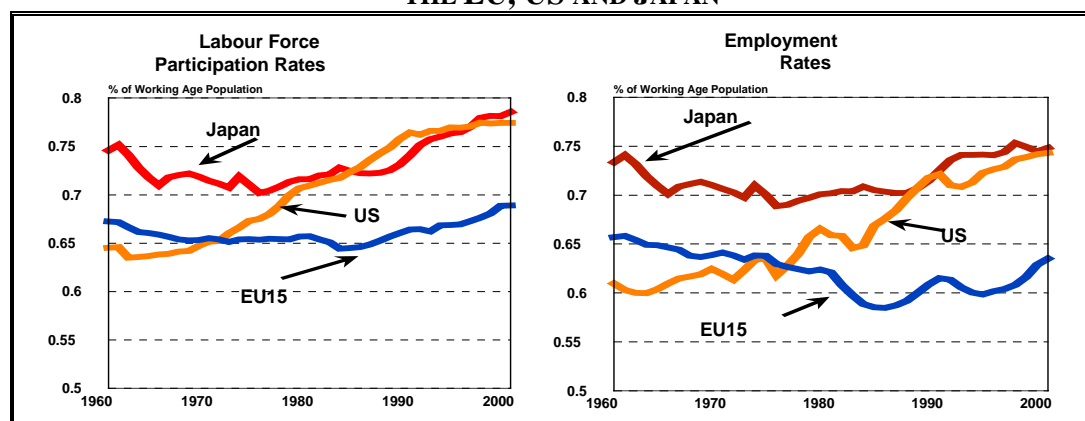
SIMULATION 1 : LABOUR MARKET REFORM : ACTION TO EXPAND THE EFFECTIVE LABOUR SUPPLY

SIMULATION OF SPECIFIC PACKAGE OF LABOUR MARKET REFORMS : REFORMS PROPOSED BY THE EU’S ECONOMIC POLICY COMMITTEE (EPC) + INCREASE IN EFFECTIVE RETIREMENT AGE : The purpose of this simulation is to examine the case for neutralising future negative developments with regard to the EU’s population of working age via comprehensive labour market reform. For this simulation one must make some credible assumptions regarding what combination of longer working lifetimes, higher participation rates or lower NAIRU’s⁵⁷ which could be realistically expected to be forthcoming from the reform initiatives which will be put in place by the respective governments. For guidance in this matter, this paper draws on the Member States’ own labour market assumptions which underpin the recent projections for the budgetary implications of ageing populations published by the EU’s Economic Policy Committee (EPC). These EPC projections, which cover the period 2000 to 2050, are based on the assumption of an increase of 4 percentage points in EU labour force participation rates over the forecast period (due to higher participation rates amongst younger, female, age-cohorts compared with earlier generations) and on reductions of 2 percentage points in structural unemployment. The successful implementation of such a significant package of labour market reforms would be capable of easing the economic loss associated with ageing populations over the coming decades by roughly 40%, a considerable achievement.

⁵⁷ **Longer working lifetimes:** With life expectancy having increased and continuing to do so, with jobs becoming less physically strenuous and with entry into the labour force occurring at a progressively later age, there is a strong prima facie case for government action to lengthen the average working lifetime. **Raising Participation Rates :** The present rates of labour force participation have two distinguishing features: the higher rate of participation for males compared with females (currently around 20 percentage points higher for men in the OECD as a whole), and that participation rates decline significantly, well in advance of the statutory retirement age. Widespread adoption of early retirement programmes, financial disincentives to continuing to work right up to retirement and policies that discourage part-time working arrangements will all have to be looked at, or redressed, if participation rates are going to be significantly increased. In addition, participation rate changes over the simulation period will also hinge on real wage and reservation wage developments, with the reservation wage being influenced by taxation and social welfare reforms over the period in question. It should be stressed that GDP growth rates would only be modified in the period when the overall participation rates are increased, although the static gains, as reflected in higher GDP levels, would of course be retained in future years. **Policies to Reduce Structural Unemployment :** Every percentage point reduction in the unemployment rate represents a budgetary saving of about a third of a point due to decreased transfer spending and increased tax receipts. Consequently, the greater the success of the labour reforms to be introduced, the greater the budgetary savings to be reaped from the unemployment reductions, with any savings been able to be used to offset the likely additional expenditures on pensions and health care. It is clear therefore that the fight against unemployment is justified not only in its own right but also as an essential element in a successful response to the demographic challenges of the next 50 years.

However, given the scale of the decline in the working age population which is predicted, it was decided for the main labour market simulation to estimate the effect of introducing reforms which would combine not only the EPC's participation rate and structural unemployment targets but would also result in an increase in the EU's effective retirement age, which is presently just less than 60 (compared, for example, with 63 in the US) up to the statutory age of 65. While this package of reform measures may appear excessively optimistic, when one examines the labour force participation rate and employment rate trends for the EU over the period 1960-2000 (graph 24), it is evident that compared with the US and Japan that the EU has the potential to significantly improve its labour market performance over the coming years and decades. In fact, on all the main measures of labour market performance over the period 1960-2000, the EU has performed significantly worse than either the US or Japan, and, on the basis of World Bank data for the fast and slow ageing groups of countries, the EU's performance has been dismal at a global level. While some progress has been made in a number of Member States over the second half of the 1990's, it is nevertheless the case that the EU has a large potential reservoir of labour which is capable of being productively utilised if the requisite reforms are forthcoming.

GRAPH 24 : LABOUR FORCE PARTICIPATION RATES AND EMPLOYMENT RATES IN THE EU, US AND JAPAN



Source : Commission services

The simulation results from successfully implementing such a comprehensive labour market reform programme in the EU, over a 10-15 year time horizon, are summarised in Table 5. In overall terms, the simulation shows that the impact of ageing in terms of living standards can be more than eliminated, with GDP per capita rising by over 24% and thereby wiping out the 19% decline predicted in the central scenario. However, potential growth rates do not recover to their central rates (graph 25), with the annual average potential growth rate rising to 1.7% for the 2000-2050 period. Other important results include the fact that the increase in pension expenditure is reduced to less than 3 percentage points compared with an increase of 6 ½ percentage points in the central scenario and that the income distribution consequences are favourable for both workers and pensioners. In terms of the financial market implications of labour market reform, while the real interest rate effects are marginal, the boost to employment and income growth ensures that there is a small positive savings response, with a build-up of financial assets equal to about 14% of EU GDP in 2050. While this increase may appear subdued it must be remembered that, in the absence of pension reform, the PAYG system still remains the principle source of

retirement income financing. In addition, the sustainability of the latter system is improved via the labour market reforms since the burden of financing the PAYG pension system is now spread over a larger employed population. As a result of the bigger workforce, the amount of social security contributions paid by individual workers falls by nearly 6% points of their wages in 2050 compared with the central scenario, thereby representing a significant gain in terms of their net income.

GRAPH 25 : EFFECT OF LABOUR MARKET REFORMS ON EU LIVING STANDARDS AND POTENTIAL GROWTH RATES

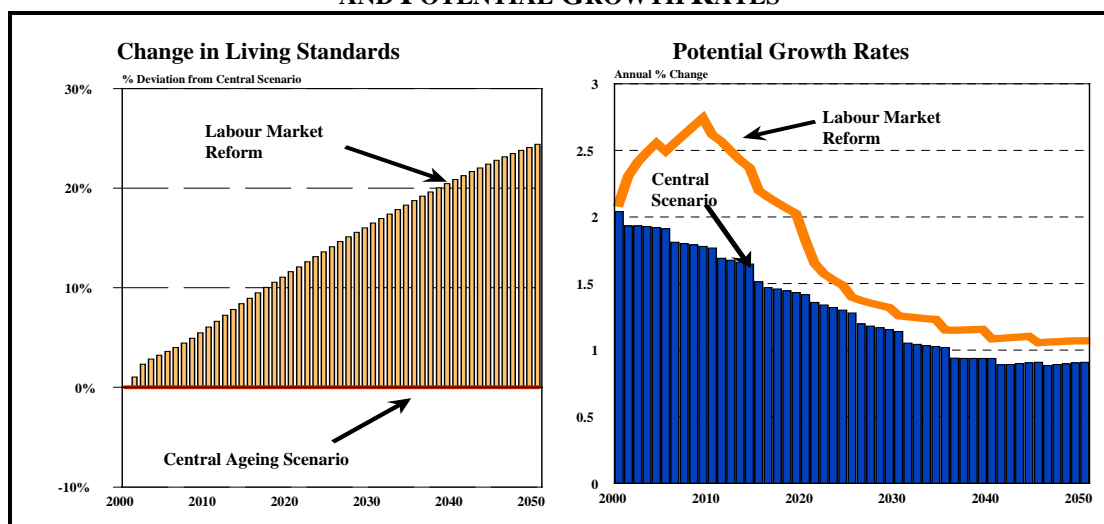
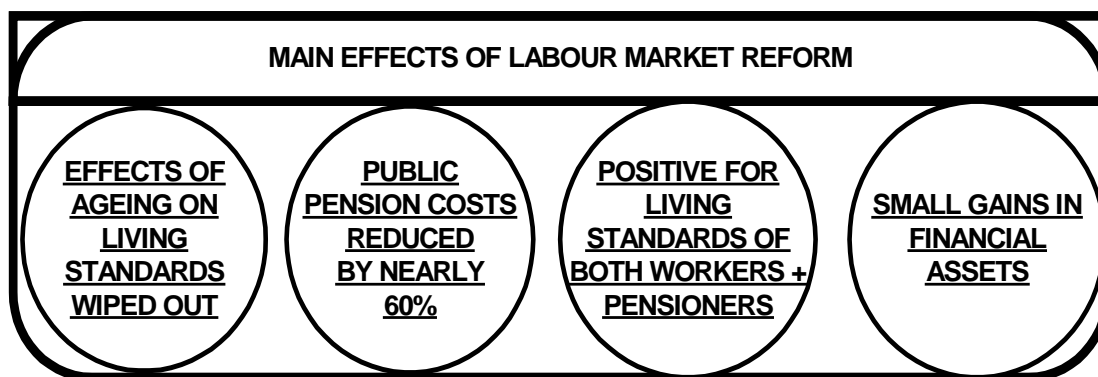


TABLE 5 : EPC LABOUR MARKET REFORMS + 5 YEAR INCREASE IN THE EFFECTIVE RETIREMENT AGE

	GROWTH	FISCAL SUSTAINABILITY	INCOME DISTRIBUTION (% DIFFERENCE FROM CENTRAL SCENARIO)		FINANCIAL EFFECTS
	GDP PER CAPITA (% DIFFERENCE FROM CENTRAL SCENARIO)	PUBLIC PENSION EXPENDITURE (% OF GDP)	WORKING AGE POPULATION CONSUMPTION	PENSIONERS CONSUMPTION	TOTAL FINANCIAL ASSETS (% POINTS OF GDP DIFFERENCE FROM CENTRAL SCENARIO)
2000	0	10.5	0	0	0
2025	+16.5	11.6	+13.2	+20.4	+5.9
2050	+24.4	13.3	+21.9	+25.2	+13.6



SIMULATION 2 : PENSION REFORM : PARTIAL SHIFT TO FUNDING

In the context of the second broad area for action, namely boosting savings and capital accumulation the present simulation looks at the effects of pension reform⁵⁸ (with Box 6 highlighting the importance of respecting the Stability and Growth Pact). As explained in an earlier study on pension reform (see Mc Morrow and Röger – 2002), there are a wide range of policy options to choose from in the pensions area, with no single “best” approach being possible. Amongst the many policy courses which could be followed, current public pension systems could be made more sustainable through undertaking what are termed “parametric” reforms, with a view to improving incentives to work and to strengthening the actuarial link between contributions and benefits. Fairness between generations and strengthening the financial basis of pension systems inherently broadens the question of the sustainability of pension systems to the wider issue of public debt management. This, in turn, suggests a need to consider issues such as increased pre-funding both within the existing systems and through the establishment of specific pension funds. Opting for more radical systemic reforms involves questions other than funding. This leads one to consider the objective of diversification in terms of retirement income provision and the risks involved in different systems. In addition, it includes the difficult question of balancing the possible beneficial side-effects on the economy with the inevitable costs of the transition process⁵⁹.

⁵⁸ This simulation examines the economic impact of moving from the present PAYG system to a partially funded system. It is important to remember that it is the public sector’s exposure to the unfunded liabilities of the PAYG-pension system which is the single greatest source of government expenditure pressure over the coming decades. If retirement income was derived from a fully funded pension system, ageing would only significantly impact on health expenditures and old age poverty relief. This simulation examines the economic implications emanating from the choice between the two competing financing options for pension systems i.e. the choice between PAYG, which is financed by current taxes and social security contributions and the “funding” option, which is financed out of a stock of capital accumulated during one’s working lifetime. The “funding” option appears attractive at the moment as a way of reducing the public sectors exposure, under the PAYG system, to the pension expenditure implications of a rapidly ageing population i.e. exposure either in the form of the need to finance the additional pensions expenditure through higher taxes/social security contributions or via the need to seek specific or generalised expenditure reductions. However, while the benefits of the “funding” option are attractive, the inter-generational equity considerations (i.e. the switch to funding would impose a double burden on the present generation, with the latter having to fund their own pensions whilst continuing to finance, through taxes and social security contributions, the pensions of those who retired under the previous PAYG scheme) allied to the political fallout from the latter should not be ignored.

