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Setting targets for government budgets in the pursuit of intergenerational equity

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Setting Targets for Government Budgets in the Pursuit of Intergenerational Equity [a]

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Abstract

The Stability and Growth Pact (SGP) adopted in 1997 originally set budget balance as the medium-term objective (MTO) for all EU Member States, to create a safety margin under the 3% of GDP deficit ceiling. In a reform in 2005, MTOs were made country-specific and dependent on initial debt and the potential growth rate. They were agreed for a transition period, until the criteria for taking into account implicit pension liabilities under ageing populations were established. Preparations for this are currently (early 2009) ongoing. – Against this backdrop this paper explores possible benchmarks for setting MTOs under alternative rules for the public pension system, based on the principle of 'actuarial neutrality across generations'. The effects of privatisation of the mandatory pension system are spelled out. – The ongoing revision of the national accounts will establish new accounts for the (implicit) pension liabilities of governments. This will allow targets to be set for explicit and implicit government debt in the light of intergenerational equity. – One of the conclusions to emerge from current trends and policies is that reassessing the generosity of public pensions, especially the generously low retirement age in Europe, will remain high on the political agenda, as otherwise the burden to be shouldered by future generations will continue to increase (JEL codes: H11, H55, H6).

Keywords: Medium-term objectives for government budgets, Public pensions, Population ageing, European Union Stability and Growth Pact.

This paper was written by Heikki Oksanen, Directorate-General for Economic and Financial Affairs.

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Contents

1. Introduction and outline

This paper explores the issue of setting targets for government budget deficits in the pursuit of intergenerational equity in the context of the European Union's (EU) Stability and Growth Pact (SGP), as revised in 2005. The origins and aims of the SGP are first recalled (section 2). The revision in 2005 is then explained, emphasising that the medium-term objectives (MTOs) for government deficits became country-specific and dependent on initial debt and the potential growth rate (section 3). Since 2001 an exercise jointly undertaken by the European Commission and the Member States has produced commonly agreed projections on ageing-related public expenditures over the long term for each Member State, with the second round published in 2006, and the third round in the pipeline for 2009 (section 4). These projections have been used since 2001 to analyse the requirements of the financial sustainability of public finances and made available to the ECOFIN Council Ministers of the EU (section 5).

Next, we specifically address the question of setting budgetary targets under alternative rules for the public pension system, based on the criterion of 'actuarial neutrality across generations' as a benchmark for intergenerational equity, as outlined by Beetsma and Oksanen (2008). The effects of switching to partial funding and privatisation of the mandatory pension system, under a simple model, are spelled out (section 6).

The implications of this simple model for setting fiscal targets are then discussed, focusing in particular on the implicit pension debt of governments. This is interesting in that, in 2005, the ECOFIN Council agreed that MTOs should become country-specific and dependent on initial debt and the potential growth rate, while also agreeing that they were only set for a transition period until the criteria for taking implicit pension liabilities into account under ageing populations are established. The analysis here is designed to explore the possible quantitative implications of such criteria. Special attention is given to the work of the statistical community on the next revision of the national accounts, where new accounts will be established for the (implicit) pension liabilities of governments (section 7).

Given the baseline projections for ageing-related expenditures, the outcome from the *actuarial neutrality* rule outlined in this paper is a significant reduction in explicit public debt, with crucial implications for financial markets. This and wider implications for

global financial flows are briefly discussed (section 8), and the paper concludes with a summary of results and the main implications for policy design (section 9).

2. The Excessive Deficit Procedure and the SGP: origins and aims

When the EU heads of state and government agreed to establish an economic and monetary union with a single currency in Maastricht in December 1991, their primary concern had to be the stability and the credibility of the new currency. Without this, the single currency would not have been able to deliver the advantages of a more efficiently functioning single market to any of the participants. In particular, stability and credibility were indispensable for Germany, which was supposed to give up its strong Deutschmark. To achieve this aim, the new EU Treaty delegated monetary policy to the European Central Bank, with independent status. To eliminate the possibility of irresponsible fiscal policies disturbing monetary policy or the economy in any other ways, sound public finances were made one of the guiding principles of economic policy (Article 4 TEC[1]). This was ensured by prohibiting (1) central bank financing of governments, (2) their privileged access to other financial institutions and (3) the bail-out of debts of any public entity with the help of the European Community or the Member States. In parallel, (4) setting price stability as the primary objective of the ECB was designed to prevent bail-out of debts of a Member State through inflation (i.e. eroding the real debt burden by inflation was eliminated). This arsenal of measures geared to preventing divergences from sound public finances was further complemented in the Treaty with an Excessive Deficit Procedure (EDP), with reference values for deficits (3% of GDP) and debt (60% of GDP). The EDP can ultimately lead to fines being imposed on any Member State that does not correct its Excessive Deficit before the deadline set by the EU Council (Article 104 TEC). The two reference values may well be questioned for their simplicity, but one should note that, according to the Treaty (Article 104), the EDP was supposed to be implemented "with a view to indentifying gross errors", and that discretion was left to the Council of Ministers (ECFIN Council) in using the reference values, as it made it not only possible but even obligatory "to take into account all other relevant factors". Thus,

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[1]   References are made to the Treaty Establishing the European Community (TEC) as in force in 2008; all Articles referred to here originate from the Maastricht Treaty of 1991, and they are essentially maintained in the Reform Treaty under ratification in 2008.

the Maastricht Treaty aimed to strike a balance between the simplicity of the rules required for the political process and the complexity of the underlying economic rationale.

Between the signing of the Treaty and its entry into force on 1 November 1993, the European Union experienced two major currency crises (latter half of 1992 and August 1993). The credibility of the single currency plan was hit hard, and it soon became clear that the decision to establish monetary union was not going to be taken by the end of 1996, the first possible starting date if the majority of the Member States fulfilled entry criteria. However, it then became more and more likely that monetary union would start on 1 January 1999, as the Treaty stipulated that it would start with those countries that were eligible, regardless of how many they were.

Preparing for this eventuality made it necessary to provide further assurances to the German public and politicians that all potentially participating countries would be committed to pursuing sound public finances. The record from the previous 20 years was not encouraging: in the countries that ultimately adopted the single currency public debt had grown from 30% of GDP before the first oil crises in the early 1970s to 60% at the time of signing the Maastricht Treaty, and to above 70% by the mid-1990s. In 1991, it was 100% in Italy and nearly 130% in Belgium — two founding members of the EU — and it continued to rise significantly until 1995. In Germany itself and in France it had risen from around or below 40% in 1991 to nearly 60% in 1995. Thus, the prospects of establishing monetary union on solid ground were not very promising. There was not only the question of whether countries acting (wisely) in their own interest might possibly harm one another (which is one of the issues still debated by experts) but, more fundamentally, some people saw a risk that short-sighted politicians would harm both their own and all other countries by pursuing irresponsible policies.

These fears (although not necessarily put in such straightforward terms at the time) led the German Finance Minister to come up with a proposal for a so-called Stability Pact, which would lead to automatic sanctions for countries with excessive deficits. However, automatism was not legally possible as, according to the Treaty, it is for the Council to take decisions. This eventually led to agreement regarding the regulation "on speeding up and clarifying implementation of the excessive deficit procedure". It set a strict time schedule for the consecutive stages under the EDP, detailed various criteria to be applied in the procedure and established a scale (as a percentage of GDP) of eventual fines. "As a

rule" appeared in a couple of strategic places in the text to make it comply with the discretion reserved for the Council. This regulation became the "corrective arm" of what was labelled the "Stability and Growth Pact" to reflect the view of some of the Member States (in particular, France) that the task of the EU fiscal framework was also to support economic activity.[2]

This corrective arm was meant to eliminate irresponsible policies in the short and medium term by ensuring that the sanctions became a credible threat. The other part of the SGP, the regulation "on the strengthening of surveillance of budgetary positions and the surveillance and coordination of economic policies" aimed to prevent excessive deficits by requiring countries to strive for a budget that is close to balance or in surplus in the medium run (the "preventive arm"). The safety margin below the 3% of GDP deficit was designed to allow the automatic stabilisers to do their work, unless the economy falls into a very severe recession. As part of this regulation, euro-area members must submit a "Stability Programme" every year, in which they set out their budgetary path and the underpinning measures for the coming years. The other EU countries submit similar "Convergence Programmes", with the subtext that they are striving to comply with the convergence criteria set for adopting the euro.

Issues relating to the long-term sustainability of public finances in connection with ageing populations were not mentioned in these original regulations. Of course, sticking consistently to balanced budgets (on average over time) implies that in a growing economy (nominal growth is decisive here) debt to GDP ratio converges (slowly) to zero. Thus, such a policy rule, if consistently pursued, has persistent consequences for public debt. However, (probably) the first time population ageing appears in a text submitted to the ECOFIN Council was on 1 May 1998 when the decision to adopt the single currency was taken. The declaration under structural reforms talks about "addressing all aspects of social security systems in view of ageing populations" (ECOFIN Council, 1998). This did not come out of the blue, as groundwork had already been started and published by the Directorate-General for Economic and Financial Affairs (DG ECFIN) of the European Commission (for example in 1996), and by the OECD. Mentioning ageing

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[2] For more details, see Eichengreen and Wyplosz (1998); Fischer et al. (2006) classify the various proposals to amend the Pact; prominent examples are Wyplosz (2005), von Hagen (2002), Fatas et al. (2003), Fitoussi (2002), Blanchard and Giavazzi (2004). The proposals that focus on long-term sustainability are especially relevant to this paper: Pisani-Ferry (2002), Calmfors and Corsetti (2004) and Buiter and Grafe (2004).

populations in the context of moving to full monetary union no doubt gave new impetus to tackling this challenge. In 1999, new reports and studies were published by DG ECFIN, and in late 1999 a working group for ageing populations was appointed under the Economic Policy Committee (AWG/EPC). The first round of demographic and ageing-related public expenditure projections was published in 2001, and the issue of the long-term sustainability of public finances became a permanent item on the policy agenda and in various reports.

3. The revision of the SGP in 2005

The revision of the SGP agreed upon at the ECOFIN Council and endorsed by the European Council in March 2005 was triggered by something quite different from the topics in this paper. But as the opportunity was there, the revision also addressed the issue of meeting the challenges of population ageing.

The SGP had been put on hold at the end of 2003 as a result of the failure to apply the procedure in the case of the Excessive Deficits of Germany and France. Apart from the fact that in many Member States deficits exceeded 3%, the particular issue that triggered the crisis was an issue of a Member State in Excessive Deficit (Germany) that had implemented the recommendations it had received, but exogenous factors had turned out to be more unfavourable than expected and the deficit therefore did not decline. The Commission considered that it was legally obliged to recommend moving to the next stage of the procedure (i.e. one step closer to potential sanctions), while Germany, supported by France, wanted to return to the previous recommendations and revise them (Korkman, 2005, p. 117). This dispute caused a deadlock in the Council, as the required qualified majority was not found under the correct legal procedure for a decision. In the subsequent ruling, the Court of Justice of the European Communities (2004) considered (among other things) that the recommendations can indeed be amended at a later stage by the Council, stating also that this can legally only happen on a fresh recommendation from the Commission (paragraph 92). Thus, under the original SGP the Commission was in a position to block a revision of a previous recommendation by not putting any recommendations on the table, but if it did so the Council was, by a qualified majority, free to decide what it wanted. This was a clarification of the legal procedure under the original SGP, which went against the legal interpretation of the Commission in 2003.

The credibility of the SGP had suffered in the legal dispute. Seen in a positive light, the situation provided an opportunity for a review of the SGP. One of the main outcomes was that the possibility of repeating the steps was made explicit in the revised SGP: it allows recommendations to be revised and deadlines for correcting Excessive Deficits to be extended if unexpected adverse economic events occur. Similarly, the revision comprises several improvements and clarifications on short- and medium-term budget management designed to prevent pro-cyclical fiscal behaviour. Specifically, budgetary adjustment should be judged in terms of the cyclically adjusted balance, net of one-off items and temporary measures.

While implementation of the SGP had so far emphasised public deficits, in the revision "the Council gave due consideration … to safeguard the sustainability of public finances in the long run, to promote growth and to avoid imposing excessive burdens on future generations" (European Council, 2005). Thus, the revised SGP includes special provisions for treating structural reforms, including pension reforms.

It had become obvious that the similarly expressed medium-term objective (MTO) for budget balance for all countries under the original SGP was a simplification without sound economic rationale: it was sufficient to avoid excessive deficits but it was not an economically justified budget balance target for countries in very different positions with regard to initial debt and ageing-related expenditure projections. The joint work on expenditure projections had highlighted that the Member States deviated considerably in this regard, and it became clear that MTOs should be seen as the link from the challenges of population ageing to budget plans for the medium term (until the end of the Stability and Converge Programme period). Therefore, the revised SGP made MTOs country-specific, subject to possible revision in the case of major structural reforms and in any case every four years.

However, it was not yet possible to find a more lasting solution for setting MTOs, and thus they were set provisionally by taking only two factors into account: initial debt position and potential growth. Although references are made to structural reforms in general and ageing-related issues in particular, their implications for the provisional MTOs remained limited, mostly to the adjustment path. Essentially, for countries that already have adopted the euro or participate in ERM-II, the MTO set in 2005 ranges from a minimum of -1% of GDP for low-debt and high-potential-growth countries to balance or surplus for high-debt or low-potential-growth countries (ECOFIN Council,

2005). The baseline adjustment path was determined so that a country that has not yet reached its MTO should reduce its cyclically adjusted deficit annually by at least 0.5% of GDP.

The revised SGP also addressed the impact of systemic pension reforms on MTOs, as a particular issue arises when part of the public pension system is replaced by a private-sector-managed fully funded tier. This issue was triggered by the enlargement of the EU in 2004: Poland's mandatory pension system contained an important second pillar and it became necessary to clarify the rules. In essence, partial privatisation of public pensions triggers an immediate reduction in pension contributions paid to the first pillar while pensions stemming from the previously accrued rights need to be honoured, and therefore expenditures only go down much later, over the ensuing decades. A stock of assets will be built up in the newly established funded pillar, but this will not be part of the government accounts as, according to the decision by Eurostat (2004), funded defined-contribution schemes should be recorded as part of the private sector.[3] To cope with the reform, the government may issue debt, making some of the implicit pension debt explicit. Should this be an acceptable consequence of the reform? The problem for the SGP is that the public deficit and debt increase, while the fall in implicit liabilities due to the reduction of future pension payments from the PAYG pillar is not recognised in the national accounts used for assessing compliance with the SGP.[4]

The result was that the corrective arm of the revised SGP gives some leeway, as follows: "consideration to the net cost of the reform will be given for the initial five years after a Member State has introduced a mandatory fully-funded system", so that during the five years "100, 80, 60, 40 and 20 percent of the net cost of the reform to the publicly managed pillar" will be taken into account (European Council, 2005; for a detailed presentation, see European Commission, 2007). This leeway is indeed very limited as the reference deficit level as a share of the cost falls over time and is restricted to five years only, while the transition under pension reforms typically lasts for decades.