⁵⁹ Some form of systemic reform is inevitable given that the 2 linchpins of the PAYG system which determine the real wage bill on which SSC’s are levied, namely increases in employment / population of working age and strong real wage / productivity growth have both deteriorated in recent decades with Japan already experiencing declines in its population of working age. This position will become untenable over the coming decades in other areas such as the EU and the fast ageing group as the growth rate of the 15-64 age cohort also turns negative. While the central scenario assumes no change in TFP and a small boost from increased capital intensity on labour productivity, it would be foolish to expect a large reversal in the downward trend of labour productivity.

Following an empirical analysis of the various options, the 2002 study concluded that a complete shift to funding would appear difficult in terms of firstly, the fall in returns for pension funds, secondly, the relatively low growth rate gain and finally, the size of the transition burden to be serviced by EU workers. It opted instead, for a partial shift to private funding and for the replacement of the remainder of the PAYG system with an actuarially fair, notional, defined contribution system. Such an approach could in fact constitute an “optimal” policy path to be followed by the EU at the present time as it strives to find a workable balance between the cost advantage apparently offered by funded schemes and the income security and other advantages provided by the PAYG system. Furthermore, in terms of a risk diversification strategy for retirement income provision, a mixed approach may be more appropriate as it allows individuals to draw on both the returns to human capital investment, in the form of the real wage growth which underpins the PAYG system, and returns to physical capital investment in a funded system (i.e. the real interest rate)⁶⁰.

SIMULATION OF SPECIFIC PENSION REFORM SCENARIO: PARTIAL SHIFT AWAY FROM THE PUBLICLY-RUN PAYG PENSION SYSTEM TOWARDS PRIVATE FUNDING OF RETIREMENT INCOME : The present simulation is carried out by setting up a second voluntary, private, pillar in ECFIN’s ageing model, alongside the existing public PAYG pillar. The simulation assesses the situation whereby the social security contributions (SSC’s) paid into the EU’s PAYG system are frozen at their year 2000 levels (i.e. 16% of wages⁶¹) for the next 50 years. By freezing these contributions, one is in effect saying that the generosity of the public pension system will decline considerably in the coming decades since retaining the same, pension income, replacement rate in 2050 as in 2000, would imply an increase in SSC’s of about 10% points of wages in 2050. In addition to gaining a better understanding of the financial market implications, the main purpose of this simulation is to look at whether a partial shift to funding could be a useful weapon in offsetting the negative growth and public expenditure effects of ageing by boosting overall savings and capital accumulation in the EU and by reducing public expenditure on pensions.

Since it involves a fundamental shift in the system of retirement income financing, a move to partial funding will result in significant changes in the consumption / savings patterns of worker and pensioner households, especially the former since existing pensioners will be initially protected by the gradual introduction of any changes. Worker households will experience more fundamental changes, enjoying on the one hand a steady decline in their PAYG financing burden in the form of lower social security contributions (SSC’s) but on the other hand having to adjust to the prospect of relying less on the state for their retirement income. Private provision for retirement income will become essential in these circumstances, with workers forced to build up a stock of financial assets to offset the future income loss from the less generous PAYG system. The financial market implications of all these changes, which were not explored in the 2002 paper, are expected to be very large, with the shift to funding generating immense sums of additional pension funds and other

⁶⁰ See Mc Morrow and Röger (2002) for a comprehensive overview of the pension reform debate and an empirical assessment of the main policy reform options.

⁶¹ Wages are equal to total wage costs i.e. wages including all taxes and the social security contributions of employees and employers.

financial assets and with the managers of those assets faced with finding appropriate investments either in the EU or abroad.

Since this simulation involves a more complicated set of economic and financial interactions than the labour market simulation, it is important to look separately at the following 3 issues :

- Firstly, what are the broad macroeconomic effects of such a partial shift to funding and should pension reform only form part of an overall package of ageing related reforms ?.
- Secondly, given the present breakdown of household financial assets in the EU, what are the financial market implications of pension reform in terms of the build-up of additional financial assets and where those assets will be invested in a global capital market (i.e. what are the implications for the EU's rate of gross fixed capital formation and for its build-up of net external assets) ?.
- Finally, what do the economic and financial market effects imply for the income, wealth, savings and consumption patterns of individual worker and pensioner households in the EU over the coming decades ?.

A : PARTIAL SHIFT TO FUNDING : OVERVIEW OF MACROECONOMIC EFFECTS : IN PARTICULAR WHAT HAPPENS TO SAVINGS, CAPITAL ACCUMULATION AND GROWTH ?

: As graph 26 indicates, this simulation, equivalent to a gradual decline in income for PAYG pensioners of between 35-40% by 2050, suggests that there are only small GDP per capita and potential growth rate effects from a partial shift to funding, despite the boost to workers income from the significant reduction in the burden of SSC's. Real rates of return also fall relative to the central scenario. On the other hand, the public finances gain significantly from such a shift with public expenditure on pensions as a % of GDP falling by roughly 4½% points in 2050 compared with the central scenario. There is also an increase in the amount of financial assets held by households, with workers increasing their savings rate in order to compensate for the reduced generosity of the public pension system. In overall terms, the aggregate private savings ratio rises by about 1 percentage point compared with the central scenario⁶².

While this increase in the savings rate will lead to a net increase in the accumulated assets of the EU's household sector of around 40 percentage points of GDP in 2050 compared with the central scenario, unfortunately since the outlook for potential growth in the EU is relatively subdued compared with elsewhere in the world, only a small proportion of these assets will be invested in the EU. In fact the EU's investment to GDP ratio increases only slightly, with 80% of the increase in savings being invested abroad. As a result of this, the improvement in EU living standards is higher than the increase in potential growth rates since interest income from abroad is helping to cushion the former. This is indicated by the growing divergence between the GDP per capita and GNP per capita income measures, with EU citizens being

⁶² It should be pointed out that this rise in the savings rate does not take account of any "transition burden" which may be involved in partially moving from the PAYG system, whereby workers would still have to pay, through their SSC's, for some of the rights accrued by workers and existing pensioners under the old, single pillar, PAYG system. Given this assumption some increase in government debt is inevitable in order to ease the transition costs involved. Another important issue which is not considered here is whether contributions to private pension schemes should be compulsory or voluntary.

more dependent on their investments in non-EU countries to sustain their present living standards, compared with the central scenario.

GRAPH 26 : LIMITED GAIN IN EU LIVING STANDARDS (LEVELS) AND POTENTIAL GROWTH RATES FROM A SHIFT TO FUNDING

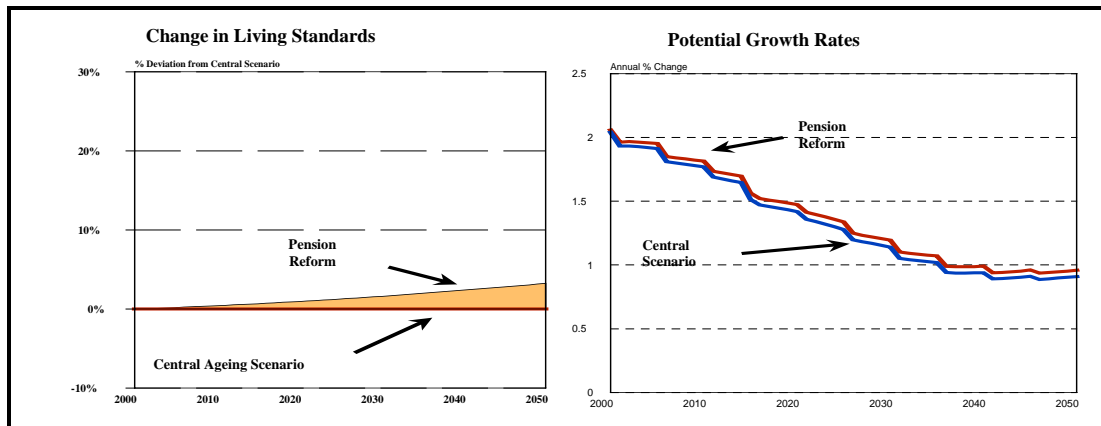


TABLE 6 : PARTIAL SHIFT TO A VOLUNTARY FUNDED SYSTEM

	GROWTH	FISCAL SUSTAINABILITY	INCOME DISTRIBUTION (% DIFFERENCE FROM CENTRAL SCENARIO)		FINANCIAL EFFECTS
	GDP PER CAPITA (% DIFFERENCE FROM CENTRAL SCENARIO)	PUBLIC PENSION EXPENDITURE (% OF GDP)	WORKING AGE POPULATION CONSUMPTION	PENSIONERS CONSUMPTION	TOTAL FINANCIAL ASSETS (% POINTS OF GDP DIFFERENCE FROM CENTRAL SCENARIO)
2000	0.0	10.5	0.0	0.0	0.0
2025	+1.6	12.0	+7.5	-6.4	+28.1
2050	+3.2	12.6	+15.2	-8.4	+40.2

B : WHAT IS THE IMPACT OF PENSION REFORM ON THE BUILD-UP OF ADDITIONAL PENSION FUND ASSETS IN THE EU ? : As shown in Table 7, at the moment in the EU the total net wealth of the household sector (which ultimately have claims on all of the assets of the corporate and government sectors and, by definition, also the liabilities of the latter sectors) is of the order of 410% of EU15 GDP in the year 2000 (i.e. nearly €36 trillion). This net wealth is essentially made up of the EU's capital stock plus the debt of the government sector and residential property. As table 7 indicates net wealth can be broken down into financial (44% of total) and non-financial (56% of total), with close to 85% of non-financial assets being in the form of property. Furthermore the table also gives a breakdown of net financial assets into gross financial assets and liabilities. This decomposition shows that gross assets were 238% of GDP in the year 2000, with gross liabilities equal to 58% of GDP. In terms of the shares of overall gross financial assets, equity and bond holdings and bank deposits make up around 2/3 of all EU assets, with pension funds and life insurance savings accounting for 28-30% of the total. On the liabilities side, mortgages are the dominant element.

TABLE 7 : HOUSEHOLD SECTOR WEALTH – EU15 (2000)
(€TRILLION + % OF GDP)

	€TRILLION	% OF GDP
BREAKDOWN INTO NET FINANCIAL AND NET NON-FINANCIAL WEALTH		
NET FINANCIAL WEALTH (ASSETS - LIABILITIES)	15.5	180
NET NON-FINANCIAL WEALTH	19.8	230
TOTAL NET WEALTH	35.3	410
TOTAL GDP	8.6	100
FURTHER BREAKDOWN OF NET FINANCIAL WEALTH INTO GROSS ASSETS AND GROSS LIABILITIES		
GROSS FINANCIAL ASSETS	20.5	238
(BANK DEPOSITS)	(5.6)	(65)
(PENSION FUNDS)	(2.3)	(26)
(EQUITIES + BONDS)	(7.8)	(91)
(LIFE INSURANCE)	(3.5)	(41)
(OTHER)	(1.3)	(15)
GROSS FINANCIAL LIABILITIES	5.0	58
(MORTGAGES)	(3.1)	(36)
(CONSUMER CREDIT)	(0.8)	(9)
(OTHER LOANS)	(1.1)	(13)
NET FINANCIAL WEALTH (ASSETS – LIABILITIES)	15.5	180

Source : OECD (2002), Babeau and Sbrano (2003)

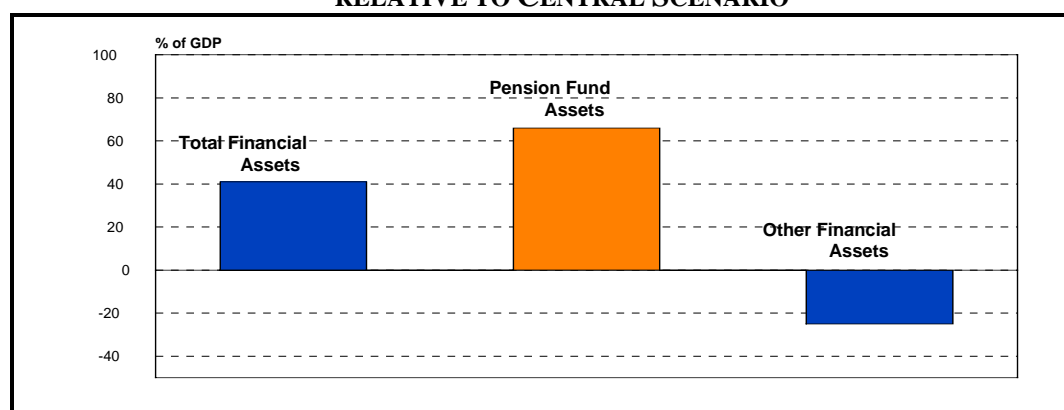
In terms of separating out the pension fund assets, the table shows that the value of EU pension assets in the year 2000 was of the order of 26% of GDP out of the 238% total shown in Table 7 for gross household financial assets. Using this estimate of 26%, what are the implications of a partial shift to funding for both the overall total of financial assets in the EU (i.e. the 238% of GDP) and for the composition of those assets i.e. those held by pension funds and those held as other financial assets (i.e. bank deposits, equities and bonds, life insurance and other assets). In terms of the implications of a partial shift to funding for the stock of financial assets, Table 8 shows the figures for the central and pension reform scenarios and at the bottom of the table gives the net change due to a partial shift to funding. In overall terms the table shows that financial assets as a % of GDP will continue to grow over the next 50 years in both the central and pension reform scenarios, with a partial shift to funding having the effect that additional financial assets equal to roughly 40% of GDP are generated. This is a net gain since the model predicts that pension fund assets will grow by about 65% of GDP (i.e. equivalent to over € 5½ trillion in constant 2000 prices, with pension fund assets as a share of GDP being 3½ times larger in 2050 compared with 2000), relative to the central scenario which implies that the growth in pension funds will come at the expense of other forms of savings, which according to the model will see a decline of roughly 25% points of GDP. This figure of 25% is the authors best estimate of the likely displacement effect of a partial shift to funding on the non-pension fund savings (bank deposits etc) of the household

sector (a substitution effect of 35%-40%)⁶³. If this displacement estimate proves accurate it will have big implications for the structure of financial markets in the EU, with ongoing trends towards disintermediation in the banking sector expected to be reinforced⁶⁴.

**TABLE 8 : EU15 - IMPACT OF A PARTIAL SHIFT TO FUNDING ON THE STOCK OF HOUSEHOLD FINANCIAL WEALTH
(ALL VARIABLES ARE EXPRESSED AS A % OF GDP)***

	TOTAL HOUSEHOLD SECTOR	
	2000	2050
CENTRAL SCENARIO		
TOTAL FINANCIAL ASSETS OF HOUSEHOLDS	238	250
(PENSION FUND ASSETS)	(26)	(27)
(OTHER FINANCIAL ASSETS)	(212)	(223)
PARTIAL SHIFT TO FUNDING		
TOTAL FINANCIAL ASSETS OF HOUSEHOLDS	238	290
(PENSION FUND ASSETS)	(26)	(92)
(OTHER FINANCIAL ASSETS)	(212)	(198)
PARTIAL SHIFT TO FUNDING : CHANGE RELATIVE TO THE CENTRAL SCENARIO		
CHANGE IN FINANCIAL ASSETS RELATIVE TO CENTRAL SCENARIO	0	+40
(PENSION FUND ASSETS)	(0)	(+65)
(OTHER FINANCIAL ASSETS)	(0)	(-25)

**GRAPH 27 : PARTIAL SHIFT TO FUNDING : CHANGE IN FINANCIAL ASSETS IN 2050
RELATIVE TO CENTRAL SCENARIO**



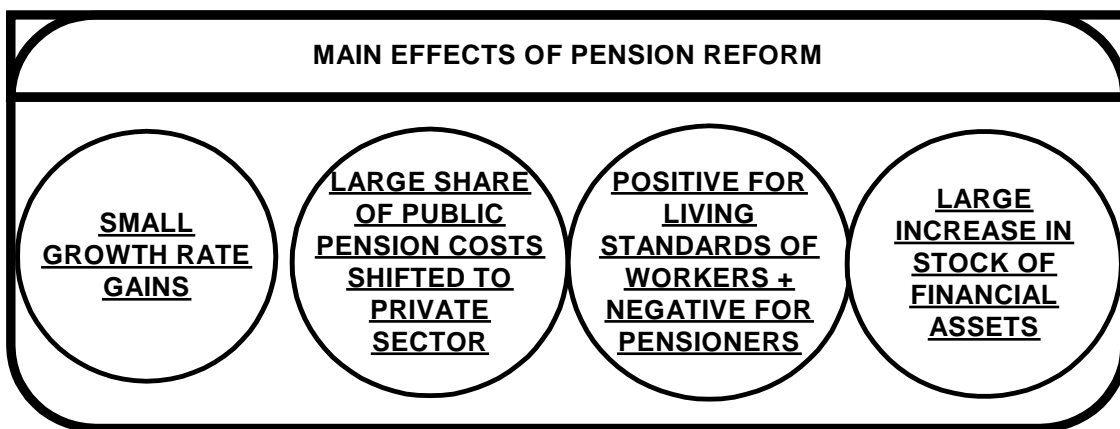
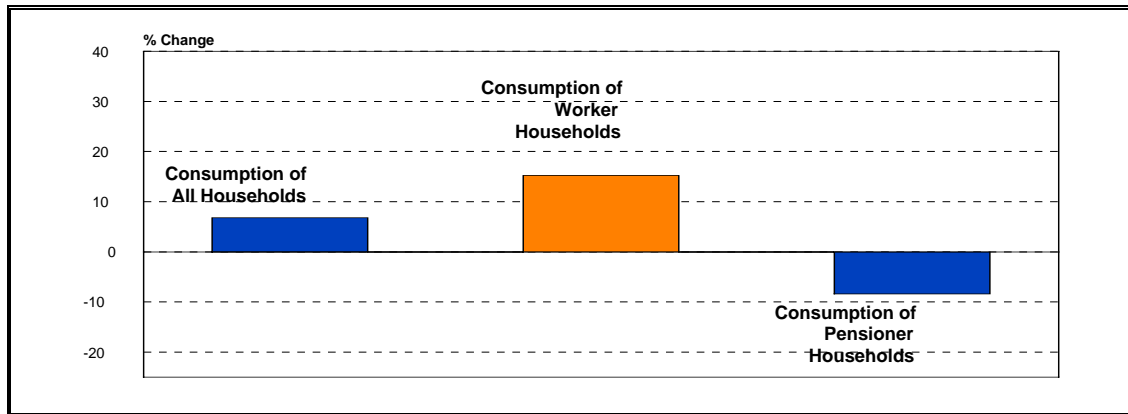
⁶³ This savings “displacement” effect occurs in the working years, with its impact being felt in terms of potential consumption in retirement. According to the model, since retirees will have to build-up additional pension fund assets during their working life in order to compensate for future reductions in the generosity of the PAYG pension system, they will partially do so by reducing the build-up of their non-pension fund financial assets such as the other savings instruments shown in Table 7 and perhaps will take on less commitments on the liabilities side, most probably in relation to property investments. Consequently, the share of these latter financial and property assets in the overall total of a households wealth holdings will decline in any shift to funding.

⁶⁴ This is similar to the result in Borsch-Supan and Winter (2001) which suggests that the substitution effect between “new retirement saving and current saving” will ensure that “one third of the new saving will be crowded out while two thirds will be net additions to the capital stock”.

C : INCOME DISTRIBUTION CONSEQUENCES OF SHIFT TO FUNDING : WHAT HAPPENS TO THE STANDARDS OF LIVING OF WORKERS AND PENSIONERS DUE TO THE CHANGES IN THE FINANCING OF RETIREMENT INCOME : As discussed earlier, while the standard of living of the population as a whole is not really altered by the shift to funding, this policy change has dramatic implications for the relative prosperity of EU workers versus pensioners. This is clearly demonstrated in Table 6 which shows that workers are the big gainers from the partial shift to funding and that pensioners will be increasingly faced with a substantial fall in their standard of living, with the interest income from their additional pension fund assets, mainly invested abroad, only cushioning to a certain extent the reduction in their PAYG income. While the overall private savings rate grows, on average, by about 1% of GDP over the next 50 years in the pension reform scenario, this masks big changes at the level of worker and pensioner households, with the savings rate of the former rising as a share of their disposable income and with pensioners accelerating their rate of dissaving compared with the central scenario. As shown in Graph 28, worker households will gain substantially in terms of average living standards, with pensioners suffering losses of over 8% relative to the baseline. It is also important to point out that the decline in living standards for individual pensioners will manifestly be much greater than the aggregated picture presented in Table 6 due to the uneven distribution of financial assets across households.

In the case of workers, small increases in real wages associated with the growing scarcity of labour, allied to a significant drop in social security contributions, results in a large gain in their living standards. However, while workers gain, it is important to underline that this is due to the fact that they would prefer to spend a relatively large proportion of the income gain from lower social security contributions, rather than building up sufficient pension fund assets to offset the reduced PAYG income in retirement, thereby leading to a serious underfunding of pension income compared with the central scenario. One of the essential conclusions to be drawn from this stylised scenario, is the importance of the "compulsory" savings aspect of the present PAYG system which policy makers should be loathe to change unless an effective system is put in place to ensure a similar level of savings in any of the alternative approaches. This latter point needs emphasising if governments do not wish to be faced by growing calls later on to address the income distribution problems which will follow if workers fail to make adequate provision for their retirement income. These results may suggest a genuine "market" failure in terms of pension income provision with large numbers of households systematically undersaving for their retirement needs.

GRAPH 28 : PARTIAL SHIFT TO FUNDING : CHANGE IN 2050 IN THE CONSUMPTION OF WORKERS AND PENSIONERS RELATIVE TO THE CENTRAL SCENARIO



SIMULATION 3 : COMPREHENSIVE REFORM SCENARIO
BROAD PACKAGE OF EU LABOUR MARKET REFORMS + PARTIAL SHIFT TO FUNDING + INITIATIVES AIMED AT OFFSETTING THE EFFECTS OF AGEING VIA PRODUCTIVITY GROWTH

In simulations 1 and 2, the model was used to individually assess the relative potency of a large package of labour market reforms and a partial shift to funding. The main conclusion to be drawn so far is that labour market reforms are substantially more important than pension reform when assessed against a wide range of criteria, especially the most important criterion i.e. growth in living standards. However, looking at individual reforms in this way is somewhat misleading since a large package of labour market reforms, along the lines of that outlined in simulation 1, could not be successfully implemented without significant changes to the public pension system since, on the basis of the central scenario, social security contributions as a % of wages are expected to rise by around 10% points in 2050 if no changes are introduced. Consequently, it is this paper's view that labour market and pension system reforms must be looked at together, with the present analysis stressing the importance of ensuring that these reforms are introduced in a sequenced manner in order to avoid potentially negative growth and financial market implications. Given that the shift to funding (i.e. simulation 2), in the absence of labour market reform, resulted in a large movement of funds outside the EU, it seems clear that if

policy makers are interested in retaining the EU as an attractive location for investment over the coming decades as well as ensuring high standards of living for its citizens, then the most attractive policy solution must be a coherent and balanced package of reforms involving mutually reinforcing changes to EU labour markets and pension systems.

For this final simulation, the labour market⁶⁵ and pension system reforms, described in simulations 1 and 2, are introduced in a sequenced manner in the model, with the partial shift to funding the last element of a set of reforms aimed at maximising the labour supply, savings and financial market gains from the overall package of reforms. In addition, a small productivity shock is also introduced to reflect the gains to be achieved from introducing such a comprehensive group of reforms⁶⁶. As shown in Graph 29a, the overall impact of these reforms would be to increase the EU's living standards by close to 30 percent compared with the central scenario, with over 80% of the gain emanating from the package of labour market reforms. Pension reforms would be important not only in realising those gains but also in contributing positively in terms of savings and capital accumulation and in underpinning the development of an internationally competitive EU financial sector. Graph 29b gives an overview of all the simulation results in section 4.1 relative to the baseline (as opposed to the central) scenario which, as explained earlier, is set equal to the average growth rates experienced over the 1990's. This graph again highlights the fact that the biggest contribution to the easing of the economic pressures of ageing clearly emanates from the package of labour market reforms.