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[3] This decision by Eurostat concerned defined-contribution, funded pension systems that may be managed by the government. It considered that the fund's assets are ultimately owned by the participants, who bear the risk associated with the return on the assets. These systems should therefore be classified in the private sector. With regard to defined-benefit schemes, an important criterion is the degree of funding. The Dutch occupational defined-benefit system is classified in the private sector (as it is fully funded), while the Finnish partially funded mandatory defined-benefit system falls within the general government (as the degree of funding is only about a quarter).

This was one of the issues — a very concrete one — related to population ageing and pension reforms faced by the SGP revision, but it was understood that even more fundamental issues were not satisfactorily resolved. This was openly stated in 2005 by the ECOFIN Council, which said that the new MTOs were set for a transition period until the "criteria and modalities for taking into account implicit liabilities [related to increasing expenditures in the light of ageing populations] are appropriately established and agreed by the Council" (ECOFIN Council, 2005). This transition period was supposed to be at most four years. Setting up the citeria is currently (early 2009) on the table of the committees that prepare ECOFIN Council decisions.

4. Ageing-related public expenditure projections

Although the ECOFIN Council was not yet able, in 2005, to set well-based rules for taking the implicit pension debt into account, serious groundwork had already been done in the EU since 1999 in the Ageing Working Group of the Economic Policy Committee (AWG/EPC). As said above, the first round of demographic and ageing-related public expenditure projections had been published in 2001, and they laid the basis for analysing the long-term sustainability of public finances in various EU reports. The Stockholm European Council in 2001 had agreed on a three-pronged strategy to ensure the sustainability of public finances and public policies vis-à-vis ageing populations by (i) reducing debt at a fast pace; (ii) raising employment rates and productivity; and, (iii) reviewing and, where necessary, reforming pension, healthcare and long-term care systems. These had also become regular features in the Stability and Convergence Programmes of the Member States (updated annually), and the second round of jointly produced projections was already in the pipeline in 2005 (Economic Policy Committee and European Commission, 2001 and 2006a-b).

To highlight some of the complex issues stemming from, for example, the diversity of social security systems in the EU, we give here a summary of the challenge of ageing based on the projection round of 2006 (the third will be available in 2009). It provides projections for population ageing-related public expenditures in the EU Member States (EU-25 at the time) from 2004 to 2050 (henceforth referred to as "EPC projections").

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[4] Tabellini (2003) makes this point. Oksanen (2004) presents a numerical illustration of the effect of partial privatisation on public deficit and debt.

They are based on demographic projections, a commonly agreed set of macroeconomic assumptions regarding the labour force, productivity growth and real interest rates, and the policies or policy rules prevailing in 2005.

Pensions are largely unfunded in most EU countries. Before EU enlargement in 2004, only the Netherlands, Denmark and the United Kingdom featured a substantial funded pension pillar.[5] If strictly applied, a pure PAYG pension system implies that contributions into the system exactly match pension payments. Such a system thus affects neither the government's deficit nor its debt. However, the consequence of increasing expenditure under a pure PAYG system is that over the coming decades PAYG pension contributions (or other taxes) have to increase substantially. Cumulating all ageing-related expenditures, we see that the projected increase by 2050 is 5%-points of GDP (or more) in half of the EU Member States (Economic Policy Committee and European Commission, 2006a-b). If this were to be financed from current tax revenues, then the statutory tax rates would have to increase by at least 8-10%-points (depending on the tax base). This raises serious questions about the negative consequences of such tax hikes, including lower labour supply and tax evasion. Thus, one of the first lessons is that "sustainability of public finances" is not something that in essence can be defined solely with reference to deficit and debt. Broader issues of acceptability and feasibility of the tax rate technically required to cover the projected expenditures also need to be covered by the analysis.

In 2004, EU-25 pension expenditures were on average 10.6% of GDP, ranging from 4.7% of GDP in Ireland to 14.2% in Italy. The average increase in the EU-25 by 2050 is a relatively modest 2.2%-points of GDP. This is much less than the increase in the old-age dependency ratio, which (other things being equal) would imply an 8.1%-point increase in expenditure. The countervailing factors are a projected increase in the employment rate of prime-age workers and in the retirement age, and, notably, a decrease in the average pension relative to the average wage. The projected average expenditure

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[5] Economic Policy Committee and European Commission (2006a), pp. 52-56, provides an overview of European pension systems; Economic Policy Committee and European Commission (2006b), pp. 28-31, contains a scheme of the pension reforms in the EU. See also Whiteford and Whitehouse (2006). In Finland, the statutory pension system is 20-25% funded, and consists of investments mainly in assets other than Finnish government bonds. It is classified within general government accounts; consequently (e.g. in 2006), while gross public debt was 39%, net debt was negative, at -24% of GDP (Ministry of Finance of Finland, 2007).

increase of 2.2%-points of GDP also conceals large differences between Member States, from a 5.9%-point decrease in Poland to a 12.9%-point increase in Cyprus.

Healthcare and long-term-care expenditures are projected to rise, on average, at roughly the same relative speed as pensions. The dispersion across countries is smaller than for pensions, presumably partly because a common methodology was applied to projecting these costs.

Based on ageing-related expenditure projections, and taking into account current deficit and debt ratios, the European Commission (2006, pp. 86-87) classifies EU Member States into three groups as regards risks to the sustainability of public finances: (1) "high-risk": the Czech Republic, Greece, Cyprus, Hungary, Portugal and Slovenia, where the projected increase in pension expenditure ranges from 5.6 to 12.9%-points of GDP; (2) "medium-risk": Belgium, Germany, Spain, France, Ireland, Italy, Luxembourg, Malta, Slovakia and the UK, where the projected increase ranges from zero to 7.4%-points of GDP; and (3) "low risk": Denmark, Estonia, Latvia, Lithuania, the Netherlands, Austria, Poland, Finland and Sweden, where the projected change ranges from a decrease of 5.9% to an increase of 3.5%-points of GDP.

The EPC projections should be regarded with considerable caution. For example, the significant decreases in projected expenditures, notably in Poland, Estonia and Malta, and the very small increase for Italy, stem from the policy rules in force in 2005. There is serious doubt, however, about the *political sustainability* of those rules (and possibly also their interpretation). This doubt mainly concerns the indexation of pensions: the rule that is formally in place (e.g. price indexation only), and therefore assumed for the projection, may not be politically sustainable.[6]

The EPC projections do show, however, that ageing-related public expenditures pose a severe challenge to almost all EU Member States. In this paper we refer to EU-average figures for illustrative purposes, while a closer analysis would require a careful look into the EPC projection for each Member State separately.

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[6] Poland is an example: in 2005 the indexation rule was changed to inflation only, abolishing the partial indexation to real wages. In line with the common methodology, the projections were based on this new rule, implying a significant reduction in projected replacement rates. However, the original indexation rule was restored in 2007 (Republic of Poland, 2008). As even the restored rule can be regarded as conflicting with the basic principles of the Polish Notional Defined Contribution system,

5. Using expenditure projections for the 'sustainability gap' indicator

Soon after completing the first round of ageing-related expenditure projections in 2001, these projections were used to construct a quantitative indicator for the long-term stability of public finances along the lines of Buiter (1985). An indicator called 'sustainability gap' is based on the constant tax rate that would fulfil the intertemporal budget constraint (ITBC) of a government, given the projected expenditures and servicing the current debt. This tax rate is compared to the current tax rate, and the difference is called the gap (see European Commission, 2006; also Buiter and Grafe, 2004). The gap derived from an infinite-horizon calculation is now more prominent, while a gap derived from a calculation up to 2050 was first used. The Board of Trustees of the US Social Security System (Board of Trustees, 2007) uses the same method.

However, it is by no means self-evident that this indicator is an exhaustive measure of the distance from 'sustainability'. To start with, for a given projected expenditure increase an infinite number of tax rate paths exist that fulfil the ITBC of the government, while the scenario with a *constant tax rate* is only one of them. We have already noted above that the standard pure PAYG rule is one of them: taxes are increased along with the increase in expenditure. This, combined with a rule to keep the public debt ratio constant, is certainly one scenario that technically fulfils ITBC of the government. Thus, there are several arguments for looking at a broader range of tax rate scenarios. First, the required tax increases may not be economically feasible (due to distorting labour supply, for example, or even moving the system to the right of the peak of the Laffer curve). Second, subsequent generations generally differ from each other with regard to their fertility, longevity, retirement age and pension benefits. Hence, to achieve intergenerational equity, one might envisage that they also pay different pension contributions and other taxes (Sinn, 2000 and 2004). Third, it is possible that MTOs should not be set solely on the expenditure projection based on current policies. It might well be that for many EU Member States the emphasis should first be put on designing reforms that reduce these expenditures (e.g. European Council, 2005), and MTOs should only be based on the revised projections. When designing a comprehensive policy

one may reasonably expect further changes to the indexation rule or occasional increases in pension payouts.

package, alternative calculations for MTOs could be made conditional on several reform options.

It is clear, as is also acknowledged by the European Commission (2006, p. 21-22), that the SGP incorporates intergenerational equity neither explicitly nor systematically. One reason for this is that distributional issues are a matter of political preferences expressed and implemented at national level — taking actions affecting the fundamental principles of national social security is even explicitly excluded from the competence of the European Union (Article 137 TEC; this is maintained in the Reform Treaty of 2007, which is pending ratification). A further reason is the lack of data: since the EPC projections do not provide data by age cohort, they do not allow the link to be examined between the costs and benefits of each subsequent generation.

However, pensions (and other ageing-related expenditures) are a large item in government budgets; they deeply concern intergenerational burden sharing and are thus tantamount to rolling over public debt from one generation to the next. There is therefore a compelling case for analysing alternative policy options from the point of view of intergenerational equity. The aim of the following section is to provide a simple overall framework to take account of the intergenerational equity embodied in the public pension system when establishing fiscal targets.

6. The intergenerational distribution of costs under alternative fiscal rules

This section is based on a model presented by Beetsma and Oksanen (2007, 2008) to address the consequences, under population ageing, of different fiscal and pension arrangements for public deficits, public debt, implicit pension liabilities and the balance of contributions and benefits per generation. The formal presentation is kept to the minimum here, and also only the main implications are described.

We deviate from standard analyses of public pensions system that assume that they are operated on a pure PAYG basis (i.e. that the contribution rate is determined by expenditure). Instead, an important starting point in this instance is that, under population ageing and changes to the rules for public pensions (partly brought about by the former), maintaining a pure PAYG system does not necessarily have a solid foundation. The argument in Beetsma and Oksanen (2008), as earlier put forward by Sinn (2000) and Oksanen (2004), goes as follows: under a pure PAYG with fixed parameters, if fertility

declines and/or longevity increases to a permanently new level, the first generation with the new demographic characteristics will gain at the expense of all future generations, as it will have paid the contributions determined by the longevity of the previous generation but will enjoy the benefits over a longer retirement period (this is a generalisation of the inference concerning the windfall to the first generation(s) when a pure PAYG system is established). To correct this unequal treatment, some of the policy parameter values should be changed: if the benefit rates are maintained, the contribution rate should be increased immediately it becomes evident that fertility has declined and longevity is increasing; or the future benefits should be reduced by decreasing the pension accrual rates and/or by increasing the retirement age. The principle that similar generations should pay the same price for similar pension benefits opens up a wide range of reform options, with the salient feature that the system may no longer continue as a pure PAYG, but may move to partial funding. More specifically, it may accumulate either assets or debt, even permanently (debt should be accumulated if the accrued rights in the public pension system are significantly reduced, for example, in the context of privatisation while respecting the rights accrued before the reform; this means that the implicit debt becomes explicit).[7]

Description of the pension model

In the model, workers are identical, they work for a certain number of years and they receive a pension when they retire. We study the effects of fertility decline and longevity increase. Retirement age and pension accrual (and hence replacement rate) may change. Fertility per person is f children. Pensions can be partly (or fully) financed out of current workers' contributions or they can be partly (or fully) financed out of the assets accumulated from contributions in the past. The discounted pension benefits to be

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[7] The argument above is different from the arguments put forward, for example, by Kotlikoff (1997) and Feldstein and Samwick (2002) that privatisation and funding provide efficiency gains to be shared between the current and future generations. If valid, their arguments also apply without population ageing, while the argument above should prove that there might be a case for moving to partial funding under population ageing just for the sake of neutral burden sharing, even without the possible efficiency gains. — Orszag and Stiglitz (2001) rightly point out that moving to partial funding of public pensions means pre-funding in the broad sense so that the system accumulates assets, while establishing individual accounts is a separate matter. — The neutrality principle referred to here is more generally applicable than Musgrave's (1986) 'fixed relative position' rule for a pure PAYG system, as promoted, for example, by Esping-Andersen et al. (2002). It is worth emphasising here that a mandatory public pension system (for paternalistic elimination of people's short-sightedness, and to avoid free riding under social insurance based on Rawlsian principles) need not be a pure PAYG, but that it can be funded to any degree, and this degree can also change over time.

received by current workers are termed the "implicit pension debt" (*IPD*, also called "accrued-to-reference-date liability") of the public sector.

The key variables and parameters are best defined with the help of the consolidated public sector (government including the pension system) instantaneous simplified budget constraint: it owns (net) financial assets A_t in period t (public debt amounts to negative assets), and all taxes are levied on the wage bill.[8] The budget constraint is

(1) $$c_t w_t L_t + (\rho_t - 1) A_{t-1} = \pi_{t-1} w_t R_t + A_t - A_{t-1},$$

where c_t is the tax rate, w_t is the (gross) wage rate,[9] L_t is the "effective" labour supply of workers in period t, ρ_t is the financial market interest rate factor (the interest rate is $\rho_t - 1$), π_{t-1} is the pension accrual rate and R_t is the "effective" number of the elderly. Here, $L_t = l_t \tilde{L}_t$, where $\tilde{L}_t$ is the number of new entrants to the labour force in period t, and l_t is the number of years spent in work in period t, divided by the number of years spent in work in the reference period 0. Further, since periods refer to generations here, and as the number of years during which a pension benefit is received generally differs from the number of years that individuals pay contributions to the pension system, we define σ_t as the number of years spent in retirement in period t divided by the number of years spent working in period $t-1$, i.e. $R_t = \sigma_t L_{t-1}$. Finally, $\rho_t = (1 + g_t)(1 + \mu_t)$, where $1 + g_t = \dfrac{w_t}{w_{t-1}} \dfrac{L_t}{L_{t-1}}$ is the wage bill growth factor, and $\mu_t > 0$ is an exogenous mark-up of the financial market interest rate factor on the wage bill growth factor. Hence, μ_t is not influenced by the demographic shocks considered below.[10] The accrual rate as a share of the wage net of contributions, π_{t-1}^n, is set by policy. Using π_{t-1}^n, one then derives the appropriate accrual rate π_{t-1} as a share of the gross wage w_t.

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[8] For convenience, we label all primary revenues of the public sector as "taxes", even though in our model they consist mostly of pension contributions. The reason is that primary revenues also include taxes collected (from wages) to service the initial explicit debt of the government.

[9] From now on, "wage" stands for "gross wage" — that is, the wage before pension contributions are paid.

[10] Note that for setting up the accounting framework, the expression for the interest rate is merely an identity; for the main results below, however, we need to assume that μ_t is exogenous.

Pure PAYG and constant debt ratio

We first spell out the policy rule that keeps the financial position of the public sector unchanged (i.e. assets as a share of the total wage bill are kept constant at a level $\bar{a} = a_0$). The total tax rate then consists of a component that covers the current pension outlays and a second component that captures the cost of debt servicing so that a_t is kept constant. This implies that (under the assumption of positive wage bill growth) the budget balance is in deficit (surplus) if government net assets are negative (positive).

A new policy rule: actuarial neutrality across generations

Now, we introduce the following *policy rule:* starting from the current period, for the (known or projected) demographic characteristics (fertility, retirement age and longevity) and pension accrual pertaining to current workers and the interest mark-up projected for the next period, the tax rate is set at a level that will be indefinitely sustainable under the hypothetical situation that no changes to these factors will occur in the future. This rule essentially stipulates that, from now on, (hypothetical) identical generations will be treated identically by the government. Note that we do *not* assume that these factors will remain unchanged indefinitely. Rather, *the rule* amounts to how the tax rate is determined from now on as a function of the demographic variables, pension policy parameters and the interest mark-up. If and when one or more of these factors change for a new generation of workers, the same principle as just defined applies again. For example, when the life expectancy of a new working generation is projected to increase, the tax rate on this generation's income is raised. We now derive the formula for setting the tax rate implied by *this rule*.

Where applicable, a superscript t indicates that the variable is based on the information available in period t. For example, μ_t^t denotes the interest mark-up in period t known in period t, while μ_{t+1}^t denotes the interest mark-up projected for period $t+1$ under the information available in period t.[11]

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[11] For clarity, we also attach a superscript to the length of the working life variable, l_t^t, to indicate that it is the value known in period t when the tax rate for workers in that period is determined. Variable θ below also carries a superscript as for each period it has both an 'ex ante' and an 'ex post' value; for a detailed explanation of our rule, see the *Appendix*.

We define θ as the *IPD* as a share of the total wage bill. For the burden from the past (period *t*-1) and given the (known) parameter values in period *t*, it is

$$(2) \qquad \theta_{t-1}^t = \frac{IPD_{t-1}^t}{w_{t-1}L_{t-1}^{t-1}} = \frac{\pi_{t-1}\left(l_{t-1}^{t-1}/l_t^t\right)\sigma_t^t}{\left(1+\mu_t^t\right)f_{t-1}},$$

while for period *t*, given the known parameter values and those projected for *t*+1, it is

$$(3) \qquad \theta_t^t = \frac{IPD_t^t}{w_t L_t^t} = \frac{\pi_t \sigma_{t+1}^t}{\left(1+\mu_{t+1}^t\right)f_t}.$$

Higher fertility *f* and longer working life *l* raise the total wage bill and hence reduce the *IPD* as a share of the wage bill. An increase in the pension accrual rate π or a (projected) increase in the number of years in retirement relative to the length of working life σ naturally raises it. An increase in the interest rate mark-up implies heavier discounting of future liabilities and thus has a depressing effect on θ.

Using the above expressions, the tax rate implied by the new *policy rule* is found to be (see the *Appendix* to Beetsma and Oksanen, 2008):

$$(4) \qquad c_t^a = \mu_{t+1}^t \left[\left(\frac{1+\mu_t^t}{1+\mu_{t+1}^t}\right)\left(\theta_{t-1}^t - a_{t-1}\right)\right] + \theta_t^t.$$

Hence, each generation of workers first contributes to the public accounts to share the burden stemming from past decisions on pensions and other expenditures and revenues by paying the interest mark-up on the sum of implicit pension liabilities and explicit public debt (possibly corrected for a change in the mark-up — see the first term on the right-hand side), and then pays the full present value of its own future pensions (the second term). An increase in the length of the working life $l_t^t > l_{t-1}^{t-1}$ implies that the *IPD* accumulated in the past is shouldered by more labour input, which means a reduction in the contribution rate.

Now that we have shown these implications of our *policy rule* we label it as *actuarial neutrality across generations*: the burden of initial explicit and implicit public debt is shared equally between current and future generations and each generation covers the actuarial value of its own future pensions. Like any actuarial calculation implementation

of the *rule* is partly based on fixed policy parameters (e.g. the pension accrual rate and the retirement age) and partly on projected values (longevity and interest rate).

The expression for the tax rate in equation (4) is applicable for any changes, permanent or temporary, in the demography, retirement age, generosity of pensions and interest rate margin in subsequent periods. Under this *rule*, while respecting the rights of current retirees regardless of what they paid for them, the balance of pension contributions and benefits of each generation, starting from the time at which this *rule* is first implemented, is entirely separate from the characteristics and pension policy choices of other generations. The *rule* and its implications can be viewed as a natural benchmark for neutral treatment of different generations by the government. This contrasts with pure PAYG pension financing, which generally produces systematic redistribution across generations under population ageing.

An important implication of our *rule* is that the sum of explicit public debt (-*a*) and implicit liabilities as a share of the wage bill (labelled the "total debt ratio") evolves as follows:

$$(5) \qquad \theta_t^t - a_t = \frac{1 + \mu_t^t}{1 + \mu_{t+1}^t} \left[\left(l_{t-1}^{t-1} / l_t^t \right) \theta_{t-1}^{t-1} - a_{t-1} \right].$$

This equation thus implies that the total debt ratio remains constant if $\mu_t^t = \mu_{t+1}^t$ and $l_{t-1}^{t-1} = l_t^t$. An increase in the length of working life or an increase in the interest mark-up implies a reduction in total debt. Other things being equal, higher implicit liabilities (a higher θ_t^t) require higher pension contributions, which implies an offsetting reduction in the public debt. Note that (5) is applicable under any initial degree of funding, which then evolves as a function of factors in the formula for c_t^a. In particular, if the system were initially fully funded, it would remain so under the *actuarial neutrality rule*.

The calibration

Our numerical examples are largely based on the following stylised calibration taken from Oksanen (2005). The unit period corresponds to 30 years, which is roughly the average childbearing age of women in Europe. It is also roughly the average age difference between a retired person (70) and a worker (40). Throughout, we assume that the annual growth rate of the nominal wage per worker is 3.28%, which stems from a

unit real wage growth rate of 1.75% and an inflation rate of 1.5% per annum. The interest rate mark-up over the growth of the total wage bill is 1.5%-points per annum.

The economy starts in period 0 in a steady state in which people work for 40 years and spend 18 years in retirement (hence, $\sigma_t = 0.45$). These figures are thus used to scale pension contributions and pensions to correspond to realistic figures, although the formal model works with a 30-year period. Fertility, moreover, initially preserves a constant population. Further, the unit pension is initially set at 55% of the wage after pension contributions (i.e., $\pi_{t-1}^n = 0.55$, see *Appendix*), so as to make the initial figures comparable with those for 2004 in the EPC projections. Initial public debt is 60% of annual GDP.

Period 1 includes both a 20% fall in fertility (roughly corresponding to a fall from 2.1 children per woman, which is needed for full replacement, to 1.7, which is close to the current average in Europe) and an increase in longevity by three years (this corresponds to one year for each ten-year period). Period 2 includes a further increase in longevity by three years. This allows us to match quite closely the assumptions regarding the increase in longevity in the EPC projections for the EU average (an increase in life expectancy (at birth) for males (6.3 years) and for females (5.1 years) from 2004 to 2050).

The numerical results

We skip here the results for the pure PAYG and concentrate on the time paths of the most relevant variables under various policy options that observe the *actuarial neutrality rule*. We consider two possible policy measures to contain the rising ageing burden: an increase in the retirement age and a reduction in the replacement rate; the tax rate is then residually determined. We also consider (partial) privatisation of the public pension pillar, where the latter is partly replaced by a mandatory, funded private pillar. Most figures are expressed in percentages of GDP, assuming for simplicity that the total wage bill (including pension contributions) is a constant 60% of GDP.

Table 1 illustrates the implications of the *actuarial neutrality* rule. The baseline assumes no change in the generosity of the benefits or in the retirement age. The fall in fertility (via a reduction in the discount rate) and the rise in life expectancy both raise the *IPD* as a share of GDP. In anticipation of this increase, taxes already rise in period 1 (the system moves to partial funding). Hence, the rise in the implicit debt ratio is followed by an

equivalent reduction in the (explicit) public debt ratio (or increase in the public asset ratio), and the deficit turns into a surplus from period 1 onwards in all panels. The surplus is largest in period 1, when the population is affected by two shocks simultaneously (the rise in workers' life expectancy and the fall in the fertility rate). A reduction in the accrual rate (panel 2.1) produces a smaller implicit debt/GDP ratio, thereby requiring smaller surpluses than under the baseline. This effect is further amplified when the reduction in the accrual rate is combined with an increase in the retirement age. The expenditure increase of 2.7%-points of GDP in panel 2.2 in Table 1 roughly corresponds to the EPC projection for the EU.

All actuarially neutral scenarios clearly show that, as long as the demographic change is permanent, the financial position of the government should also change permanently. Depleting public assets once the ageing process has ended is therefore excluded, unless pension accrual is drastically reduced.

Table 2 considers the latter option induced by partial privatisation (possibly in combination with other measures) in which implicit pension debt is swapped for (explicit) public debt. This partial privatisation is implemented with a one-third reduction in the accrual rate expressed as a share of the gross wage rate. Under *actuarial neutrality* taxes paid to the government fall immediately (the contributions to the newly established private second pillar come on top of these taxes). Obviously, as accrued pension rights are respected, public pension expenditure falls only gradually. Comparing the new steady state with period 0, the public debt/GDP ratio falls only slightly (panel 1). In period 1 it exceeds the 60% limit of the SGP, while the deficit ratio in that period remains just marginally below the 3% limit. Adding to this a reduction in the accrual rate leads to a further swap of debt in panels 2.1-2.2, where the deficit ratio is in breach of the SGP in period 1, as is the debt ratio from period 1 onwards.

Table 1: Public finances and pensions under *actuarial neutrality*

Period	0	1	2	3	4	change
1. Actuarial neutrality — baseline: net accrual rate 55%; fixed retirement age						
pension exp/GDP, %	11.9	11.9	16.3	18.2	18.2	6.3
tax rate	21.7	26.4	28.4	28.4	28.4	6.7
public debt/GDP, %	60.0	-25.1	-60.5	-60.5	-60.5	-120.5
IPD/GDP, %	228.5	313.5	349.0	349.0	349.0	120.5
total debt/GDP, %	288.5	288.5	288.5	288.5	288.5	0.0
budget surplus/GDP, %	-1.9	2.5	2.3	1.5	1.5	4.4
2.1. Actuarial neutrality — accrual rate reduced to 48%; fixed retirement age						
pension exp/GDP, %	11.9	11.9	14.6	16.3	16.3	4.4
tax rate	21.7	24.6	26.4	26.4	26.4	4.7
public debt/GDP, %	60.0	8.1	-24.4	-24.4	-24.4	-84.4
IPD/GDP, %	228.5	280.3	312.9	312.9	312.9	84.4
total debt/GDP, %	288.5	288.5	288.5	288.5	288.5	0.0
budget surplus/GDP, %	-1.9	0.8	1.3	0.6	0.6	3.2
2.2. Actuarial neutrality — accrual rate reduced to 48%; increase in working life (40-41-42)						
pension exp/GDP, %	11.9	11.6	13.4	14.6	14.6	2.7
tax rate	21.7	23.5	24.3	24.3	24.3	2.6
public debt/GDP, %	60.0	18.8	-4.3	-4.3	-4.3	-64.3
IPD/GDP, %	228.5	264.1	280.9	280.9	280.9	52.4
total debt/GDP, %	288.5	282.9	276.6	276.6	276.6	-11.9
budget surplus/GDP, %	-1.9	0.2	0.6	0.1	0.1	2.5

Notes: (1) The tax rate consists mainly of pension contributions and is expressed as a percentage of the total wage cost. (2) The final column "change" gives the %-point change from period 0 to the new steady state, except for the budget surplus/GDP ratio, where it gives the %-point change from period 0 to the lowest or highest level.

Table 2: Public finances and pensions under actuarial neutrality: one-third privatisation

Period	0	1	2	3	4	change
1. Actuarial neutrality — 55% accrual rate; fixed retirement age						
pension exp/GDP, %	11.9	11.9	10.9	12.1	12.1	0.2
tax rate	21.7	20.6	21.9	21.9	21.9	0.2
public debt/GDP, %	60.0	**79.4**	55.8	55.8	55.8	-4.2
IPD/GDP, %	228.5	209.0	232.7	232.7	232.7	4.2
total debt/GDP, %	288.5	288.5	288.5	288.5	288.5	0.0
budget surplus/GDP, %	-1.9	-2.9	-0.8	-1.4	-1.4	-1.0
2.1. Actuarial neutrality — accrual rate reduced to 48%; fixed retirement age						
pension exp/GDP, %	11.9	11.9	9.7	10.9	10.9	-1.0
tax rate	21.7	19.4	20.6	20.6	20.6	-1.1
public debt/GDP, %	60.0	**101.6**	**79.9**	**79.9**	**79.9**	19.9
IPD/GDP, %	228.5	186.9	208.6	208.6	208.6	-19.9
total debt/GDP, %	288.5	288.5	288.5	288.5	288.5	0.0
budget surplus/GDP, %	-1.9	**-4.0**	-1.5	-2.0	-2.0	-2.1
2.2. Actuarial neutrality — accrual rate reduced to 48%; increase in working life (40-41-42)						
pension exp/GDP, %	11.9	11.6	9.0	9.8	9.8	-2.1
tax rate	21.7	18.6	19.1	19.1	19.1	-2.6
public debt/GDP, %	60.0	**106.8**	**91.4**	**91.4**	**91.4**	31.4
IPD/GDP, %	228.5	176.1	187.3	187.3	187.3	-41.2
total debt/GDP, %	288.5	282.9	278.7	278.7	278.7	-9.8
budget surplus/GDP, %	-1.9	**-4.4**	-2.0	-2.2	-2.2	-2.5

Notes: see Table 1.