TABLE 9 : COMPREHENSIVE REFORMS SCENARIO

	GROWTH	FISCAL SUSTAINABILITY	INCOME DISTRIBUTION (% DIFFERENCE FROM CENTRAL SCENARIO)		FINANCIAL EFFECTS
	GDP PER CAPITA (% DIFFERENCE FROM CENTRAL SCENARIO)	PUBLIC PENSION EXPENDITURE (% OF GDP)	WORKING AGE POPULATION CONSUMPTION	PENSIONERS CONSUMPTION	TOTAL FINANCIAL ASSETS (% POINTS OF GDP DIFFERENCE FROM CENTRAL SCENARIO)
2000	0	10.5	0	0	0
2030	+19.3	9.3	+24.0	+16.3	+40.1
2050	+29.4	8.9	+46.1	+19.1	+57.2

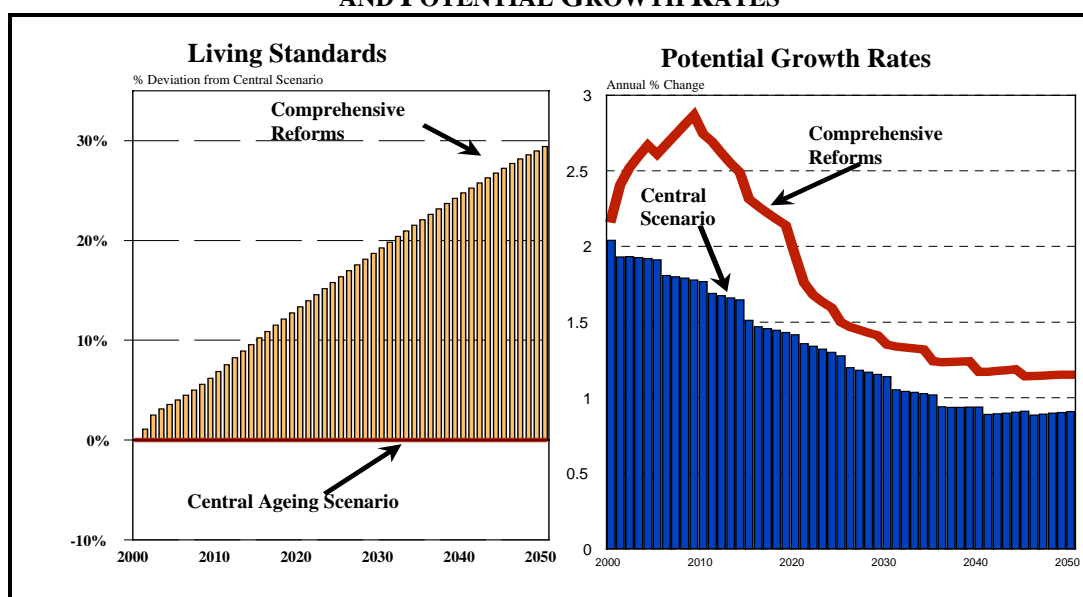
⁶⁵ This package of EU labour market reforms included a 4% points increase in participation rates, a 2% points reduction in structural unemployment and an increase in the effective retirement rate from the present rate of less than 60 up to the statutory retirement age of 65.

⁶⁶ **DEMOGRAPHIC CHANGE AND PRODUCTIVITY: THE ROLE OF TECHNICAL PROGRESS IN EASING THE DOWNTURN IN LIVING STANDARDS:** One of the key areas to look at in terms of easing the threat to future living standards are policies conducive to improvements in total factor productivity. As stressed by Richardson (1997) "there may be links between human capital and technological innovation, between trade policies and technology, between human capital and income distribution and so on. Trade openness may also be a condition for deriving the benefits of a better-educated labour force. This suggests that in order to foster improvements in total factor productivity there is a need for a consistent set of policies founded on open trade, macroeconomic stability and encouragement for the accumulation of human capital". Policy reforms in this area can lead to both GDP level effects (i.e. static, once-off, efficiency gains) and long run, permanent, GDP growth rate effects (i.e. dynamic gains). An example of this split between static and dynamic gains would be the EU's single market programme with the static gains coming through in the form of economies of scale and greater competition and with the permanent growth rate effects resulting from the increased competition in an enlarged market having a favourable effect on technological innovation and investment.

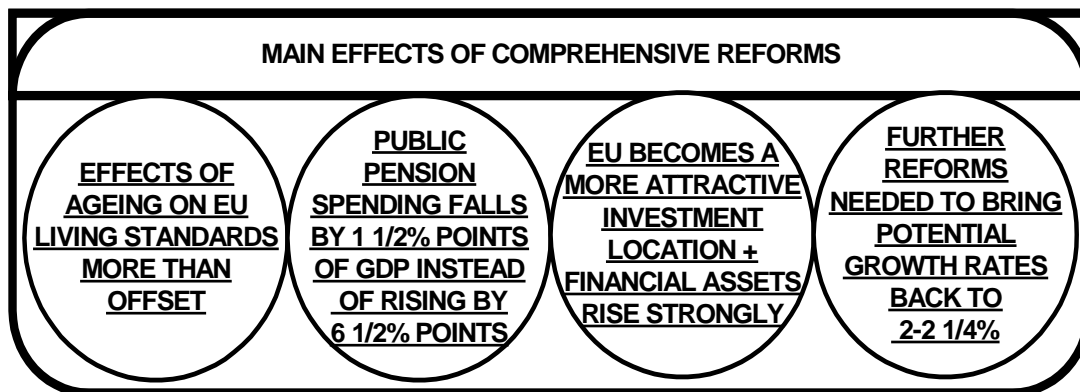
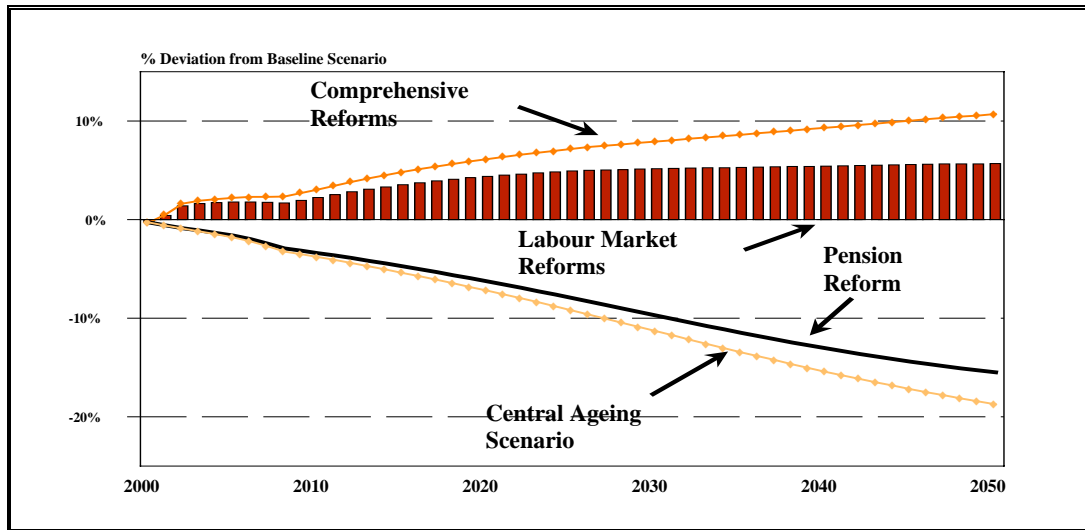
The overall conclusion to be drawn from this last simulation is that if governments are successful in introducing a reform package on this scale then the economic implications of ageing are capable of being more than offset in the Community as a whole. In addition, such a combination of reforms would result in the EU becoming a more attractive investment location, with the exodus of funds being reduced since the outlook for EU potential growth rates improves. The model predicts that 75% of the additional pension fund assets which would be created from the shift to funding would be invested in the EU compared with a figure of only 20% which was predicted to occur in the absence of labour market reform. However, it is clear that given the growing divergence between the GDP per capita and GNP per capita income measures, EU citizens will be increasingly dependent on their investments in non-EU countries to sustain their present living standards.

Finally, an important point to note regarding this final scenario is that while the loss in living standards is overcome, potential growth rates do not recover to their baseline levels of 2-2¼%, rising to only 1.8% on an annual average basis. The EU would therefore need additional labour market improvements, which clearly have limits in terms of participation rate and structural unemployment reductions, in order to bring potential growth rates back up to the baseline EU levels. If policy makers wished to achieve such growth rates, either participation rates would have to rise by an additional 15 percentage points, compared with the labour reform scenario, or the effective retirement age would have to rise to 72. While an increase in participation rates of this magnitude would appear unrealistic, the 7 year increase in the effective retirement ages (ERA), is not that outlandish. In fact, a large number of respected commentators are already asking that governments link changes in the ERA to changes in life expectancy which would therefore imply a retirement age of 70 in 2050 since life expectancy is forecast to rise by 5 years between now and then (i.e. 1 year per decade).

GRAPH 29A : EFFECT OF COMPREHENSIVE REFORMS ON EU LIVING STANDARDS AND POTENTIAL GROWTH RATES

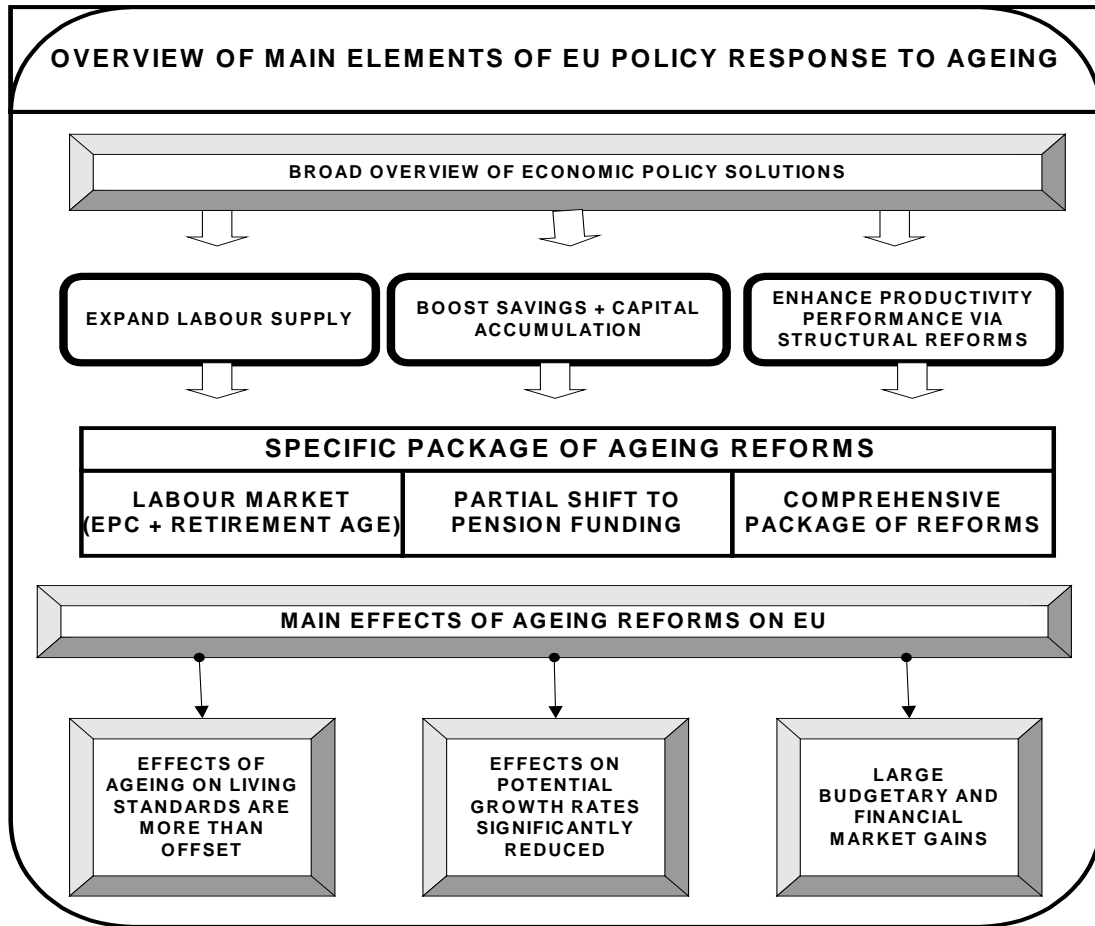


GRAPH 29B : OVERVIEW OF SIMULATION RESULTS



MAIN CONCLUSIONS OF SECTION 4.1 : The main conclusions to be drawn from the policy agenda laid out in section 4.1 is that governments will need to adopt a multi-faceted approach in order to moderate the economic burden of ageing. At a general level, a broad package of reforms will be required combining fiscal consolidation; pension & health care reforms; labour market reforms, including action to boost labour force participation rates and to increase the effective retirement age to reflect increased longevity; and finally structural reform initiatives to enhance the efficiency of resource allocation and to stimulate higher, sustainable, rates of economic growth. In more specific terms, the simulations in this section have shown that a combination of the EPC proposed labour market reforms allied to an increase in the effective retirement age to 65 and a partial shift to pension funding have the ability to more than offset the effects of ageing on living standards and to substantially reduce the negative effects of ageing in terms of potential growth rates. The budgetary gains from such a broad package of reforms will also be considerable with public expenditure on pensions falling by 1 1/2% points compared with a rise of 6 1/2% points in the central scenario. In terms of income distribution both workers and pensioners gain from the proposed policy package. Finally, with regard to the fourth element of the policy evaluation framework laid out earlier, namely the financial market implications, financial assets would grow by about 57% of GDP which is equivalent to € trillion in constant 2000 prices, with an even larger increase in pension fund assets coming at the expense of other forms of savings. In overall terms, the

simulations in this section suggest that the economic impact of the “greying” of the population over the next 50 years will only become unbearable for the Community in the event that its labour markets, and by implication its tax and social security systems, remain in their present state and if reform of the public pension system is not a priority for action over the coming decade⁶⁷.



⁶⁷ As stated in Bovenberg and van der Linden (1997) “Just as with other trends that affect our society, ageing requires countries to adapt their economies... countries have many alternative ways to do just that. Since ageing is a rather predictable trend, countries have ample time to adjust. Indeed, we advocate that countries spread their eggs not only over various policy measures but also over time. Gradually phasing in policy measures and announcing these measures early, avoids abrupt, painful policy corrections”.