Other ageing-related expenditures

In order to obtain a picture of the overall budgetary consequences of ageing, the above approach to pensions can also be extended to *other ageing-related* expenditures. The most important categories are *healthcare and long-term care expenditures*. In 2004, these were 6.4% and 0.9% of GDP in the EU-15 respectively, while their projected increase by 2050 amounts to 1.6% and 0.7% of GDP respectively (these figures should be regarded as highly uncertain, and the conclusions derived only tentative).

Who benefits from these expenditures and who provides the financing? A stylised fact is that roughly half of healthcare costs benefit the working-age population (including their children), while the other half benefit the elderly, particularly those approaching their final years of life. As the bulk of public expenditure on long-term care is related to the elderly, we simply assume that they consume all of it.

An estimate must then be made of how an increase in longevity affects the volume of healthcare facilities and long-term care services used by the elderly. One extreme assumption is that it increases proportionally with the number of people over, say, 60 years of age. The opposite extreme is that an increase in longevity raises these expenditures hardly at all, as the bulk of these are concentrated in the last few years before death.

As for the financing, we note that public health and long-term care expenditures are normally covered by tax revenues that are also paid by the elderly. The way in which these expenditures are financed thus differs significantly from that of pension outlays, which are typically covered by pension contributions paid by workers, but not by pensioners.

Fortunately, the framework described above is derived from a more general model that we can also apply to other ageing-related expenditure items (see the *Appendix* for details).

Again, we spell out the effects of ageing on expenditures, on taxes on wages and income of the elderly, on debt and on the deficit under the same *rule* as for pensions: after any change, the tax rate is set at a level that is financially sustainable as long as there is no new shock, and, *mutatis mutandis,* revised when such a shock arrives. We also compute

the implicit debt for each period, which is defined as the capital value of these expenditures benefiting the elderly in the ensuing period.

Note that the *policy rule* does not always result in perfect neutrality across generations, as it did for pensions. The reason is the assumption that the same tax rate is applied to the incomes of both workers and pensioners. For example, if the working-age generation were to start consuming a higher amount of healthcare services than the previous generation did, then policy-makers should immediately increase the tax rate. The current elderly will then also pay higher taxes, although they will get nothing in return. Thus, under these assumptions the succeeding generations cannot be treated completely separately.

We consider a scenario where the long-run expenditure increases by 2.3%-points of GDP, roughly corresponding to the EPC projection for the EU average, and combine it with the pension scenario for a moderate retirement age increase and a net accrual rate reduction to 48% (panel 2.2 in Table 1). Table 3 provides the result. The total debt ratio declines relatively little. The conventionally measured government deficit moves from an initial 1.9% of GDP deficit to a surplus of 1.6% over 60 years, while explicit debt declines by almost 100% of GDP over two generations. Although these figures are only illustrative, they are so large that they deserve careful assessment with respect to their policy implications.

Table 3: Overall financial implications of ageing

Period	0	1	2	3	4	change
expenditure/GDP, %	19.2	18.9	22.5	24.3	24.3	5.1
tax rate	31.7	34.8	35.7	35.7	35.7	4.0
public debt/GDP, %	60.0	-8.6	-39.2	-39.2	-39.2	-99.2
net ID/GDP, %	281.3	340.5	362.9	362.9	362.9	81.6
total debt/GDP, %	341.3	331.9	323.8	323.8	323.8	-17.5
budget surplus/GDP, %	-1.9	1.6	1.6	1.0	1.0	3.5

Notes: ID = implicit debt. Further, see Table 1.

7. Possible implications for setting fiscal targets

Consequences of pension reforms for public debt and deficit

We should recall that the fundamental principles of public pensions systems are in the exclusive competence of the Member States in the EU. However, as pensions are the biggest expenditure item in government budgets, they become an object of EU fiscal rules. If and when Member States apply the principle of intergenerational equity along the lines presented above, they might move to partial funding in the mono-pillar pension system, bringing about a significant financial surplus in this part of government accounts. Similarly, if they enter into significant privatisation of their mandatory pension systems, respecting accrued pension rights, a significant proportion of their implicit pension debt might become explicit, bringing about a deficit. As the initial implicit pension debt in most European countries is large, 200-300% of annual GDP, its movements can in realistic and moderate cases be more than 50 percentage points either upwards or downwards over a generation (30 years), depending whether the mono-pillar is maintained or the system is partially privatised. We have shown above that, when also taking other ageing-related expenditures into account, the implication for budget surplus under a mono-pillar system could in a reasonable case be 1.6% of GDP over 60 years, while under one-third privatisation the deficit ceiling of 3% of GDP could easily be breached.

These implications for general government budget balances and debt need to be taken into account when designing the rules for setting fiscal targets, and also when assessing the possible adverse consequences of the EDP ceiling of 3% of GDP for systemic pension reforms.

Both the MTOs under the original SGP set at 'close to balance or surplus' and the provisional MTOs established as a result of the 2005 revision of the SGP, ranging from a deficit of 1% of GDP to balance or surplus, if persistently followed, imply (in most Member States) a reduction in (net) public debt and, hence, safely guarantee the sustainability of (explicit) public debt. This is in the right direction in terms of containing the increase in the financial burden on future generations. This policy line was also endorsed by the Stockholm European Council in 2001 when it called for a rapid reduction of public debt in view of ageing populations.

However, a fundamental question arises here regarding the consistency of public policies: if MTOs set for the general government are based on a rule that does not take due account of the changes in the social security budget brought about by population ageing and pension reforms, those reforms may lose their significance, meaning and intended effects. The first example where this can happen is a pension reform leading to partial funding in the public pension system: if the MTO for the general government is independently fixed at any given number (for example zero), then the surplus in the pension system is squandered by a deficit in other parts of general government. The clear implication, therefore, is that the (planned) surplus in the public pension system should enter as a direct component into the MTO for the general government, thereby making it deviate from zero or any other number set prior to the pension reform.[12]

The second example is partial privatisation of the public pension system: respecting accrued rights and following the *actuarial neutrality rule* for future rights may give rise to a conflict with the excessive deficit ceiling, although how serious this becomes will depend on several other factors. In our stylised examples for one-third privatisation and 60% of GDP initial public debt (Table 2), there is a serious risk that the SGP will not be met.[13]

Lower initial debt gives more room for adjustment. Also, the budget surplus target would be higher under a policy of frontloading taxes to finance the future increase in the costs of healthcare and long-term care. This would counterbalance the negative effect on the budget balance of pension system privatisation. However, the movements induced by partial privatisation can be large, and there may be a rationale to take them specifically into account when setting MTOs. While the revised SGP now recognises the problem with the transitional cost of (partial) privatisation of pensions, the leeway over the 3% of

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[12] If the public pension system is organised as a separate entity, then a separate question arises as to where it should invest. Some authors argue that if pension funds (private or public) invest in government bonds, they are in effect pure PAYG (e.g. Barr, 2004, p.114). Of course, this requires that the government must always issue new debt (i.e. increases the deficit) to accommodate such investment. Whether or not this happens depends on rules and policies. From the perspective of intergenerational equity, investment by a public (private) pension fund in government debt is neutral if net public debt is reduced (kept constant) in response to this investment. Bosworth and Burtless (2004) find that this requirement has been met at state level in the US, while in OECD countries (from 1970-2000) 60-100% of public pension saving at national level was offset by larger deficits in other budgetary accounts.

[13] Note here that the reference scenario is not a pure PAYG mono-pillar system, but a mono-pillar that is first reformed to implement *actuarial neutrality*. The latter would lead to a reduction of the public debt, while the one-third privatisation would turn that around to an increase (compare, for example, panels 2.2 in Tables 1 and 2, respectively).

GDP deficit ceiling is quite limited. Hence, while there might be sound economic reasons for privatisation, it is clear that under otherwise similar policies a country that maintains a mono-pillar system can be much more comfortable with the EDP rules than a country that contemplates and implements partial privatisation of the system. In other words, significant privatisation may lead to an Excessive Deficit and prevent the Member State from adopting the euro. This may create an incentive to abandon or delay a reform to establish a fully funded second pillar.

Measurement and use of IPD estimates

The capital value of accrued-to-date pension rights, labelled here as *IPD*, has a central place in the above framework, and it helps to explain the movements of total government debt and swap between implicit and explicit debt. Obviously, estimating *IPD* is not a straightforward matter. In the 1990s there was some interest in estimating these liabilities (e.g. van den Noord and Herd, 1993), but no systematic updates have been made available since then.

This gap will be filled in a few years' time as the international statistical community is about to finalise its proposals to set up, in the next SNA/ESA revision,[14] new supplementary accounts for accrued public pension liabilities (see Advisory Expert Group on National Accounts (AEG), 2007; also European Commission, 2007, Part II, Section 2.3). Social security pension liabilities will not be inserted into the core accounts, but one of the main pending issues is the treatment of government pension debt vis-à-vis its own employees, which alone can be of the order of 60% of GDP in some EU countries. On the one hand, it is similar to pension liabilities of private sector employers, who are required by law to show it in their balance sheets, and it can be argued that the treatment should be the same for the sake of neutrality, for example, when the cost of labour is compared across sectors. On the other hand, these pensions can be partly or closely integrated with social security pensions, which will be recorded only in the supplementary accounts. How to strike a balance between these conflicting considerations is still a moot point (early 2009). Whatever the solution might be, the supplementary account figures will also be used, depending on the purpose of each exercise. Then, if the definition of public debt were to change to the effect that public

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[14] SNA = System of National Accounts; ESA = European System of Accounts.

debt shifts upwards by 60% of GDP (*IPD* related to government employees), or 200-300% (total *IPD*), the meaning of the reference figures for public deficit and debt would change significantly. The solution could always be that the definitions of public debt and deficit for the purposes of the EDP are different from those for the standard accounts. However, an overall assessment taking into account all the factors required by the Treaty (Article 104) could always benefit from the new data on *IPD*.

Some authors hesitate when it comes to estimating *IPD* and making it public, and are especially worried that it can be confusingly compared to explicit public debt. First, under most public pension systems in Europe, implicit pension rights are not backed by clearly defined explicit commitments. For example, there is often ambiguity about inflation indexation. Second, there is a fear that the official publication of an *IPD* estimate may give those liabilities an explicit nature, so that it becomes more difficult for the government to renege on them. For this reason, Coeuré and Pisani-Ferry (2005) argue against including implicit liabilities in their measure of the net balance position of the government. This worry could be overcome by adding a statement to the official publication of implicit liabilities that the figures are based on current policy and that no legal rights can be extracted from them. Moreover, alternative estimates based on alternative assumptions could be produced to give the baseline figures a less definitive nature.

A counterargument to hesitating to estimate and publish *IPD* is that the process itself would bring about a useful clarification of accrued pension rights. People and politicians may take different views of the content and implications of the prevailing rules on pension rights, but it can even be regarded as a responsibility of the state to clarify its commitments so that private agents are in a better position to plan and execute their own voluntary pension savings. This argument goes beyond pure economic considerations, and needs to be clarified as part of the political process on pension reform. Experts are undoubtedly needed to provide the necessary statistical basis, including clarity about the uncertainty of all estimates.

Furthermore, a debate is ongoing as to how *IPD* estimates should be interpreted. It is considered that a large *IPD* (compared to explicit public debt) does not necessarily indicate a problem with financial sustainability or intergenerational equity. This is true especially if the *IPD* in not growing, and it should be clearly recognised that the figures for public debt and deficit, including *IPD*, would be of a completely different magnitude

than the conventional national accounting figures hitherto. This simply follows from the change in definition, without any change in the underlying economic meaning. The need to become familiar with a new definition should not, however, be an obstacle to broadening the scope of statistical analysis.

It has also been said that, when a new pure PAYG system is established, the *IPD* is quite small at first and therefore fails to signal a problem of sustainability that might well be looming over the long run (European Commission, 2007, p. 99; Franco, 1995; Blanchet and Ouvrard, 2006). The counterargument to this is that in such a case a projection for *IPD* would give just as much warning as the expenditure projection or any indicator based on it. Thus, not only using the current *IPD*, but also projecting the scale of *IPD* could and should be part of any forward-looking exercise, adding useful information to the pure expenditure projection. *IPD* contains useful additional information as to when the right is accrued and by which age cohort.

Furthermore, it should be understood that the *IPD* is not without qualification a stand-alone indicator of the future pension burden. The way the *IPD* could be part of a policy rule among other factors, as explained in this paper, should in principle remove any worries of misinterpreting *IPD* estimates.

Proposed use of the sustainability gap for setting MTOs

Preparations to take ageing-related implicit liabilities into account when setting MTOs, as requested by the ECOFIN Council in 2005, are currently (early 2009) taking place, with the aim of their being implemented in the 2009 round for the Stability and Convergence Programmes. The *sustainability gap* indicators developed since 2001 form the basis for the ongoing deliberations (European Commission, 2008, pp. 106-109). In brief, for the 'gap' the constant tax rate (possibly adjusted for an ageing-related tax component) fulfilling the intertemporal budget constraint (ITBC) of the government under the (commonly agreed) projection for public expenditures (technically to infinity) is calculated. This is then compared to the current tax rate (or the one planned for the end of the medium-term programme period). It has also been (correctly and usefully) explained that the definition of 'gap' incorporates *open-system pension liabilities*, defined as the present value of projected pension expenditure minus revenue up to infinity. Thus, if the gap is closed by the required increase in the tax rate (or decrease in non-ageing-related expenditures) the present value of revenues covers the present value

of expenditures and the initial net debt. In this way, implicit liabilities are taken into account.[15]

Under this approach, the starting point for setting MTOs is to close the sustainability gap by reducing the difference by half a percentage point per year. This would be an ambitious policy line in most Member States, implying a significant budget surplus and reduction of debt. The problem is that this outcome can be questioned, as the 'closing the sustainability gap' rule may be regarded as too simplistic and therefore fail to take account of various other economic factors. For this reason, and also simply because an ambitious policy adjustment can be considered to be politically unrealistic, proposals have been made to make an ad hoc adjustment to the target and close the gap only partially (European Commission, 2008, pp. 107-108). This would mean in most cases that the burden on future generations would continue to increase.

More specifically, one of the problems with the analytical basis for using the 'gap' is that it does not take account of the different characteristics of succeeding generations with regard to fertility and longevity, or their choices in terms of pension system parameters. Therefore, a scenario where the tax rate is constant does not treat generations equally. Setting the tax rate as constant for the calculation of the 'gap' does not follow from the requirement of fulfilling the intertemporal budget constraint (ITBC) of the government. Many other tax rate paths could do this, and some of them can make a better rule for policy. Thus, as a number of relevant components and factors are missing, an ambitious policy proposal could quite easily be rejected. It is unfortunately not easy to remove this problem as age-cohort-specific data is lacking – *IPD* estimates that become available later will help, but this will take time.

A further broader problem is that starting too narrowly from the expenditure projections may shift the emphasis too much to the revenue side of government budgets while, for a number of Member States, designing pension reform and revising policy rules for other ageing-related expenditures is likely to take priority, and MTOs are likely to be based more on the revised projection of expenditures. In other words, starting from the current baseline expenditure projection and allowing leeway for the 'closing the gap' rule may

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[15] European Commission (2006, Chapter I and Annex I), and (2007, Section 2.3); see also Buti and Nogueira Martins (2006), and Blanchet and Ouvrard (2006).

give a comforting signal and divert attention from the need to reform the policies determining expenditures.

In sum, setting MTOs starting from the sustainability gap based on the commonly agreed baseline expenditure projections, whether amended by ad hoc adjustment or not, may not give a solid foundation for establishing MTOs, given in particular that governments need to be able to defend these objectives before their national parliaments. As other factors and broader policy options are missing, further work might still be needed to find a balance between the simplicity of the rule and the need to take complex economic factors into account. The work of statisticians, pension actuaries and economists on *IPD* estimates for now and for the future (under alternative assumptions on the ageing process and policy parameters) could provide further material for striking the necessary balance. It is therefore possible that the methods for taking account of the implicit liabilities to be set in the near future will still be provisional, and improvements will be made when more comprehensive data are made available as a result of *IPD* estimates for the revised national accounts.

8. Wider implications

Based on the ageing-related expenditure projections from the EPC 2006 exercise for an average EU Member State, both the stylised actuarial neutrality rule presented in this paper and the 'closing the sustainability gap' rule would imply a virtual elimination of (net) public debt — the summary example in Table 3 above gives a reduction of around 70% of GDP in 30 years and a further reduction of 30% in the next 30 years. This can be a puzzling result for many observers, and there are several issues that need closer examination.

First, as a significant reduction in public debt is derived from the projections available and the applied *policy rule*, one possible conclusion is that such a scenario is not realistic or desired, and thus something has to give. However, this does not mean that the rule should be rejected, but the outcome could lead to a series of questions as to what should be changed in policies determining the expenditures to arrive at other outcomes that look either more realistic or more politically desirable, or both. This is in essence also the prevailing policy approach as issued by the ECFIN Council: the Member States should

do more to contain expenditures and to reduce public debt (the latter being the same as pre-funding for future expenditures).

Second, there was a 40 percentage point change in the public debt to GDP ratio in the current euro-area countries in the 30 year period 1975-2005 – in the opposite direction. Thus, changes can be quite large over a generation.

Third, the outcome is derived from expenditure projections and policy rules that can be regarded as acceptable, and thus the next step could be to consider whether the drastic reduction in net public debt can be made feasible and realistic. This is not self-evident. For example, public debt instruments can be considered to be available on the market as it is useful for there to be a riskless store of value for private agents (as government paper has been in the Western World for a long time). These provide a benchmark for the rates of more risky assets and liquidity and thereby form a necessary basis for markets to function. Is it then a problem that government (net) debt should go to zero (or negative)? Not necessarily, as the government can still issue debt and play an increasing role as a financial investor. Also, if the move towards establishing public-private partnerships for infrastructure investments were to be partly triggered by the desire to contain the increase in public debt (sparked by SGP rules or not), this reasoning would be reversed and the government would be more inclined to pursue public investment projects without reverting to private financing. Furthermore, partial privatisation of the public pension system is a way of maintaining larger explicit public debt without flouting intergenerational neutrality, as shown above (swapping explicit debt for implicit). These are just brief comments on the various possibilities of dealing with the decrease in explicit net public debt induced by a policy of pursuing intergenerational equity, all of which would require closer examination.

A more complete assessment would require looking into broader macroeconomic consequences. Increased saving in the public sector follows under population ageing from a partial model for the public pension system (both in this paper and in the sustainability gap calculation). In addition, under population ageing people may also save more privately, because, if people spend proportionally more time in retirement when their longevity increases, they will need to save more (if public pensions do not cover all their expenditures). This is implied by an overlapping generations (OLG) model. Increase in aggregate saving means that capital intensity of production increases. The parameters of the public pension system are crucial for the outcome: reduction of the

replacement rate and an increased share of time in retirement increases saving; thus, an increase in the retirement age, for given longevity, reduces saving. To get the basic variables right, one has to note that over the very long term the saving *rate* may decrease: if and when fertility decreases permanently, the rate of growth of the economy will decline, which means that a lower saving *rate* is sufficient to maintain a given, increased capital-output ratio (for a more detailed analysis, see Oksanen, 2009a).

The increase in the capital-output ratio leads to further questions: does it mean that the marginal product of capital decreases, and, if so, is it possible for it to fall below the rate of growth of the economy so that the economy is no longer dynamically efficient? If that were the case, then current consumption could be increased without hurting the consumption of future generations. As to how likely this is to happen will depend on investment opportunities globally. Global savings increased in the last 10-15 years to the extent that Ben Bernanke (2005) called it "global saving glut", with the consequence that real interest rates decreased to close to zero and equity and house prices boomed, especially in the US (and in most European countries). For Bernanke the US current account deficit was partly a consequence of the saving glut in the rapidly ageing industrial countries (especially in Germany and Japan) and in the emerging economies (notably China), but in the longer term, according to him, the financial institutions in the developing world could be made to function more properly so that investment risks would be reduced and capital would start flowing in a more natural direction, i.e. to them rather than from them to the US. In short, for our purposes here, saving due to pre-funding the future ageing-related expenditures in the Western World does not necessarily make it excessive if and when the global financial system improves and makes good use of those savings. This is a big 'if and when' in early 2009, and it does not concern only the developing world but also the US and the rest of the old industrial world.

Whatever the event, if under the assumptions regarding demography and pensions and other ageing-related expenditures intergeneration equity (under actuarial accounting) seems to lead to higher than optimal saving, then it is not self-evident that intergeneration equity should be abolished and the current generation should consume more and leave a rising burden to future generations. The alternative is to increase the retirement age. This would reduce saving and help to eliminate the possible "saving glut", and still achieve intergenerational equity. We thus come once more to the need to take an all-embracing look at setting policy parameters for the pension system and other

public expenditures and the rule for how to share the financial burden across generations, i.e. the path for taxes. This then gives the targets for government deficit and both explicit and implicit debt.

9. Concluding remarks

This paper has explored the issue of setting medium-term objectives for government budgets under the EU Stability and Growth Pact (SGP) and ageing populations. The purpose of the EU fiscal rules and the economic analysis behind them has evolved a lot since the Maastricht Treaty was agreed in 1991. The deficit ceiling of 3% of GDP was designed first to set a benchmark to identify gross errors in fiscal policy, but, to make the single currency project credible and acceptable, it was soon given a more binding status. The primary purpose of 'close to balance or surplus' rule as specified in the original SGP adopted in 1997, was to reduce the risk of breaching the 3% ceiling. This was the same objective for all countries, and therefore it gave no guidance and economic rationale for determining a possible surplus target, although it did not exclude the possibility that the Member States might pursue more ambitious policies (although it may have made it more difficult to find national support for a significant surplus, as the reference target from the EU and in most Member States was zero).

When the SGP was revised in 2005 it was commonly accepted that Member States differed appreciably, and economic reasoning required making the budgetary objectives country-specific. However, the provisional MTOs for the first four-year period did not make any great differentiation and remained close to the original figures. This was accepted, as the "criteria and modalities" for taking account of the implicit liabilities related to ageing populations were not yet duly developed, and hence further work was required to establish such criteria, which are scheduled for implementation in the 2009 fiscal programme updates.

In this paper we have noted that the Member States differ a lot with regard to their ageing-related expenditures, and that their public pension systems are very different in particular. As their commitments, understood as the accrued implicit pension debt, are large in all countries, the differences in level and the projected change under current policies are also large. To make sense of the magnitudes involved we need a benchmark. The *actuarial neutrality rule*, meaning that succeeding generations are treated equally in

the sense of actuarial values for benefits and pension contributions paid by each generation, can serve this purpose. The role of experts is not to dictate that policies in the real world should follow this rule — this is to be determined by the political process — but to provide a framework for identifying a wide range of policy options and their implications. Our examples show that, under *actuarial neutrality,* the fiscal targets indeed vary considerably, depending on possible pension reforms.

Three main results emerge from our analysis with stylised data:

(1) Based on the projection of ageing-related expenditures mimicking the EU average, the *neutrality rule* would imply a significant budget surplus for several decades; the provisional MTOs under the revised SGP set in the range from -1% of GDP to balance or surplus do not therefore seem to be sufficiently ambitious.

(2) Significant (but realistic) partial privatisation of public pension systems can lead to a conflict with the excessive deficit ceiling of 3% of GDP, and in any case a country that maintains a mono-pillar system can be much more comfortable with the SGP rules than a country that contemplates and implements partial privatisation of the system. This can be regarded as one of the harmful side effects of fiscal rules. A remedy could entail a change to the Protocol on the Excessive Deficit Procedure (EDP) annexed to the EU Treaty, which could be made by a unanimous decision of the EU Council if considered appropriate. — For this consideration the issue of swapping implicit debt for explicit may be raised with regard to its consequences for the other countries, as the total amount of explicit public debt would increase. Assessing this would involve earlier deliberations regarding the foundations of EU fiscal rules when it was considered that excessive borrowing by any country harms the others as financing is drawn from a common pool (this was specifically directed towards Italy with its high indebtedness and the fact of being a relatively large country). However, the arguments about a limited common pool are not necessarily decisive in a case where the debt increases as a result of privatisation of pensions: assets are accumulated in the second pillar, providing additional supply of funds to the common pool. Of course, implicit pension debt and explicit public debt are not perfect substitutes, but the negative effects of a swap on other countries' economies would probably be insignificant. The question of privatisation of pensions also relates to the provision of the EU Treaty that the fundamental principles of social security systems are in the exclusive competence of each Member State.

(3) In setting targets for budget balance, giving too much weight to the prevailing expenditure projection might divert attention from reforming the policies that determine those expenditures. It would be even more questionable to adjust the otherwise well-founded targets downwards by an ad hoc leeway without considering changes in the policies determining expenditures. This would not be in line with the call by the ECOFIN Council in 2006 to combine the reforms of expenditure policies and a reduction in public debt, meaning that the framework for policy design should be able to handle both the expenditure and revenue side of government budget, identify policy options and give quantitative expression to them. The actuarial neutrality framework and the estimates for the implicit debt to be made available for the revised national accounts can serve this purpose. The political processes would benefit from wider options for pension reforms than are often available, as reform proposals often remain piecemeal. To be open to a wider range of options, not only would proposals for reforms to move to partially funded and privatised pension systems be useful, but drastically reforming the rules of the first pillar might also be worth considering. One such option is the so-called notional defined benefit (NDC) system where the contribution rate is fixed and the benefits adjust automatically to reflect demographic change. The advantage of this system is that, under population ageing, for a given retirement age the benefit level reduces and thus there is an incentive to postpone retirement and to continue building up pension rights. An increase in the retirement age as a result of this incentive or other measures adapted to each particular set of national pension system rules may be the key to reforming pensions in European welfare states and to otherwise conducting sound fiscal policies vis-à-vis future generations.

Postscript

Medium-term objectives for government budgets form the link between the initial conditions (especially explicit public debt) and long-term developments in public expenditures. The framework presented in this paper, based on the principle of treating succeeding generations neutrally, is one possible specification for this link, explicitly incorporating more than just the 'closing the sustainability gap' rule, which is based on technical assumptions regarding the tax rate and expenditure projections. However, whatever their differences, given the prevailing projections on expenditures, both imply a drastic reduction of public debt. This might look puzzling in the light of the financial crisis of 2008-09. We now recognise that not only are the projections into the future over

several decades uncertain, but also the initial conditions may not be known: we do not know yet what the consequences of today's crisis will be on economies as a whole, and specifically, what the rescue operations will finally cost governments and thereby the tax payer. However, sooner or later government finances need to be put back on a sound track. Although keeping financial institutions functioning requires a lot of attention, a policy line for future fiscal policies also needs to be set. For this, combining the present conditions and future commitments, notably those related to population ageing, in an integrated framework can be regarded as useful. The SGP is the institutional set-up at EU level for assessing the policies of the Member States and designing corrections if need be, for the sake of the Member States and in the common interest. MTOs are the key variable building the bridge between the present and the future. As there is now more uncertainty about economies than for a long time, a clear framework is needed more than ever, notably for establishing the methods for setting targets for the fiscal position in the medium term. This task was not only triggered by the current crisis, however; it was already included in 2005 when the SGP was revised and country-specific budgetary targets were set only provisionally. Fulfilling this task is an opportunity to look carefully into the economic rationale for setting such targets. The criteria and methods for doing this would benefit from clarity with regard to the principles of how succeeding generations are treated by public policies, covering both ageing-related public expenditures and their financing.

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Setting Targets for Government Budgets in the Pursuit of Intergenerational Equity [a]

by Heikki Oksanen[b]

April 2009

Abstract

The Stability and Growth Pact (SGP) adopted in 1997 originally set budget balance as the medium-term objective (MTO) for all EU Member States, to create a safety margin under the 3% of GDP deficit ceiling. In a reform in 2005, MTOs were made country-specific and dependent on initial debt and the potential growth rate. They were agreed for a transition period, until the criteria for taking into account implicit pension liabilities under ageing populations were established. Preparations for this are currently (early 2009) ongoing. – Against this backdrop this paper explores possible benchmarks for setting MTOs under alternative rules for the public pension system, based on the principle of 'actuarial neutrality across generations'. The effects of privatisation of the mandatory pension system are spelled out. – The ongoing revision of the national accounts will establish new accounts for the (implicit) pension liabilities of governments. This will allow targets to be set for explicit and implicit government debt in the light of intergenerational equity. – One of the conclusions to emerge from current trends and policies is that reassessing the generosity of public pensions, especially the generously low retirement age in Europe, will remain high on the political agenda, as otherwise the burden to be shouldered by future generations will continue to increase (JEL codes: H11, H55, H6).

Keywords: Medium-term objectives for government budgets, Public pensions, Population ageing, European Union Stability and Growth Pact.

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The views expressed in this paper are those of the author and do not necessarily reflect the views of the European Commission.

Contents

1. Introduction and outline

This paper explores the issue of setting targets for government budget deficits in the pursuit of intergenerational equity in the context of the European Union's (EU) Stability and Growth Pact (SGP), as revised in 2005. The origins and aims of the SGP are first recalled (section 2). The revision in 2005 is then explained, emphasising that the medium-term objectives (MTOs) for government deficits became country-specific and dependent on initial debt and the potential growth rate (section 3). Since 2001 an exercise jointly undertaken by the European Commission and the Member States has produced commonly agreed projections on ageing-related public expenditures over the long term for each Member State, with the second round published in 2006, and the third round in the pipeline for 2009 (section 4). These projections have been used since 2001 to analyse the requirements of the financial sustainability of public finances and made available to the ECOFIN Council Ministers of the EU (section 5).