BOX 6 : EU BUDGETARY PRUDENCE : THE IMPORTANCE OF RESPECTING THE STABILITY AND GROWTH PACT

This box looks at the issue of offsetting the negative impact of ageing on national savings through adherence to the provisions of the stability and growth pact (SGP). If this is actively pursued over the coming years, not only will national savings benefit but a sounder fiscal position will ensure more favourable debt dynamics when the public sector spending pressures from ageing start to emerge. In the specific case of the EU, respect of the SGP provisions will inevitably involve the introduction of wide-ranging reforms to those most age sensitive areas of government expenditure such as pensions and health care, without which deficits will be difficult, if not impossible, to control with consequent problems in terms of debt sustainability. Given the existence of high tax to GDP ratios in most of the Member States and the potentially distortionary impact of the large additional tax hikes which would be required, this box assumes that any budgetary adjustments which take place do so on the expenditure side of the budget and not on the revenue side as was the case in the central ageing scenario. Using this budgetary assumption, a simple illustration of the importance of adhering to the provisions of the SGP is given below, by looking at the debt and debt servicing implications of this “non-financing” alternative (i.e. allowing government expenditure not revenue to increase in the face of ageing).

THE IMPORTANCE OF RESPECTING THE SGP : It is clear that respecting the SGP’s “close-to-balance or in surplus” rule demands additional consolidation efforts on behalf of many of the Member States, and that maintaining that position will be difficult once the demographic situation starts to worsen in the coming years. Such efforts are nevertheless vital for both avoiding the development of unsustainable debt positions and for helping to fund age-related spending increases. With regard to the latter, if the provisions of the SGP are adhered to, the declining interest payments burden associated with shrinking public debts could be used to fund part of the additional expenditure burden on the pensions and health sides linked to the retirement of the “baby boom” generation. In this way the primary balance adjustment to the demands of an ageing population could be eased. Member State governments must therefore use the “breathing space” available over the next few years to place the public finances on a durably sound footing.

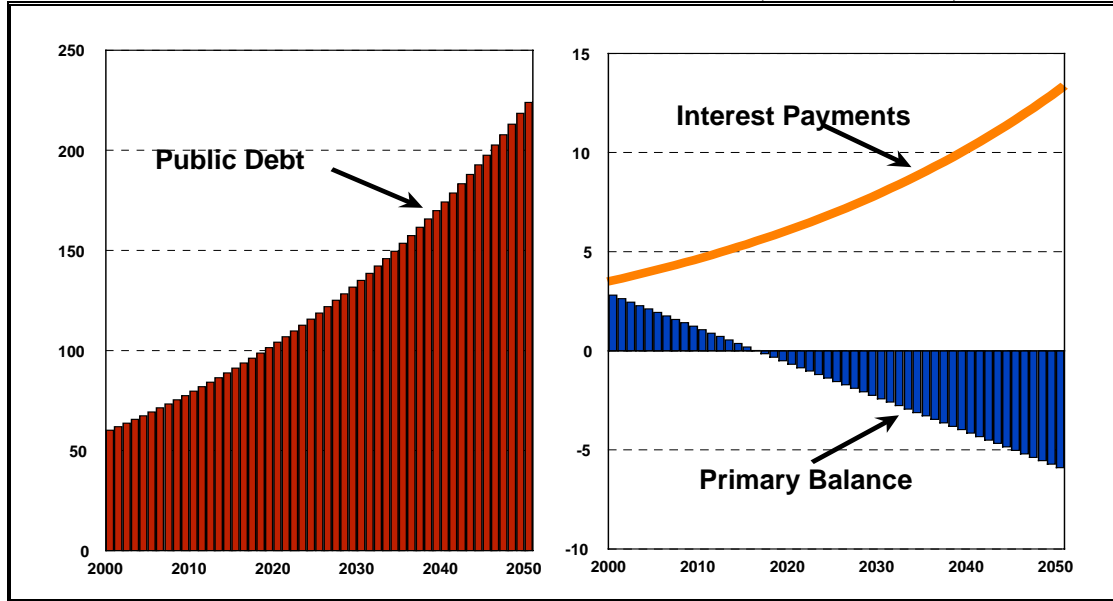
Primary Balance, Interest Payments and Debt to GDP ratio implications of Ageing in the event that the SGP is not adhered to : (i.e. Governments resort to debt as opposed to tax financing). The evolution of the debt ratio depends on interest rate and growth rate developments as well as trends in relation to the primary balance. While the primary balance is a crucial determinant of overall fiscal positions it is not the only one, with the initial stock of debt and debt servicing costs also playing a key role in the evolution of fiscal positions. When real interest rates are greater than real growth rates, unless the surplus on the primary balance is adequate to compensate for the increased debt interest payments, debt dynamics are unstable and a vicious circle of rising debt as a percentage of GDP will inevitably ensue. It is clear in these circumstances that the initial fiscal starting position impacts strongly on a country’s debt evolution, with lower debt/GDP ratios and higher primary surpluses in the base year ensuring more virtuous debt dynamics. With high debt levels in many EC Member States, and with interest payments already eating up 6-7% points of GDP in some cases, it is clear that a number of countries are still especially vulnerable to adverse interest rate developments⁶⁸.

Using the primary balance estimates which underpin the central ageing scenario⁶⁹, and the latter’s predicted GDP growth rates, the present simulation assesses the associated debt dynamics in the event of non-compliance with the SGP over the 50 year period. This scenario is for illustrative purposes only since such a full scale resorting to debt financing would quickly run into problems. Consequently, its only purpose is to highlight the extent and nature of the budgetary difficulties which are likely to manifest themselves. In addition to the primary balance and growth rate data, the effective interest rate on the public debt has been calculated for the year 2000 and is extrapolated forward to 2050. The real interest rate / real growth rate differential is of the order of 2 ¼ percentage points. In overall terms, in the event of a debt financing policy being adopted, the EU would experience a deterioration in its primary balance of 8¾ percentage points, and increases of 9¾ and 164 percentage points respectively in the interest payments to GDP and the debt to GDP ratios over the fifty year period.

⁶⁸ The benefits of consolidation for these high debt countries are clearcut: lower debt servicing costs, emanating from lower debt levels and lower interest rates, with the latter lower rates in turn boosting growth. As regards the interest rate benefits, studies such as Faruquee et al (1996) for the OECD countries and Ball and Mankiw (1995) for the US point to reductions of about 0.8-0.9 percentage points in real interest rates following public debt reductions of 20-25% points.

⁶⁹ These primary balances can of course also be used as an indication of the SGP induced adjustments needed to respect the close to balance rule.

GRAPH A : NON RESPECT OF STABILITY AND GROWTH PACT (EU15 - % OF GDP)



It should be borne in mind that while the above graphs take account of the age related deterioration in both primary balances and real growth rates, they do not reflect any potential deterioration in debt dynamics driven by real interest rates being higher because of the higher deficits and debt levels. No attempt is consequently made to assess the likely evolution of the gap or differential between real interest rates and real growth rates over the period because of the large uncertainties involved. While it is conceivable that if the pressures on primary balances are not adequately tackled the fiscal situation will be further stretched by higher rates of interest on Government debt, such a prediction is not clearcut in circumstances where GDP growth rates are also expected to fall.

4.2 DEALING WITH THE INTERNATIONAL FINANCIAL MARKET EFFECTS OF AGEING : MORE NOT LESS GLOBALISATION IS NEEDED

In addition to the policy actions needed in those areas of the developed world most affected by ageing, along the lines of the specific EU package of reforms described in 4.1, it is also in the EU's and the developed world's interest to initiate a process of deepening in global integration. Closer global linkages will help in terms of both underpinning more sustainable world income patterns and in galvanising support for the globalisation process itself. Given that ageing is a global phenomenon and one which will demand a wide variety of policy reforms in the 5 areas covered in the model, there will be very different policy priorities depending on the specific national circumstances. It is not the intention of the present section to examine in great detail the various policy responses which are likely but to look at the implications of a plausible income convergence scenario for the global economy over the coming decades which is based on a mutually beneficial boost to trade and financial flows between the developed and developing groups of countries. This income convergence scenario assumes that due to ageing in the developed world, and the structural savings surpluses which will become increasingly available, that the coming decades represent a unique opportunity for the developing group of countries to converge in income terms with the rest of the world⁷⁰.

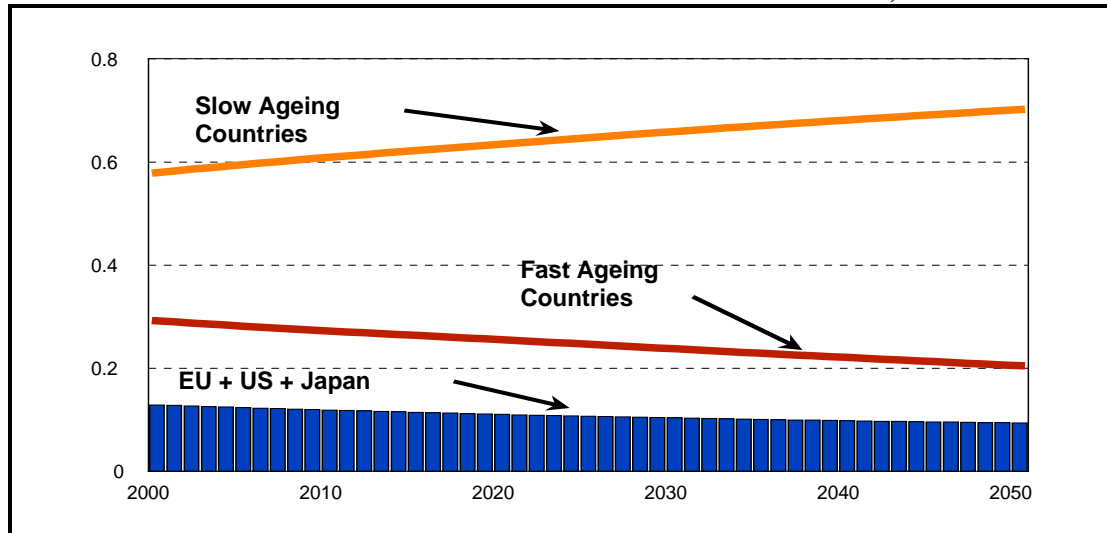
SIMULATION 4 : GLOBAL INCOME CONVERGENCE

As discussed in the previous sections the drive towards closer integration of the world economy is clearly already generating its own growth momentum in a large number of developing countries. The ongoing process of adapting existing institutional arrangements to bring them into line with more developed country norms not only underpins domestic growth fundamentals but adds credibility in terms of foreign investor expectations. These latter external effects are already reflected in FDI flows, with those countries deemed furthest ahead in terms of integration, also benefiting from a disproportionate share of total inward investment. While some recent trends are encouraging, in this papers central scenario it is assumed that the TFP trends witnessed over the 1990's are extrapolated forward over the simulation horizon to 2050. On the basis of this assumption, there is very little change in global income convergence trends over the period, with the more developed areas (i.e. the EU, US and Japan combined) of the world retaining living standards which are over 6 times greater than the average of the fast and slow ageing groups of countries. These trends translate into a situation in 2050 whereby the more developed group of countries take 40% of world output whilst representing only 9% of the worlds total population. In terms of living standards, these global output shares translate into the slow and fast

⁷⁰ Equipe Ingenue (2001) quote " If the residents of developed countries most advanced in the ageing process were to rely on financial autarky and exclusively invest their additional saving in their home countries, it would generate an over-accumulation of productive capital, the rise in the capital-labor ratio of production leading to a decline in the marginal productivity of capital, hence in its rate of return. Financial globalisation instead allows for a process of equalising rates of return on capital worldwide : retired households from developed countries would benefit from additional income from their investment abroad, while numerous working-age cohorts in less-developed countries would benefit from a higher capital stock, hence a higher capital-labour ratio, therefore higher labour productivity and better wages. Moreover, investment abroad leads to a better diversification of non systemic risk, but possibly also to an increase in systemic risk, as recent financial crises have illustrated. Thus if our analysis leads to the conclusion that large amounts of capital would likely be transferred from OECD to developing countries as a result of differences in their demographic dynamics, it would raise the issue of the stability of the international financial system".

ageing countries having a combined GDP per capita in 2050 which is only 15% of that of the EU, US and Japan⁷¹.