Next, we specifically address the question of setting budgetary targets under alternative rules for the public pension system, based on the criterion of 'actuarial neutrality across generations' as a benchmark for intergenerational equity, as outlined by Beetsma and Oksanen (2008). The effects of switching to partial funding and privatisation of the mandatory pension system, under a simple model, are spelled out (section 6).

The implications of this simple model for setting fiscal targets are then discussed, focusing in particular on the implicit pension debt of governments. This is interesting in that, in 2005, the ECOFIN Council agreed that MTOs should become country-specific and dependent on initial debt and the potential growth rate, while also agreeing that they were only set for a transition period until the criteria for taking implicit pension liabilities into account under ageing populations are established. The analysis here is designed to explore the possible quantitative implications of such criteria. Special attention is given to the work of the statistical community on the next revision of the national accounts, where new accounts will be established for the (implicit) pension liabilities of governments (section 7).

Given the baseline projections for ageing-related expenditures, the outcome from the *actuarial neutrality* rule outlined in this paper is a significant reduction in explicit public debt, with crucial implications for financial markets. This and wider implications for

global financial flows are briefly discussed (section 8), and the paper concludes with a summary of results and the main implications for policy design (section 9).

2. The Excessive Deficit Procedure and the SGP: origins and aims

When the EU heads of state and government agreed to establish an economic and monetary union with a single currency in Maastricht in December 1991, their primary concern had to be the stability and the credibility of the new currency. Without this, the single currency would not have been able to deliver the advantages of a more efficiently functioning single market to any of the participants. In particular, stability and credibility were indispensable for Germany, which was supposed to give up its strong Deutschmark. To achieve this aim, the new EU Treaty delegated monetary policy to the European Central Bank, with independent status. To eliminate the possibility of irresponsible fiscal policies disturbing monetary policy or the economy in any other ways, sound public finances were made one of the guiding principles of economic policy (Article 4 TEC[1]). This was ensured by prohibiting (1) central bank financing of governments, (2) their privileged access to other financial institutions and (3) the bail-out of debts of any public entity with the help of the European Community or the Member States. In parallel, (4) setting price stability as the primary objective of the ECB was designed to prevent bail-out of debts of a Member State through inflation (i.e. eroding the real debt burden by inflation was eliminated). This arsenal of measures geared to preventing divergences from sound public finances was further complemented in the Treaty with an Excessive Deficit Procedure (EDP), with reference values for deficits (3% of GDP) and debt (60% of GDP). The EDP can ultimately lead to fines being imposed on any Member State that does not correct its Excessive Deficit before the deadline set by the EU Council (Article 104 TEC). The two reference values may well be questioned for their simplicity, but one should note that, according to the Treaty (Article 104), the EDP was supposed to be implemented "with a view to indentifying gross errors", and that discretion was left to the Council of Ministers (ECFIN Council) in using the reference values, as it made it not only possible but even obligatory "to take into account all other relevant factors". Thus,

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the Maastricht Treaty aimed to strike a balance between the simplicity of the rules required for the political process and the complexity of the underlying economic rationale.

Between the signing of the Treaty and its entry into force on 1 November 1993, the European Union experienced two major currency crises (latter half of 1992 and August 1993). The credibility of the single currency plan was hit hard, and it soon became clear that the decision to establish monetary union was not going to be taken by the end of 1996, the first possible starting date if the majority of the Member States fulfilled entry criteria. However, it then became more and more likely that monetary union would start on 1 January 1999, as the Treaty stipulated that it would start with those countries that were eligible, regardless of how many they were.

Preparing for this eventuality made it necessary to provide further assurances to the German public and politicians that all potentially participating countries would be committed to pursuing sound public finances. The record from the previous 20 years was not encouraging: in the countries that ultimately adopted the single currency public debt had grown from 30% of GDP before the first oil crises in the early 1970s to 60% at the time of signing the Maastricht Treaty, and to above 70% by the mid-1990s. In 1991, it was 100% in Italy and nearly 130% in Belgium — two founding members of the EU — and it continued to rise significantly until 1995. In Germany itself and in France it had risen from around or below 40% in 1991 to nearly 60% in 1995. Thus, the prospects of establishing monetary union on solid ground were not very promising. There was not only the question of whether countries acting (wisely) in their own interest might possibly harm one another (which is one of the issues still debated by experts) but, more fundamentally, some people saw a risk that short-sighted politicians would harm both their own and all other countries by pursuing irresponsible policies.

These fears (although not necessarily put in such straightforward terms at the time) led the German Finance Minister to come up with a proposal for a so-called Stability Pact, which would lead to automatic sanctions for countries with excessive deficits. However, automatism was not legally possible as, according to the Treaty, it is for the Council to take decisions. This eventually led to agreement regarding the regulation "on speeding up and clarifying implementation of the excessive deficit procedure". It set a strict time schedule for the consecutive stages under the EDP, detailed various criteria to be applied in the procedure and established a scale (as a percentage of GDP) of eventual fines. "As a

rule" appeared in a couple of strategic places in the text to make it comply with the discretion reserved for the Council. This regulation became the "corrective arm" of what was labelled the "Stability and Growth Pact" to reflect the view of some of the Member States (in particular, France) that the task of the EU fiscal framework was also to support economic activity.[2]

This corrective arm was meant to eliminate irresponsible policies in the short and medium term by ensuring that the sanctions became a credible threat. The other part of the SGP, the regulation "on the strengthening of surveillance of budgetary positions and the surveillance and coordination of economic policies" aimed to prevent excessive deficits by requiring countries to strive for a budget that is close to balance or in surplus in the medium run (the "preventive arm"). The safety margin below the 3% of GDP deficit was designed to allow the automatic stabilisers to do their work, unless the economy falls into a very severe recession. As part of this regulation, euro-area members must submit a "Stability Programme" every year, in which they set out their budgetary path and the underpinning measures for the coming years. The other EU countries submit similar "Convergence Programmes", with the subtext that they are striving to comply with the convergence criteria set for adopting the euro.

Issues relating to the long-term sustainability of public finances in connection with ageing populations were not mentioned in these original regulations. Of course, sticking consistently to balanced budgets (on average over time) implies that in a growing economy (nominal growth is decisive here) debt to GDP ratio converges (slowly) to zero. Thus, such a policy rule, if consistently pursued, has persistent consequences for public debt. However, (probably) the first time population ageing appears in a text submitted to the ECOFIN Council was on 1 May 1998 when the decision to adopt the single currency was taken. The declaration under structural reforms talks about "addressing all aspects of social security systems in view of ageing populations" (ECOFIN Council, 1998). This did not come out of the blue, as groundwork had already been started and published by the Directorate-General for Economic and Financial Affairs (DG ECFIN) of the European Commission (for example in 1996), and by the OECD. Mentioning ageing

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[2] For more details, see Eichengreen and Wyplosz (1998); Fischer et al. (2006) classify the various proposals to amend the Pact; prominent examples are Wyplosz (2005), von Hagen (2002), Fatas et al. (2003), Fitoussi (2002), Blanchard and Giavazzi (2004). The proposals that focus on long-term sustainability are especially relevant to this paper: Pisani-Ferry (2002), Calmfors and Corsetti (2004) and Buiter and Grafe (2004).

populations in the context of moving to full monetary union no doubt gave new impetus to tackling this challenge. In 1999, new reports and studies were published by DG ECFIN, and in late 1999 a working group for ageing populations was appointed under the Economic Policy Committee (AWG/EPC). The first round of demographic and ageing-related public expenditure projections was published in 2001, and the issue of the long-term sustainability of public finances became a permanent item on the policy agenda and in various reports.

3. The revision of the SGP in 2005

The revision of the SGP agreed upon at the ECOFIN Council and endorsed by the European Council in March 2005 was triggered by something quite different from the topics in this paper. But as the opportunity was there, the revision also addressed the issue of meeting the challenges of population ageing.

The SGP had been put on hold at the end of 2003 as a result of the failure to apply the procedure in the case of the Excessive Deficits of Germany and France. Apart from the fact that in many Member States deficits exceeded 3%, the particular issue that triggered the crisis was an issue of a Member State in Excessive Deficit (Germany) that had implemented the recommendations it had received, but exogenous factors had turned out to be more unfavourable than expected and the deficit therefore did not decline. The Commission considered that it was legally obliged to recommend moving to the next stage of the procedure (i.e. one step closer to potential sanctions), while Germany, supported by France, wanted to return to the previous recommendations and revise them (Korkman, 2005, p. 117). This dispute caused a deadlock in the Council, as the required qualified majority was not found under the correct legal procedure for a decision. In the subsequent ruling, the Court of Justice of the European Communities (2004) considered (among other things) that the recommendations can indeed be amended at a later stage by the Council, stating also that this can legally only happen on a fresh recommendation from the Commission (paragraph 92). Thus, under the original SGP the Commission was in a position to block a revision of a previous recommendation by not putting any recommendations on the table, but if it did so the Council was, by a qualified majority, free to decide what it wanted. This was a clarification of the legal procedure under the original SGP, which went against the legal interpretation of the Commission in 2003.

The credibility of the SGP had suffered in the legal dispute. Seen in a positive light, the situation provided an opportunity for a review of the SGP. One of the main outcomes was that the possibility of repeating the steps was made explicit in the revised SGP: it allows recommendations to be revised and deadlines for correcting Excessive Deficits to be extended if unexpected adverse economic events occur. Similarly, the revision comprises several improvements and clarifications on short- and medium-term budget management designed to prevent pro-cyclical fiscal behaviour. Specifically, budgetary adjustment should be judged in terms of the cyclically adjusted balance, net of one-off items and temporary measures.

While implementation of the SGP had so far emphasised public deficits, in the revision "the Council gave due consideration … to safeguard the sustainability of public finances in the long run, to promote growth and to avoid imposing excessive burdens on future generations" (European Council, 2005). Thus, the revised SGP includes special provisions for treating structural reforms, including pension reforms.

It had become obvious that the similarly expressed medium-term objective (MTO) for budget balance for all countries under the original SGP was a simplification without sound economic rationale: it was sufficient to avoid excessive deficits but it was not an economically justified budget balance target for countries in very different positions with regard to initial debt and ageing-related expenditure projections. The joint work on expenditure projections had highlighted that the Member States deviated considerably in this regard, and it became clear that MTOs should be seen as the link from the challenges of population ageing to budget plans for the medium term (until the end of the Stability and Converge Programme period). Therefore, the revised SGP made MTOs country-specific, subject to possible revision in the case of major structural reforms and in any case every four years.

However, it was not yet possible to find a more lasting solution for setting MTOs, and thus they were set provisionally by taking only two factors into account: initial debt position and potential growth. Although references are made to structural reforms in general and ageing-related issues in particular, their implications for the provisional MTOs remained limited, mostly to the adjustment path. Essentially, for countries that already have adopted the euro or participate in ERM-II, the MTO set in 2005 ranges from a minimum of -1% of GDP for low-debt and high-potential-growth countries to balance or surplus for high-debt or low-potential-growth countries (ECOFIN Council,

2005). The baseline adjustment path was determined so that a country that has not yet reached its MTO should reduce its cyclically adjusted deficit annually by at least 0.5% of GDP.

The revised SGP also addressed the impact of systemic pension reforms on MTOs, as a particular issue arises when part of the public pension system is replaced by a private-sector-managed fully funded tier. This issue was triggered by the enlargement of the EU in 2004: Poland's mandatory pension system contained an important second pillar and it became necessary to clarify the rules. In essence, partial privatisation of public pensions triggers an immediate reduction in pension contributions paid to the first pillar while pensions stemming from the previously accrued rights need to be honoured, and therefore expenditures only go down much later, over the ensuing decades. A stock of assets will be built up in the newly established funded pillar, but this will not be part of the government accounts as, according to the decision by Eurostat (2004), funded defined-contribution schemes should be recorded as part of the private sector.[3] To cope with the reform, the government may issue debt, making some of the implicit pension debt explicit. Should this be an acceptable consequence of the reform? The problem for the SGP is that the public deficit and debt increase, while the fall in implicit liabilities due to the reduction of future pension payments from the PAYG pillar is not recognised in the national accounts used for assessing compliance with the SGP.[4]

The result was that the corrective arm of the revised SGP gives some leeway, as follows: "consideration to the net cost of the reform will be given for the initial five years after a Member State has introduced a mandatory fully-funded system", so that during the five years "100, 80, 60, 40 and 20 percent of the net cost of the reform to the publicly managed pillar" will be taken into account (European Council, 2005; for a detailed presentation, see European Commission, 2007). This leeway is indeed very limited as the reference deficit level as a share of the cost falls over time and is restricted to five years only, while the transition under pension reforms typically lasts for decades.

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[3]   This decision by Eurostat concerned defined-contribution, funded pension systems that may be managed by the government. It considered that the fund's assets are ultimately owned by the participants, who bear the risk associated with the return on the assets. These systems should therefore be classified in the private sector. With regard to defined-benefit schemes, an important criterion is the degree of funding. The Dutch occupational defined-benefit system is classified in the private sector (as it is fully funded), while the Finnish partially funded mandatory defined-benefit system falls within the general government (as the degree of funding is only about a quarter).

This was one of the issues — a very concrete one — related to population ageing and pension reforms faced by the SGP revision, but it was understood that even more fundamental issues were not satisfactorily resolved. This was openly stated in 2005 by the ECOFIN Council, which said that the new MTOs were set for a transition period until the "criteria and modalities for taking into account implicit liabilities [related to increasing expenditures in the light of ageing populations] are appropriately established and agreed by the Council" (ECOFIN Council, 2005). This transition period was supposed to be at most four years. Setting up the citeria is currently (early 2009) on the table of the committees that prepare ECOFIN Council decisions.

4. Ageing-related public expenditure projections

Although the ECOFIN Council was not yet able, in 2005, to set well-based rules for taking the implicit pension debt into account, serious groundwork had already been done in the EU since 1999 in the Ageing Working Group of the Economic Policy Committee (AWG/EPC). As said above, the first round of demographic and ageing-related public expenditure projections had been published in 2001, and they laid the basis for analysing the long-term sustainability of public finances in various EU reports. The Stockholm European Council in 2001 had agreed on a three-pronged strategy to ensure the sustainability of public finances and public policies vis-à-vis ageing populations by (i) reducing debt at a fast pace; (ii) raising employment rates and productivity; and, (iii) reviewing and, where necessary, reforming pension, healthcare and long-term care systems. These had also become regular features in the Stability and Convergence Programmes of the Member States (updated annually), and the second round of jointly produced projections was already in the pipeline in 2005 (Economic Policy Committee and European Commission, 2001 and 2006a-b).

To highlight some of the complex issues stemming from, for example, the diversity of social security systems in the EU, we give here a summary of the challenge of ageing based on the projection round of 2006 (the third will be available in 2009). It provides projections for population ageing-related public expenditures in the EU Member States (EU-25 at the time) from 2004 to 2050 (henceforth referred to as "EPC projections").