**GRAPH 30 : PERCENTAGE SHARES OF TOTAL WORLD POPULATION (2000-2050)
(A COMPARISON OF THE COMBINED POPULATIONS OF THE EU+US+ JAPAN WITH
THAT OF THE FAST AND SLOW AGEING COUNTRIES)**



Source : Eurostat, US Census Bureau and UN

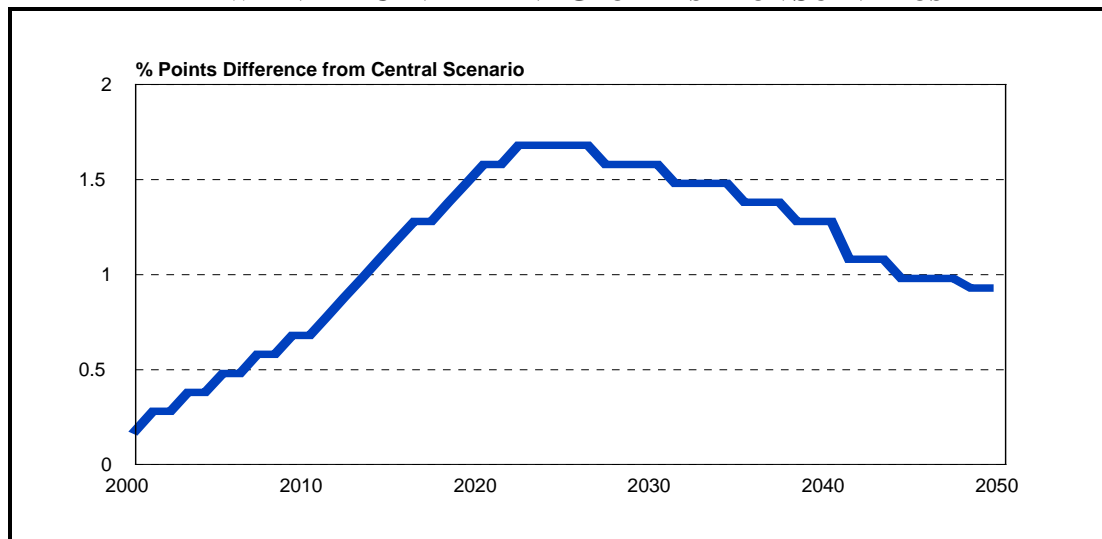
While on the basis of existing trends with regard to income convergence, the central scenario is credible, it nevertheless highlights the unfinished and patchy nature of the present globalisation process. In effect, at the moment, globalisation is largely a developed world phenomenon, with capital flows to the less developed regions being small in comparison to both total world flows and in relation to the productivity differentials which presently exist. While these productivity differentials need to be interpreted with some caution, nevertheless as the experiences of China and other south-east Asian economies have highlighted, rapid economic progress can be made by developing economies if a suitable policy regime is set in place. Given the possibilities which clearly exist it was decided, for illustrative purposes, to simulate the effects of a relatively rapid convergence process for developing countries with this process being built on a globalisation pattern which is truly worldwide in its reach.

For the purposes of this scenario, full capital mobility is assumed at the global level, unlike the assumption in the central scenario where this assumption was only applied to the EU, US and Japan, and to more limited extents for the fast and especially the slow ageing countries. In effect the simulation assumes that the fast and slow ageing groups of countries start to converge relatively quickly towards the productivity levels existing in the more developed world regions, with GDP growth rates in both areas growing at about 2% points more compared with the central scenario over the period to 2025, before falling back towards a growth differential of roughly 1% point over the subsequent 25 years. The most important results from this scenario are as follows :

⁷¹ The fast and slow ageing countries clearly have enormous potential – it could be pessimistic in the central scenario to assume that the trends of the 1990's are extrapolated forward when per capita income convergence was slow. A lot of the south east Asian countries are characterised by thrift and per capita income growth has a positive influence on savings, so world savings could rise over the next 50 years, not fall as in the central scenario. In addition, a lot of these countries are in the classic demographic take-off phase of development. The one missing ingredient is good policies. The potential is there, good policies is what will realise this potential.

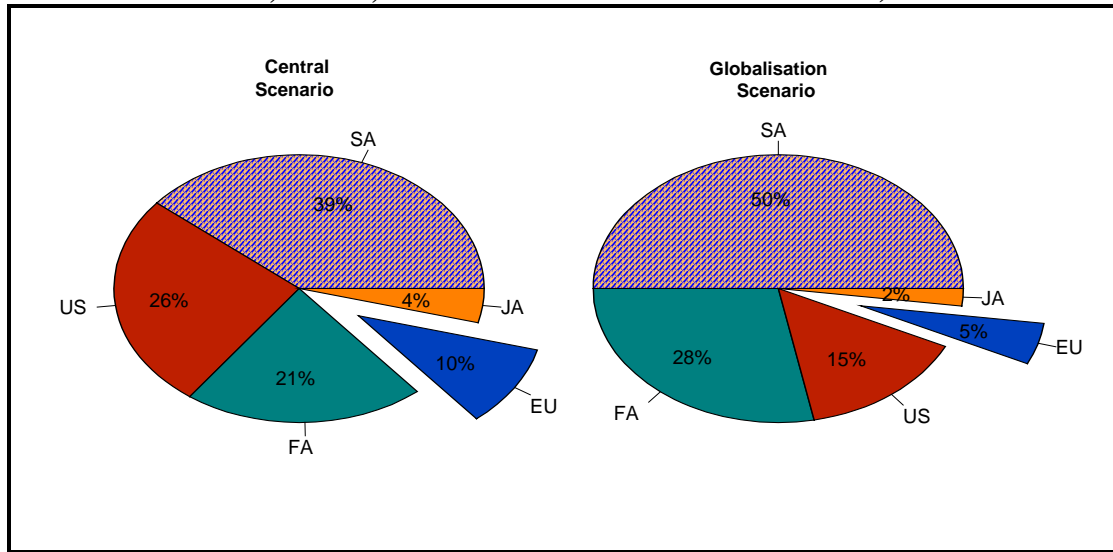
- **GLOBAL POTENTIAL GROWTH** : Worldwide growth rates rise from an annual average rate of 2.4% over the next 50 years in the central scenario to 3.6% in the globalisation scenario.

GRAPH 31 : GLOBAL POTENTIAL GROWTH RATE : % POINTS DIFFERENCE BETWEEN THE CENTRAL AND GLOBALISATION SCENARIOS

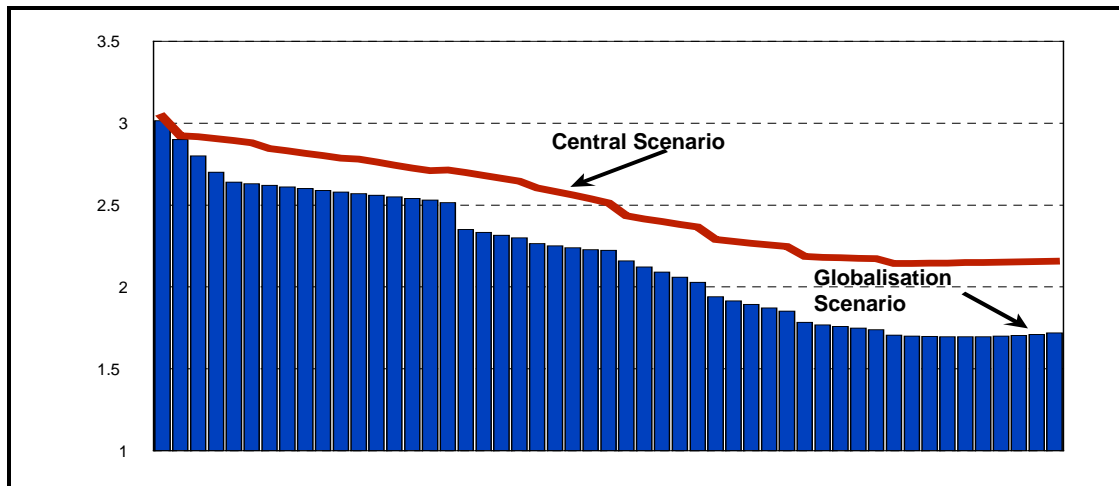


- **POTENTIAL GROWTH IN THE 5 AREAS + SHARES OF WORLD GDP** : While overall world growth is increased, the effects of globalisation in terms of the potential growth rates of the respective areas and their shares of overall world production presents a more divergent pattern. As graph 32 (shares of world GDP) and graph 33 (US potential growth rates) show, the US is in relative terms the most affected amongst the developed group of economies since less international investment resources will be directed towards the US and the incentives for US companies to invest abroad will be enhanced. In overall terms, a more fully integrated world economy would have the effect of cutting roughly a ¼ of a % point off the annual average potential growth rate of the US over the next 50 years, from 2 ½% in the central scenario to 2¼% in the present simulation. In terms of the less developed countries, these economies make significant gains in terms of their shares of world GDP. For example, the slow ageing groups share of world GDP increases to 50% in 2050 compared with 39% under the central scenario, with the fast ageing countries (which include both developed and developing countries) also growing from 21% to 28%. There are corresponding declines in the shares of the developed world, with the US witnessing the greatest decline in its share relative to the central scenario, falling in 2050 from 26% in the central scenario to 15% in the globalisation scenario.

GRAPH 32 : PERCENTAGE SHARES OF GLOBAL GDP IN 2050
(A COMPARISON OF THE CENTRAL AND GLOBALISATION SCENARIOS FOR THE EU, US, JAPAN, FAST AND SLOW AGEING COUNTRIES)

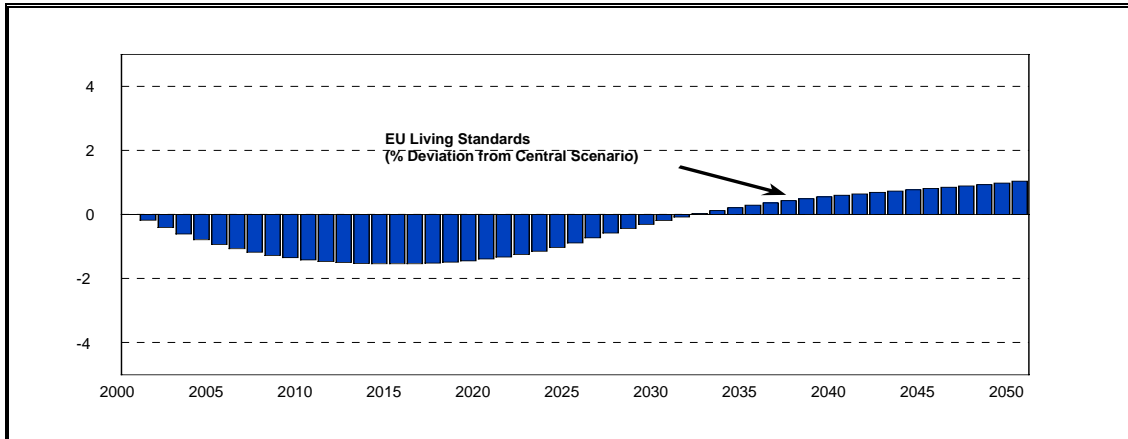


GRAPH 33 : US POTENTIAL GROWTH RATES 2000-2050

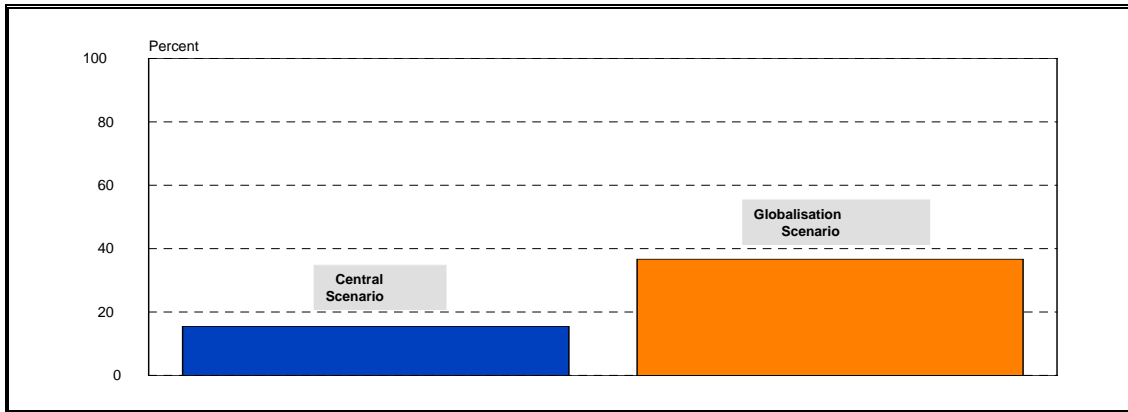


- LIVING STANDARDS / SHORT ADJUSTMENT PERIOD** : While the more developed regions will lose out in terms of their share of overall world GDP, the globalisation scenario results in only very marginal, and time-limited, losses in living standards for these countries relative to the central scenario. In fact, after about 30 years the EU, US and Japan emerge as small net gainers from this process of deeper world integration with the higher world growth rate and greater levels of income from the build-up of net foreign assets offsetting the initial losses experienced in the transition phase (see graph 34 for EU). Not only are the changes in living standards in the EU, US and Japan positive in the long run, they are also broadly similar in magnitude with all 3 areas gaining from the higher rates of returns on their foreign investments. As expected the less developed countries gain significantly in terms of GDP per capita. By 2050 average living standards in the developing world would be 37% of those of the more developed regions, compared with only 15% in the central scenario (graph 35).