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[4]   Tabellini (2003) makes this point. Oksanen (2004) presents a numerical illustration of the effect of partial privatisation on public deficit and debt.

They are based on demographic projections, a commonly agreed set of macroeconomic assumptions regarding the labour force, productivity growth and real interest rates, and the policies or policy rules prevailing in 2005.

Pensions are largely unfunded in most EU countries. Before EU enlargement in 2004, only the Netherlands, Denmark and the United Kingdom featured a substantial funded pension pillar.[5] If strictly applied, a pure PAYG pension system implies that contributions into the system exactly match pension payments. Such a system thus affects neither the government's deficit nor its debt. However, the consequence of increasing expenditure under a pure PAYG system is that over the coming decades PAYG pension contributions (or other taxes) have to increase substantially. Cumulating all ageing-related expenditures, we see that the projected increase by 2050 is 5%-points of GDP (or more) in half of the EU Member States (Economic Policy Committee and European Commission, 2006a-b). If this were to be financed from current tax revenues, then the statutory tax rates would have to increase by at least 8-10%-points (depending on the tax base). This raises serious questions about the negative consequences of such tax hikes, including lower labour supply and tax evasion. Thus, one of the first lessons is that "sustainability of public finances" is not something that in essence can be defined solely with reference to deficit and debt. Broader issues of acceptability and feasibility of the tax rate technically required to cover the projected expenditures also need to be covered by the analysis.

In 2004, EU-25 pension expenditures were on average 10.6% of GDP, ranging from 4.7% of GDP in Ireland to 14.2% in Italy. The average increase in the EU-25 by 2050 is a relatively modest 2.2%-points of GDP. This is much less than the increase in the old-age dependency ratio, which (other things being equal) would imply an 8.1%-point increase in expenditure. The countervailing factors are a projected increase in the employment rate of prime-age workers and in the retirement age, and, notably, a decrease in the average pension relative to the average wage. The projected average expenditure

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[5] Economic Policy Committee and European Commission (2006a), pp. 52-56, provides an overview of European pension systems; Economic Policy Committee and European Commission (2006b), pp. 28-31, contains a scheme of the pension reforms in the EU. See also Whiteford and Whitehouse (2006). In Finland, the statutory pension system is 20-25% funded, and consists of investments mainly in assets other than Finnish government bonds. It is classified within general government accounts; consequently (e.g. in 2006), while gross public debt was 39%, net debt was negative, at -24% of GDP (Ministry of Finance of Finland, 2007).

increase of 2.2%-points of GDP also conceals large differences between Member States, from a 5.9%-point decrease in Poland to a 12.9%-point increase in Cyprus.

Healthcare and long-term-care expenditures are projected to rise, on average, at roughly the same relative speed as pensions. The dispersion across countries is smaller than for pensions, presumably partly because a common methodology was applied to projecting these costs.

Based on ageing-related expenditure projections, and taking into account current deficit and debt ratios, the European Commission (2006, pp. 86-87) classifies EU Member States into three groups as regards risks to the sustainability of public finances: (1) "high-risk": the Czech Republic, Greece, Cyprus, Hungary, Portugal and Slovenia, where the projected increase in pension expenditure ranges from 5.6 to 12.9%-points of GDP; (2) "medium-risk": Belgium, Germany, Spain, France, Ireland, Italy, Luxembourg, Malta, Slovakia and the UK, where the projected increase ranges from zero to 7.4%-points of GDP; and (3) "low risk": Denmark, Estonia, Latvia, Lithuania, the Netherlands, Austria, Poland, Finland and Sweden, where the projected change ranges from a decrease of 5.9% to an increase of 3.5%-points of GDP.

The EPC projections should be regarded with considerable caution. For example, the significant decreases in projected expenditures, notably in Poland, Estonia and Malta, and the very small increase for Italy, stem from the policy rules in force in 2005. There is serious doubt, however, about the *political sustainability* of those rules (and possibly also their interpretation). This doubt mainly concerns the indexation of pensions: the rule that is formally in place (e.g. price indexation only), and therefore assumed for the projection, may not be politically sustainable.[6]

The EPC projections do show, however, that ageing-related public expenditures pose a severe challenge to almost all EU Member States. In this paper we refer to EU-average figures for illustrative purposes, while a closer analysis would require a careful look into the EPC projection for each Member State separately.

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[6] Poland is an example: in 2005 the indexation rule was changed to inflation only, abolishing the partial indexation to real wages. In line with the common methodology, the projections were based on this new rule, implying a significant reduction in projected replacement rates. However, the original indexation rule was restored in 2007 (Republic of Poland, 2008). As even the restored rule can be regarded as conflicting with the basic principles of the Polish Notional Defined Contribution system,

5. Using expenditure projections for the 'sustainability gap' indicator

Soon after completing the first round of ageing-related expenditure projections in 2001, these projections were used to construct a quantitative indicator for the long-term stability of public finances along the lines of Buiter (1985). An indicator called 'sustainability gap' is based on the constant tax rate that would fulfil the intertemporal budget constraint (ITBC) of a government, given the projected expenditures and servicing the current debt. This tax rate is compared to the current tax rate, and the difference is called the gap (see European Commission, 2006; also Buiter and Grafe, 2004). The gap derived from an infinite-horizon calculation is now more prominent, while a gap derived from a calculation up to 2050 was first used. The Board of Trustees of the US Social Security System (Board of Trustees, 2007) uses the same method.

However, it is by no means self-evident that this indicator is an exhaustive measure of the distance from 'sustainability'. To start with, for a given projected expenditure increase an infinite number of tax rate paths exist that fulfil the ITBC of the government, while the scenario with a *constant tax rate* is only one of them. We have already noted above that the standard pure PAYG rule is one of them: taxes are increased along with the increase in expenditure. This, combined with a rule to keep the public debt ratio constant, is certainly one scenario that technically fulfils ITBC of the government. Thus, there are several arguments for looking at a broader range of tax rate scenarios. First, the required tax increases may not be economically feasible (due to distorting labour supply, for example, or even moving the system to the right of the peak of the Laffer curve). Second, subsequent generations generally differ from each other with regard to their fertility, longevity, retirement age and pension benefits. Hence, to achieve intergenerational equity, one might envisage that they also pay different pension contributions and other taxes (Sinn, 2000 and 2004). Third, it is possible that MTOs should not be set solely on the expenditure projection based on current policies. It might well be that for many EU Member States the emphasis should first be put on designing reforms that reduce these expenditures (e.g. European Council, 2005), and MTOs should only be based on the revised projections. When designing a comprehensive policy

one may reasonably expect further changes to the indexation rule or occasional increases in pension payouts.

package, alternative calculations for MTOs could be made conditional on several reform options.

It is clear, as is also acknowledged by the European Commission (2006, p. 21-22), that the SGP incorporates intergenerational equity neither explicitly nor systematically. One reason for this is that distributional issues are a matter of political preferences expressed and implemented at national level — taking actions affecting the fundamental principles of national social security is even explicitly excluded from the competence of the European Union (Article 137 TEC; this is maintained in the Reform Treaty of 2007, which is pending ratification). A further reason is the lack of data: since the EPC projections do not provide data by age cohort, they do not allow the link to be examined between the costs and benefits of each subsequent generation.

However, pensions (and other ageing-related expenditures) are a large item in government budgets; they deeply concern intergenerational burden sharing and are thus tantamount to rolling over public debt from one generation to the next. There is therefore a compelling case for analysing alternative policy options from the point of view of intergenerational equity. The aim of the following section is to provide a simple overall framework to take account of the intergenerational equity embodied in the public pension system when establishing fiscal targets.

6. The intergenerational distribution of costs under alternative fiscal rules

This section is based on a model presented by Beetsma and Oksanen (2007, 2008) to address the consequences, under population ageing, of different fiscal and pension arrangements for public deficits, public debt, implicit pension liabilities and the balance of contributions and benefits per generation. The formal presentation is kept to the minimum here, and also only the main implications are described.

We deviate from standard analyses of public pensions system that assume that they are operated on a pure PAYG basis (i.e. that the contribution rate is determined by expenditure). Instead, an important starting point in this instance is that, under population ageing and changes to the rules for public pensions (partly brought about by the former), maintaining a pure PAYG system does not necessarily have a solid foundation. The argument in Beetsma and Oksanen (2008), as earlier put forward by Sinn (2000) and Oksanen (2004), goes as follows: under a pure PAYG with fixed parameters, if fertility

declines and/or longevity increases to a permanently new level, the first generation with the new demographic characteristics will gain at the expense of all future generations, as it will have paid the contributions determined by the longevity of the previous generation but will enjoy the benefits over a longer retirement period (this is a generalisation of the inference concerning the windfall to the first generation(s) when a pure PAYG system is established). To correct this unequal treatment, some of the policy parameter values should be changed: if the benefit rates are maintained, the contribution rate should be increased immediately it becomes evident that fertility has declined and longevity is increasing; or the future benefits should be reduced by decreasing the pension accrual rates and/or by increasing the retirement age. The principle that similar generations should pay the same price for similar pension benefits opens up a wide range of reform options, with the salient feature that the system may no longer continue as a pure PAYG, but may move to partial funding. More specifically, it may accumulate either assets or debt, even permanently (debt should be accumulated if the accrued rights in the public pension system are significantly reduced, for example, in the context of privatisation while respecting the rights accrued before the reform; this means that the implicit debt becomes explicit).[7]

Description of the pension model

In the model, workers are identical, they work for a certain number of years and they receive a pension when they retire. We study the effects of fertility decline and longevity increase. Retirement age and pension accrual (and hence replacement rate) may change. Fertility per person is f children. Pensions can be partly (or fully) financed out of current workers' contributions or they can be partly (or fully) financed out of the assets accumulated from contributions in the past. The discounted pension benefits to be

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[7] The argument above is different from the arguments put forward, for example, by Kotlikoff (1997) and Feldstein and Samwick (2002) that privatisation and funding provide efficiency gains to be shared between the current and future generations. If valid, their arguments also apply without population ageing, while the argument above should prove that there might be a case for moving to partial funding under population ageing just for the sake of neutral burden sharing, even without the possible efficiency gains. — Orszag and Stiglitz (2001) rightly point out that moving to partial funding of public pensions means pre-funding in the broad sense so that the system accumulates assets, while establishing individual accounts is a separate matter. — The neutrality principle referred to here is more generally applicable than Musgrave's (1986) 'fixed relative position' rule for a pure PAYG system, as promoted, for example, by Esping-Andersen et al. (2002). It is worth emphasising here that a mandatory public pension system (for paternalistic elimination of people's short-sightedness, and to avoid free riding under social insurance based on Rawlsian principles) need not be a pure PAYG, but that it can be funded to any degree, and this degree can also change over time.

received by current workers are termed the "implicit pension debt" (*IPD*, also called "accrued-to-reference-date liability") of the public sector.

The key variables and parameters are best defined with the help of the consolidated public sector (government including the pension system) instantaneous simplified budget constraint: it owns (net) financial assets A_t in period t (public debt amounts to negative assets), and all taxes are levied on the wage bill.[8] The budget constraint is

(1)
$$c_t w_t L_t + (\rho_t - 1) A_{t-1} = \pi_{t-1} w_t R_t + A_t - A_{t-1},$$

where c_t is the tax rate, w_t is the (gross) wage rate,[9] L_t is the "effective" labour supply of workers in period t, ρ_t is the financial market interest rate factor (the interest rate is ρ_t-1), π_{t-1} is the pension accrual rate and R_t is the "effective" number of the elderly. Here, $L_t = l_t \tilde{L}_t$, where $\tilde{L}_t$ is the number of new entrants to the labour force in period t, and l_t is the number of years spent in work in period t, divided by the number of years spent in work in the reference period 0. Further, since periods refer to generations here, and as the number of years during which a pension benefit is received generally differs from the number of years that individuals pay contributions to the pension system, we define σ_t as the number of years spent in retirement in period t divided by the number of years spent working in period t-1, i.e. $R_t = \sigma_t L_{t-1}$. Finally, $\rho_t = (1 + g_t)(1 + \mu_t)$, where $1 + g_t = \dfrac{w_t}{w_{t-1}} \dfrac{L_t}{L_{t-1}}$ is the wage bill growth factor, and $\mu_t > 0$ is an exogenous mark-up of the financial market interest rate factor on the wage bill growth factor. Hence, μ_t is not influenced by the demographic shocks considered below.[10] The accrual rate as a share of the wage net of contributions, π_{t-1}^n, is set by policy. Using π_{t-1}^n, one then derives the appropriate accrual rate π_{t-1} as a share of the gross wage w_t.

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[8]   For convenience, we label all primary revenues of the public sector as "taxes", even though in our model they consist mostly of pension contributions. The reason is that primary revenues also include taxes collected (from wages) to service the initial explicit debt of the government.

[9]   From now on, "wage" stands for "gross wage" — that is, the wage before pension contributions are paid.

[10] Note that for setting up the accounting framework, the expression for the interest rate is merely an identity; for the main results below, however, we need to assume that μ_t is exogenous.

Pure PAYG and constant debt ratio

We first spell out the policy rule that keeps the financial position of the public sector unchanged (i.e. assets as a share of the total wage bill are kept constant at a level $\bar{a} = a_0$). The total tax rate then consists of a component that covers the current pension outlays and a second component that captures the cost of debt servicing so that a_t is kept constant. This implies that (under the assumption of positive wage bill growth) the budget balance is in deficit (surplus) if government net assets are negative (positive).

A new policy rule: actuarial neutrality across generations

Now, we introduce the following *policy rule:* starting from the current period, for the (known or projected) demographic characteristics (fertility, retirement age and longevity) and pension accrual pertaining to current workers and the interest mark-up projected for the next period, the tax rate is set at a level that will be indefinitely sustainable under the hypothetical situation that no changes to these factors will occur in the future. This rule essentially stipulates that, from now on, (hypothetical) identical generations will be treated identically by the government. Note that we do *not* assume that these factors will remain unchanged indefinitely. Rather, *the rule* amounts to how the tax rate is determined from now on as a function of the demographic variables, pension policy parameters and the interest mark-up. If and when one or more of these factors change for a new generation of workers, the same principle as just defined applies again. For example, when the life expectancy of a new working generation is projected to increase, the tax rate on this generation's income is raised. We now derive the formula for setting the tax rate implied by *this rule*.

Where applicable, a superscript t indicates that the variable is based on the information available in period t. For example, μ_t^t denotes the interest mark-up in period t known in period t, while μ_{t+1}^t denotes the interest mark-up projected for period t+1 under the information available in period t.[11]

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[11] For clarity, we also attach a superscript to the length of the working life variable, l_t^t, to indicate that it is the value known in period t when the tax rate for workers in that period is determined. Variable θ below also carries a superscript as for each period it has both an 'ex ante' and an 'ex post' value; for a detailed explanation of our rule, see the *Appendix*.