GRAPH 34 : IMPACT OF GLOBALISATION ON THE LEVEL OF LIVING STANDARDS IN THE EU

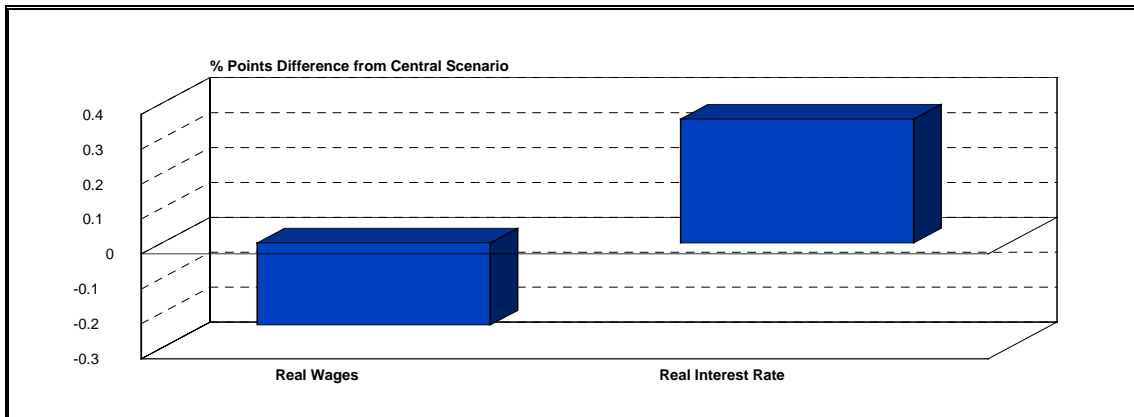


GRAPH 35 : GDP PER CAPITA IN THE FAST AGEING + SLOW AGEING COUNTRIES COMPARED WITH EU+US+JAPAN IN 2050

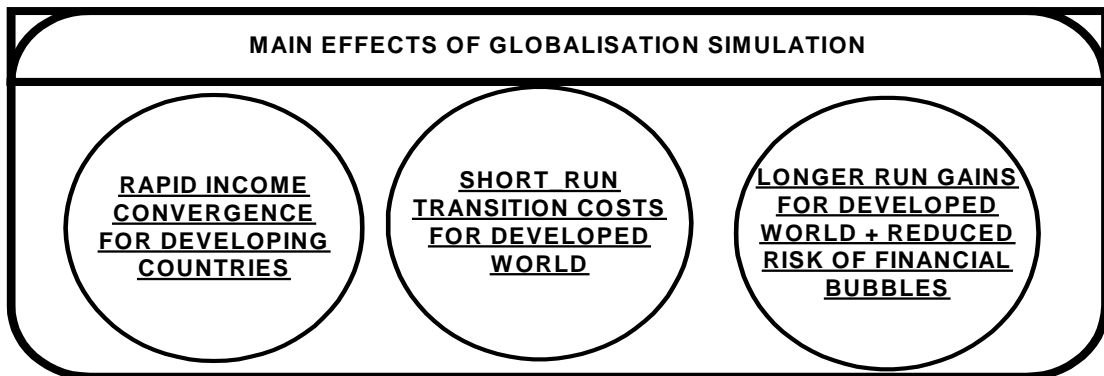


- CHANGES IN RATES OF RETURN TO LABOUR AND CAPITAL :** Unlike in the central scenario when real wages rose slightly and real rates of interest declined, the opposite occurs in the “globalisation” scenario. Compared with the central scenario, real wage increases in the more developed areas of the world are on average about a ¼ of a % point lower over the period 2000-2050, with global real interest rates about .35 of a % point higher.

GRAPH 36 : CHANGE IN REAL WAGE GROWTH AND REAL INTEREST RATES RELATIVE TO THE CENTRAL SCENARIO



- **EXTERNAL CAPITAL MOVEMENTS** : Finally, in terms of savings, investment and external capital movements, there is a clear upward shift in the outward movement of funds from the developed to the developing world, with particularly strong shifts away from the US relative to the central scenario. This potentially more efficient diversification of worldwide investment resources leads to growing divergences between the GDP and GNP income measures for all world regions, with the increase in investment opportunities in turn helping to avoid the emergence of bubble conditions in the developed world, along the lines of those which occurred in Japan and the US in the second half of the 1980's and 1990's respectively.



BOX 7 : INCOME CONVERGENCE : THEORETICAL AND EMPIRICAL EVIDENCE

Neither economic theory nor empirical evidence provides a definitive guide to when, or indeed if, global income convergence will occur. To date, studies undertaken at a worldwide level, which include both developing as well as developed countries in the sample, appear to suggest that the evidence for convergence is limited. On the other hand, research which has been confined to developed economies strongly points to evidence of catching up amongst such groups of countries. In terms of starting positions, it is clear that on average the slow ageing group of countries lag substantially behind the living standards of the rest of the world and especially the EU, the US and Japan. While the extent of the challenge appears daunting this group of countries can take heart from the post-war convergence experience of Japan and also of the EU which converged within the group itself and also towards US standards of living. As those latter processes clearly demonstrated, catching-up is possible but countries should have no illusions about the time scale involved. Convergence will most definitely take decades rather than years, a point clearly demonstrated by the relatively poor performance achieved by the slow ageing group of countries over the period 1950-2000. The economic potential for catching-up inherent in more favourable demographics and its actual realisation are two very different propositions, with the establishment of a coherent policy framework allied to consistent policy execution being the key ingredients in ensuring the realisation of the catching-up potential. In addition such a favourable outcome is predicated on political stability in the countries in question and on an absence of institutional corruption.

Various theories abound concerning the speed with which less developed economies develop over time, and whether if, or when, they converge to the income levels of the most advanced economies. Some economists, such as Romer (1986) and other advocates of the new endogenous growth theories, are quite pessimistic regarding the likelihood of convergence occurring even over long periods of time since productive technology is, in their view, of the increasing, as opposed to the more normally assumed decreasing, returns to scale variety and consequently once a country becomes a global technology leader it tends to remain so over extended periods of time due to knowledge spillovers or learning-by-doing effects. At the other end of the scale are economists such as J. Sachs and A. Warner, who are quite optimistic concerning the potential for catching-up, with in their view an adequate policy framework being a sufficient condition for that to occur. For Sachs et al. those countries which consistently implement efficient economic policies, including adherence to an open trading regime which is attractive to FDI flows and technology transfers, as well as establishing the normal institutions of a market economy, such as a properly functioning legal system with adequate protection for private property rights, will over time experience convergence. This view consequently stresses the importance of efficient economic institutions in ensuring growth and convergence. On this view of the world, if countries do not succeed in growing it has probably more to do with poor policy choices rather than technology deficiencies or low initial endowments of human capital. If this is the case then the outlook for convergence is quite favourable since past policy failures, such as the adoption of autarkic trade policies or inappropriate exchange rate arrangements, are reversible in the future if an effective institutional framework has been set in place.

Between these two extreme views is the one which underlies the present simulation, namely the Solow neoclassical growth framework, which predicts what is referred to as "conditional" convergence. The theory suggests that convergence does occur but not necessarily to the same higher level of income, since the growth potential of countries differs essentially because of differences in respective savings rates and population changes. When one allows for these differences in terms of the long run growth potential of countries, then one finds that poorer countries do in fact grow relatively faster and consequently do converge over time, but not necessarily to the same steady state standard of living. Furthermore, studies have found that the greater the gap between the present income levels of countries and their future potential, the faster they will grow.

Given the wide choice of models to choose from, it is clear that the empirical evidence becomes a major deciding factor in terms of which model to use for any long run growth analysis. In overall terms, it would appear that the approach which has enjoyed the greatest degree of support in the literature is the neoclassical view. There is in fact now widespread empirical acceptance that "conditional" convergence does occur across countries. Typical of this line of research is a 1992 study by Mankiw, Romer and Weil which showed, using cross-country regression analysis, that the neoclassical growth model could explain nearly 80% of the differences in international standards of living, using just three explanatory variables, namely population growth rates, savings rates and an indicator of human capital. In addition, papers by Barro and Sala-i-Martin 1991, Islam 1995 and Sala-i-Martin 1996, amongst many others, all found evidence for 'conditional convergence' for 'developed economies' including the EU, with rates of convergence of 2% per annum being typical for these studies. With regard to the debate on openness and growth, a number of studies, such as Sachs and Warner 1995 and Ben-David 1996, using a modified neoclassical framework, found strong evidence of per-capita income convergence for open economies with strong trading links, a scenario which is typical of the EU, Japan and a number of the fast ageing economies.

In this regard, while the analysis undertaken in the paper is predicated on the conditional convergence thesis, the importance of an appropriate policy framework is also stressed, including the role of policy institutions, along the lines of the arguments put forward by Sachs and Warner. In overall terms the key points to be retained from the convergence literature are the following.

- **Convergence is not assured** – it is conditional on rates of capital accumulation and population growth and, at a wider level, on appropriate and efficient policy making institutions. As the experiences of Japan and the

EU show, effective economic policies and institutions have an important role to play in the growth and convergence processes of these countries.

- The **speed** with which these countries grow is dictated by their own long-run growth potential and their own initial conditions. While fast rates of growth can be achieved, countries should be realistic about the speed with which convergence will take place – in fact that process normally occurs at a much slower pace than most countries assume. For the purposes of the present simulation a rate of convergence of 2% a year is assumed for the fast and slow ageing groups of countries over the period to 2025, with a 1% differential over the period 2025-2050.
- On the basis of the empirical evidence presented above, it would appear that the road to prosperity is more difficult and the **role of savings and investment**, both in physical and human forms of capital, is more important in determining steady state income levels than originally thought back in the 1950s with the accumulation of all forms of capital, including knowledge, being crucial to the relative growth performance of countries.

SUMMARY AND CONCLUDING REMARKS

Demographic factors play an important role, both directly and indirectly, in determining the economic outlook for economies. Population changes directly affect the size of the labour force and consequently potential employment and output growth. In addition, changes in demographic trends strongly influence savings and investment behaviour, the outlook for the public finances, a range of financial market variables and, more controversially, may impact on the pace of productivity growth⁷² in an economy. Given this pervasive influence, it is hardly surprising that policy makers in a large number of countries around the world are increasingly concerned about their respective long-run demographic outlooks, with the prospect of overall populations actually falling in size and ageing in structure.

REAL ECONOMY EFFECTS : In terms of growth effects, this paper suggests that, over the next 50 years, large areas of the world will witness a decline in their potential growth rates and living standards due to dramatic developments in the structure of their populations, with falling numbers in the working age cohort and rising numbers of pensioners. According to the analysis using ECFIN's ageing model, on the basis of unchanged policies, the overall economic impact of these developments over the period 2000-2050 will be to reduce the growth rate of EU living standards (i.e. GDP per capita) by about 0.4% on an annual average basis⁷³. In addition, EU potential growth rates will fall by twice that amount from the present underlying rate of 2-2 ¼% to around 1¼%. This latter average potential growth rate could in fact realistically decline to less than 1% if one were to allow for the possibly negative effects of ageing on productivity. At the international level this dismal outlook for the EU is also expected for Japan but not for the US where a much more sanguine growth picture emerges, with annual average potential growth rates in the US of 2 ½% predicted over the next 50 years. The fast and slow ageing groups of countries are expected to grow by 2 and 3 ¼ percent respectively, giving an overall global potential growth rate, for the period 2000-2050, of around 2 ½% (which compares with a rate of 4% for the period 1950-2000). In terms of the distribution of global output, the persistent differences in potential growth rates between the EU and the US result in large changes in their relative economic importance in the world, with the EU's present share of 18% of world production falling to 10% in 2050 and with that of the US continuing to rise from 23% in 2000 to 26% in 2050. Regarding Japan and the fast ageing group, their respective shares of world output will decline over the period, with the share of the slow ageing countries rising to close to 40% but with this increased share driven by demographic developments as opposed to any underlying productivity improvements.

⁷² As explained in Box 5, an inverse relationship is evident over the period 1950-2000 between population changes and improvements in living standards, with the EU and Japan having the lowest relative population growth rates over the last 50 years and the highest rates of growth in terms of living standards. However, it is important in this context to differentiate between populations which are growing more slowly (i.e. lower fertility rates) and populations which are growing older (i.e. higher life expectancy). It is a key issue for analysts to decipher if smaller, but relatively older, labour forces in the future can be equally good at generating the efficiency gains as previous generations. In addition a further complication is in assessing the influence of a more highly educated labour force over time, with each new cohort of workers tending on average to be better educated than the retiring cohort.

⁷³ Japan will witness a similar rate of decline in the growth of its living standards, with the US and the fast ageing countries falling by 0.2 and with little change expected in the growth of living standards of the slow ageing group.

FINANCIAL MARKET CONSEQUENCES : Regarding the financial market implications, large, ageing-induced, changes in global income and savings patterns, allied to a deepening in the degree of financial market integration, will underpin a sustained expansion in worldwide financial flows over the coming decades. This study predicts that these developments, allied to an ever-expanding pool of developed world retirement savings, in search of higher returns and the benefits of a diversified risk portfolio, will result in significant changes in the balance of payments / net foreign asset positions of countries. This is expected to lead to both a worldwide decline in rates of return of the order of $\frac{3}{4}$ of a % point over the next 50 years⁷⁴ and the emergence of periodic bubble conditions similar to those experienced in Japan and the US in the late 1980's and 1990's respectively, due to the ongoing restrictions on international capital flows between the developed and developing worlds⁷⁵. These predictions draw heavily on an analysis of current account trends over the period 1970-1998 which suggests firstly, that demographic developments have become an increasingly important determinant of changes in global current accounts; secondly, that significant restrictions on capital movements to large areas of the developing world impacted strongly on the volume and the geographical destination of external capital flows over this period; and finally, that it was the combination of these restrictions and the widening in growth rate differentials in the developed world in favour of the US, that resulted in a disproportionate share of the additional age-related capital flows being absorbed by the US, especially in the 1990's.

TWO-PRONGED POLICY STRATEGY : In terms of a suggested policy strategy, it is important to underline that ageing constitutes a global policy challenge, with country differences, to a large extent, being those of degree and timing rather than the overall direction of change. This paper suggests that the negative real and financial market effects of ageing can to a large extent be avoided by a two pronged policy approach :

- firstly, those developed world economies particularly affected by ageing need to take the necessary measures to offset the negative effects of this phenomenon on their potential growth rates and in so doing help to reduce their domestic savings-investment imbalances; whilst,
- secondly, the world needs more, not less, globalisation which in essence implies that the present reach of the international capital markets must be extended to encompass those areas of the developing world which are at the moment largely cut off, most notably in the case of the slow ageing group of countries which presently account for nearly 60% of the world's population and in 2050 will account for 70%. To achieve this the developed world must be prepared to engage more actively with these countries, with a willingness to accept the short run transitional costs associated with such an engagement process. More importantly, the developing countries themselves must show a willingness to adopt the confidence enhancing measures necessary to allow this process of resource transfers to be initiated in the first place.

REFORMS NEEDED IN THE AGEING DEVELOPED WORLD : In terms of a suggested policy strategy for ageing developed economies, it is clear that they will have to adopt

⁷⁴ Additional declines in rates of return are predicted in the event that governments decisively shift towards funded pension systems.

⁷⁵ These "bubbles" are timely reminders of the dangers of a world financial system which continues to be dominated by flows to and from the developed world economies.

a range of macro and structural policy actions to moderate the economic burden of ageing. In the specific case of the EU, in terms of fiscal policy, the broad framework for ensuring budgetary sustainability, in the face of substantial age-related spending pressures, appears to be in place in the form of the Stability and Growth Pact⁷⁶. With regard to the degree of readiness of the EU's labour markets to withstand the inevitable change which is looming, increases in labour force participation rates, reductions in structural unemployment and an increase in the EU's effective retirement age from less than 60 at present to the statutory age of 65 are all highly desirable reforms⁷⁷. Finally, the EU must also continue to promote higher factor productivity growth through structural reforms aimed at both enhancing allocative efficiency and at increasing the flexibility of goods, services and capital markets in the EU, whilst simultaneously acting to ensure more open and competitive trading conditions at the global level. The simulations in section 4.1 suggest that the economic impact of the "greying" of the population over the next 50 years will only become unbearable for the EU in the event that its labour markets⁷⁸, and by implication its tax and social security systems, remain in their present state and if reforms of EU public pension systems are not a priority for action.

In the context of reforms to the EU's pension systems, one of the most important conclusions from this analysis is the need to highlight the challenges presented by a partial shift to funding if EU Member States fail to enact fundamental labour market reforms⁷⁹. In the absence of such reforms, a shift to funding, which leads to a significant build-up of financial assets in EU pension funds, could result in an excessively large proportion of those additional assets being invested outside the EU since the underlying growth outlook in the domestic economy is expected to deteriorate considerably. Under this scenario, while the holders of these financial assets will gain in the form of higher external rates of return, the EU's productive capacity will be negatively affected by both the lower investment rates and the potential loss in terms of embodiment effects associated with a less modern EU capital stock. However, by firstly introducing a package of labour market reforms, ECFIN's model predicts that a significantly higher proportion of the additional pension fund assets generated from a partial shift to funding would be invested in the EU, due to the improved domestic growth environment.

HANDLING THE GLOBAL DIMENSION OF AGEING : Regarding policies at the international level, this paper strongly endorses the view that developed and developing countries have a vested interest in promoting the benefits of a more integrated world. Ageing demands more, not less, globalisation over the coming decades with closer worldwide ties needed to effectively channel the expected, ageing-induced, current account surpluses from the more developed regions of the globe to those areas in need of large capital inflows to fund their income convergence

⁷⁶ Fiscal policy will need to be closely scrutinised in order to be able to cater for the inevitable age related spending pressures which will emerge, without provoking the development of unsustainable deficit and debt positions and significant disincentive effects in relation to work effort and labour supply decisions.

⁷⁷ As shown in Mc Morrow and Röger (2002), an increase in the effective retirement age is the single most potent policy instrument for alleviating the effects of ageing.

⁷⁸ As shown in section 4.1, over 80% of the gains in the comprehensive reforms scenario emanate from the proposed changes to EU labour markets.

⁷⁹ Shifts to funding should also, of course, be accompanied by reforms of the PAYG system, with the minimum requirements being a stabilisation of the equilibrium contribution rate for PAYG contributors and a series of system design changes aimed at reducing disincentives (most notably ensuring actuarial fairness) and increasing the overall transparency of the system.

ambitions. An efficient allocation of these increased capital flows is essential not only for the economic convergence prospects of developing countries, in terms of capital accumulation and the diffusion of technological progress, but also for the risk diversification and specialisation strategies of developed economies and for income smoothing purposes in a situation of ageing populations. The simulations in section 4.2 show clearly the mutually beneficial nature of such a two-way symbiotic partnership between the developed and developing worlds. Truly integrated financial markets at the global level would provide not only an efficient mechanism for a more rationale allocation of scarce capital resources, but they would also lead to higher rates of return on external investments; to less financial bubbles; and finally, to a more sustainable globalisation process based on income convergence for the currently less developed regions of the world.

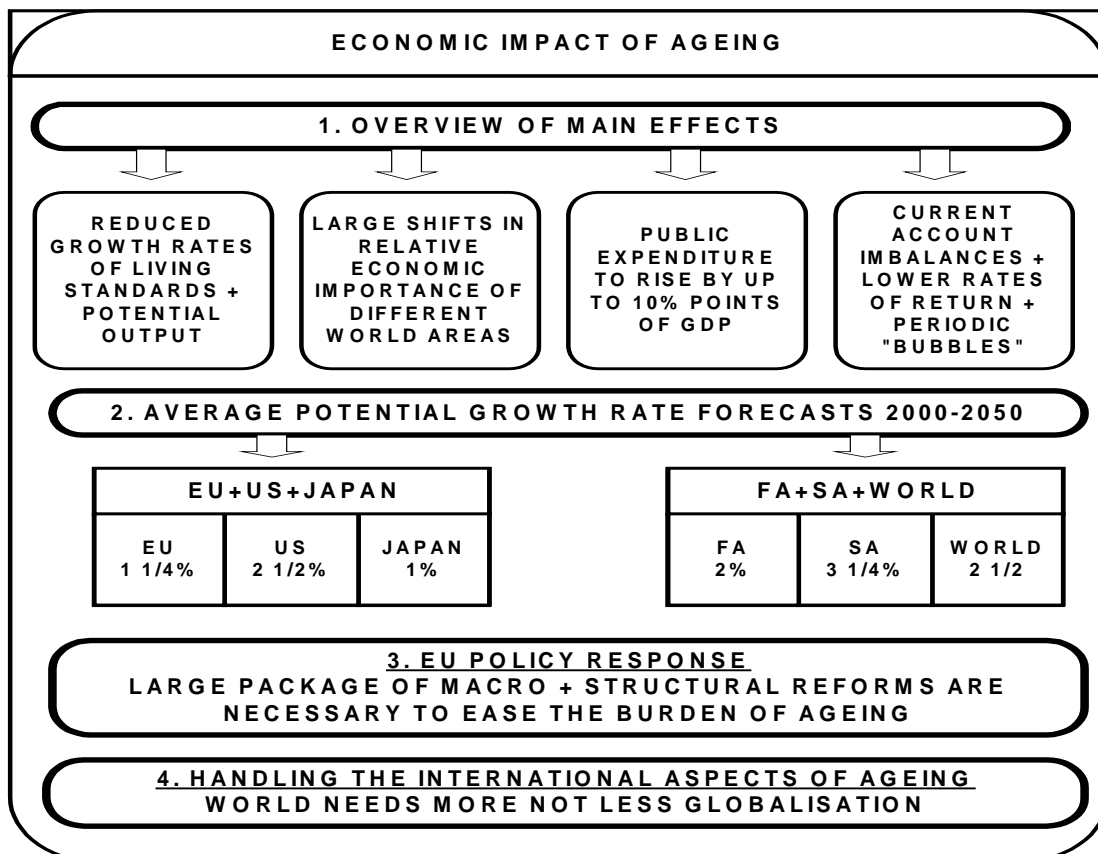
In this regard, it should be underlined that globalisation is not an inevitable process, it is one which is based on a combination of firstly, the desire of policy makers' to liberalise their economies based on their assessment of the gains from this process and secondly, the ongoing influence of technological advancements in facilitating an expansion of business opportunities at the worldwide level. While the present globalisation process appears more institutionally secure this time around (WTO, IMF, World Bank), it must be constantly nurtured, especially now that the optimism of the 1990's regarding technology and global economic prospects has given way, at least temporarily, to uncertainties and global instabilities. In addition, following Japan in the late 1980's and the US in the late 1990's, and given the projections for the coming decades, it is clear that the efficient worldwide allocation of age-related current account surpluses must now be considered as a serious and growing global policy concern.

CONCLUDING REMARKS : The choice now facing the EU, and indeed the ageing world in general, is how it should address the effects of a significant structural determinant of its long run growth trend, namely ageing. If policies do not change, and especially if labour market reforms are not rapidly and systematically introduced, then the countries affected will experience a very sharp downturn in the growth of their living standards and in their underlying potential growth rates. To offset these effects, from the analysis in this paper, the authors would strongly urge governments to :

- **Firstly**, focus their policy efforts on alleviating the negative growth effects of ageing, with many other issues, such as fiscal sustainability, being simply an indirect manifestation of the underlying growth problem;
- **Secondly**, to realise that there are no “quick fixes” available to reduce the inevitable economic burden of ageing. With the number of older people projected to grow relative to those of working age, the share of the population contributing to economically measurable productive activities is reduced. Increases in productive capacity or the foregoing of current consumption (i.e. increased saving), represent the essential means available for economies to attenuate the pressures of ageing on future working-age populations⁸⁰;

⁸⁰ In other words, in the absence of productivity improvements, age-related reductions in per capita living standards over the next 50 years are inevitable with the increase in dependency ratios ensuring that greater numbers of people will be drawing on the output of a smaller productive sector. In these circumstances, policy-makers will need to increasingly face up to the painful intertemporal transfer choices to be made in order to address the effects of ageing for future living standards i.e. how much should the present generation transfer in terms of physical and human capital in order to ensure that the retirement of the “baby boom” generation doesn't pose insurmountable problems. In addition, these choices invariably touch on the question of intra-

- **Thirdly**, to adopt a multi-faceted policy strategy since there is no single best solution, with respect of the risk diversification principle in policy formulation and actions to promote the overall flexibility of economies⁸¹ being vital for ultimate success;
- **Fourthly**, to understand that whilst opportunities in emerging markets can provide some relief for ageing developed economies, a successful strategy hinges on having a large “home-grown” component, with political support for reform dependent on better-informed citizens⁸² being presented with credible and consistent policy measures, many of which may need to be phased in gradually rather than abruptly;
- **Finally**, policy makers, whilst remaining conscious of the challenges posed by ageing and the need for effective policy actions rather than further analysis, also need to keep the negative growth effects of this phenomenon in perspective, especially since historically economic policies have been substantially more potent than demographics in shaping the economic fortunes of economies.



and intergenerational burden sharing and the extent to which the political underpinnings for resource sharing, both within and across generations, will be able to withstand the extent of the age-related transfers which will be involved. This in fact is one of the big unknowns in terms of predicting the future impact of ageing. With an increasing proportion of national resources being transferred to the retired population, it is difficult at this point in time to speculate as to the extent to which these changes in the distribution of societies resources, between the employed and dependent populations, will be capable of being resolved without periodic, inter-generational, conflicts.

⁸¹ The large changes in consumption patterns which will be induced by ageing will require enhanced flexibility in economies if the required sectoral shifts in labour demand are to be successfully realised.

⁸² The problems of the present approach to retirement income provision need to be highlighted more to citizens, especially the fact that in many countries this approach is often ineffective, fragmented, unequal and ultimately is not viable.

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