We define θ as the *IPD* as a share of the total wage bill. For the burden from the past (period t-1) and given the (known) parameter values in period t, it is

$$(2) \qquad \theta_{t-1}^t = \frac{IPD_{t-1}^t}{w_{t-1}L_{t-1}^{t-1}} = \frac{\pi_{t-1}\left(l_{t-1}^{t-1}/l_t^t\right)\sigma_t^t}{\left(1+\mu_t^t\right)f_{t-1}},$$

while for period t, given the known parameter values and those projected for t+1, it is

$$(3) \qquad \theta_t^t = \frac{IPD_t^t}{w_t L_t^t} = \frac{\pi_t \sigma_{t+1}^t}{\left(1+\mu_{t+1}^t\right)f_t}.$$

Higher fertility f and longer working life l raise the total wage bill and hence reduce the *IPD* as a share of the wage bill. An increase in the pension accrual rate π or a (projected) increase in the number of years in retirement relative to the length of working life σ naturally raises it. An increase in the interest rate mark-up implies heavier discounting of future liabilities and thus has a depressing effect on θ.

Using the above expressions, the tax rate implied by the new *policy rule* is found to be (see the *Appendix* to Beetsma and Oksanen, 2008):

$$(4) \qquad c_t^a = \mu_{t+1}^t \left[\left(\frac{1+\mu_t^t}{1+\mu_{t+1}^t}\right)\left(\theta_{t-1}^t - a_{t-1}\right)\right] + \theta_t^t.$$

Hence, each generation of workers first contributes to the public accounts to share the burden stemming from past decisions on pensions and other expenditures and revenues by paying the interest mark-up on the sum of implicit pension liabilities and explicit public debt (possibly corrected for a change in the mark-up — see the first term on the right-hand side), and then pays the full present value of its own future pensions (the second term). An increase in the length of the working life $l_t^t > l_{t-1}^{t-1}$ implies that the *IPD* accumulated in the past is shouldered by more labour input, which means a reduction in the contribution rate.

Now that we have shown these implications of our *policy rule* we label it as *actuarial neutrality across generations*: the burden of initial explicit and implicit public debt is shared equally between current and future generations and each generation covers the actuarial value of its own future pensions. Like any actuarial calculation implementation

of the *rule* is partly based on fixed policy parameters (e.g. the pension accrual rate and the retirement age) and partly on projected values (longevity and interest rate).

The expression for the tax rate in equation (4) is applicable for any changes, permanent or temporary, in the demography, retirement age, generosity of pensions and interest rate margin in subsequent periods. Under this *rule*, while respecting the rights of current retirees regardless of what they paid for them, the balance of pension contributions and benefits of each generation, starting from the time at which this *rule* is first implemented, is entirely separate from the characteristics and pension policy choices of other generations. The *rule* and its implications can be viewed as a natural benchmark for neutral treatment of different generations by the government. This contrasts with pure PAYG pension financing, which generally produces systematic redistribution across generations under population ageing.

An important implication of our *rule* is that the sum of explicit public debt (-*a*) and implicit liabilities as a share of the wage bill (labelled the "total debt ratio") evolves as follows:

$$(5) \qquad \theta_t^t - a_t = \frac{1+\mu_t^t}{1+\mu_{t+1}^t}\left[\left(l_{t-1}^{t-1}/l_t^t\right)\theta_{t-1}^{t-1} - a_{t-1}\right].$$

This equation thus implies that the total debt ratio remains constant if $\mu_t^t = \mu_{t+1}^t$ and $l_{t-1}^{t-1} = l_t^t$. An increase in the length of working life or an increase in the interest mark-up implies a reduction in total debt. Other things being equal, higher implicit liabilities (a higher θ_t^t) require higher pension contributions, which implies an offsetting reduction in the public debt. Note that (5) is applicable under any initial degree of funding, which then evolves as a function of factors in the formula for c_t^a. In particular, if the system were initially fully funded, it would remain so under the *actuarial neutrality rule*.

The calibration

Our numerical examples are largely based on the following stylised calibration taken from Oksanen (2005). The unit period corresponds to 30 years, which is roughly the average childbearing age of women in Europe. It is also roughly the average age difference between a retired person (70) and a worker (40). Throughout, we assume that the annual growth rate of the nominal wage per worker is 3.28%, which stems from a

unit real wage growth rate of 1.75% and an inflation rate of 1.5% per annum. The interest rate mark-up over the growth of the total wage bill is 1.5%-points per annum.

The economy starts in period 0 in a steady state in which people work for 40 years and spend 18 years in retirement (hence, $\sigma_t = 0.45$). These figures are thus used to scale pension contributions and pensions to correspond to realistic figures, although the formal model works with a 30-year period. Fertility, moreover, initially preserves a constant population. Further, the unit pension is initially set at 55% of the wage after pension contributions (i.e., $\pi_{t-1}^n = 0.55$, see *Appendix*), so as to make the initial figures comparable with those for 2004 in the EPC projections. Initial public debt is 60% of annual GDP.

Period 1 includes both a 20% fall in fertility (roughly corresponding to a fall from 2.1 children per woman, which is needed for full replacement, to 1.7, which is close to the current average in Europe) and an increase in longevity by three years (this corresponds to one year for each ten-year period). Period 2 includes a further increase in longevity by three years. This allows us to match quite closely the assumptions regarding the increase in longevity in the EPC projections for the EU average (an increase in life expectancy (at birth) for males (6.3 years) and for females (5.1 years) from 2004 to 2050).

The numerical results

We skip here the results for the pure PAYG and concentrate on the time paths of the most relevant variables under various policy options that observe the *actuarial neutrality rule*. We consider two possible policy measures to contain the rising ageing burden: an increase in the retirement age and a reduction in the replacement rate; the tax rate is then residually determined. We also consider (partial) privatisation of the public pension pillar, where the latter is partly replaced by a mandatory, funded private pillar. Most figures are expressed in percentages of GDP, assuming for simplicity that the total wage bill (including pension contributions) is a constant 60% of GDP.

Table 1 illustrates the implications of the *actuarial neutrality* rule. The baseline assumes no change in the generosity of the benefits or in the retirement age. The fall in fertility (via a reduction in the discount rate) and the rise in life expectancy both raise the *IPD* as a share of GDP. In anticipation of this increase, taxes already rise in period 1 (the system moves to partial funding). Hence, the rise in the implicit debt ratio is followed by an

equivalent reduction in the (explicit) public debt ratio (or increase in the public asset ratio), and the deficit turns into a surplus from period 1 onwards in all panels. The surplus is largest in period 1, when the population is affected by two shocks simultaneously (the rise in workers' life expectancy and the fall in the fertility rate). A reduction in the accrual rate (panel 2.1) produces a smaller implicit debt/GDP ratio, thereby requiring smaller surpluses than under the baseline. This effect is further amplified when the reduction in the accrual rate is combined with an increase in the retirement age. The expenditure increase of 2.7%-points of GDP in panel 2.2 in Table 1 roughly corresponds to the EPC projection for the EU.

All actuarially neutral scenarios clearly show that, as long as the demographic change is permanent, the financial position of the government should also change permanently. Depleting public assets once the ageing process has ended is therefore excluded, unless pension accrual is drastically reduced.

Table 2 considers the latter option induced by partial privatisation (possibly in combination with other measures) in which implicit pension debt is swapped for (explicit) public debt. This partial privatisation is implemented with a one-third reduction in the accrual rate expressed as a share of the gross wage rate. Under *actuarial neutrality* taxes paid to the government fall immediately (the contributions to the newly established private second pillar come on top of these taxes). Obviously, as accrued pension rights are respected, public pension expenditure falls only gradually. Comparing the new steady state with period 0, the public debt/GDP ratio falls only slightly (panel 1). In period 1 it exceeds the 60% limit of the SGP, while the deficit ratio in that period remains just marginally below the 3% limit. Adding to this a reduction in the accrual rate leads to a further swap of debt in panels 2.1-2.2, where the deficit ratio is in breach of the SGP in period 1, as is the debt ratio from period 1 onwards.

Table 1: Public finances and pensions under *actuarial neutrality*

Period	0	1	2	3	4	change
1. Actuarial neutrality — baseline: net accrual rate 55%; fixed retirement age						
pension exp/GDP, %	11.9	11.9	16.3	18.2	18.2	6.3
tax rate	21.7	26.4	28.4	28.4	28.4	6.7
public debt/GDP, %	60.0	-25.1	-60.5	-60.5	-60.5	-120.5
IPD/GDP, %	228.5	313.5	349.0	349.0	349.0	120.5
total debt/GDP, %	288.5	288.5	288.5	288.5	288.5	0.0
budget surplus/GDP, %	-1.9	2.5	2.3	1.5	1.5	4.4
2.1. Actuarial neutrality — accrual rate reduced to 48%; fixed retirement age						
pension exp/GDP, %	11.9	11.9	14.6	16.3	16.3	4.4
tax rate	21.7	24.6	26.4	26.4	26.4	4.7
public debt/GDP, %	60.0	8.1	-24.4	-24.4	-24.4	-84.4
IPD/GDP, %	228.5	280.3	312.9	312.9	312.9	84.4
total debt/GDP, %	288.5	288.5	288.5	288.5	288.5	0.0
budget surplus/GDP, %	-1.9	0.8	1.3	0.6	0.6	3.2
2.2. Actuarial neutrality — accrual rate reduced to 48%; increase in working life (40-41-42)						
pension exp/GDP, %	11.9	11.6	13.4	14.6	14.6	2.7
tax rate	21.7	23.5	24.3	24.3	24.3	2.6
public debt/GDP, %	60.0	18.8	-4.3	-4.3	-4.3	-64.3
IPD/GDP, %	228.5	264.1	280.9	280.9	280.9	52.4
total debt/GDP, %	288.5	282.9	276.6	276.6	276.6	-11.9
budget surplus/GDP, %	-1.9	0.2	0.6	0.1	0.1	2.5

Notes: (1) The tax rate consists mainly of pension contributions and is expressed as a percentage of the total wage cost. (2) The final column "change" gives the %-point change from period 0 to the new steady state, except for the budget surplus/GDP ratio, where it gives the %-point change from period 0 to the lowest or highest level.

Table 2: Public finances and pensions under actuarial neutrality: one-third privatisation

Period	0	1	2	3	4	change
1. Actuarial neutrality — 55% accrual rate; fixed retirement age						
pension exp/GDP, %	11.9	11.9	10.9	12.1	12.1	0.2
tax rate	21.7	20.6	21.9	21.9	21.9	0.2
public debt/GDP, %	60.0	**79.4**	55.8	55.8	55.8	-4.2
IPD/GDP, %	228.5	209.0	232.7	232.7	232.7	4.2
total debt/GDP, %	288.5	288.5	288.5	288.5	288.5	0.0
budget surplus/GDP, %	-1.9	-2.9	-0.8	-1.4	-1.4	-1.0
2.1. Actuarial neutrality — accrual rate reduced to 48%; fixed retirement age						
pension exp/GDP, %	11.9	11.9	9.7	10.9	10.9	-1.0
tax rate	21.7	19.4	20.6	20.6	20.6	-1.1
public debt/GDP, %	60.0	**101.6**	**79.9**	**79.9**	**79.9**	19.9
IPD/GDP, %	228.5	186.9	208.6	208.6	208.6	-19.9
total debt/GDP, %	288.5	288.5	288.5	288.5	288.5	0.0
budget surplus/GDP, %	-1.9	**-4.0**	-1.5	-2.0	-2.0	-2.1
2.2. Actuarial neutrality — accrual rate reduced to 48%; increase in working life (40-41-42)						
pension exp/GDP, %	11.9	11.6	9.0	9.8	9.8	-2.1
tax rate	21.7	18.6	19.1	19.1	19.1	-2.6
public debt/GDP, %	60.0	**106.8**	**91.4**	**91.4**	**91.4**	31.4
IPD/GDP, %	228.5	176.1	187.3	187.3	187.3	-41.2
total debt/GDP, %	288.5	282.9	278.7	278.7	278.7	-9.8
budget surplus/GDP, %	-1.9	**-4.4**	-2.0	-2.2	-2.2	-2.5

Notes: see Table 1.

Other ageing-related expenditures

In order to obtain a picture of the overall budgetary consequences of ageing, the above approach to pensions can also be extended to *other ageing-related* expenditures. The most important categories are *healthcare and long-term care expenditures*. In 2004, these were 6.4% and 0.9% of GDP in the EU-15 respectively, while their projected increase by 2050 amounts to 1.6% and 0.7% of GDP respectively (these figures should be regarded as highly uncertain, and the conclusions derived only tentative).

Who benefits from these expenditures and who provides the financing? A stylised fact is that roughly half of healthcare costs benefit the working-age population (including their children), while the other half benefit the elderly, particularly those approaching their final years of life. As the bulk of public expenditure on long-term care is related to the elderly, we simply assume that they consume all of it.

An estimate must then be made of how an increase in longevity affects the volume of healthcare facilities and long-term care services used by the elderly. One extreme assumption is that it increases proportionally with the number of people over, say, 60 years of age. The opposite extreme is that an increase in longevity raises these expenditures hardly at all, as the bulk of these are concentrated in the last few years before death.

As for the financing, we note that public health and long-term care expenditures are normally covered by tax revenues that are also paid by the elderly. The way in which these expenditures are financed thus differs significantly from that of pension outlays, which are typically covered by pension contributions paid by workers, but not by pensioners.

Fortunately, the framework described above is derived from a more general model that we can also apply to other ageing-related expenditure items (see the *Appendix* for details).

Again, we spell out the effects of ageing on expenditures, on taxes on wages and income of the elderly, on debt and on the deficit under the same *rule* as for pensions: after any change, the tax rate is set at a level that is financially sustainable as long as there is no new shock, and, *mutatis mutandis,* revised when such a shock arrives. We also compute

the implicit debt for each period, which is defined as the capital value of these expenditures benefiting the elderly in the ensuing period.

Note that the *policy rule* does not always result in perfect neutrality across generations, as it did for pensions. The reason is the assumption that the same tax rate is applied to the incomes of both workers and pensioners. For example, if the working-age generation were to start consuming a higher amount of healthcare services than the previous generation did, then policy-makers should immediately increase the tax rate. The current elderly will then also pay higher taxes, although they will get nothing in return. Thus, under these assumptions the succeeding generations cannot be treated completely separately.

We consider a scenario where the long-run expenditure increases by 2.3%-points of GDP, roughly corresponding to the EPC projection for the EU average, and combine it with the pension scenario for a moderate retirement age increase and a net accrual rate reduction to 48% (panel 2.2 in Table 1). Table 3 provides the result. The total debt ratio declines relatively little. The conventionally measured government deficit moves from an initial 1.9% of GDP deficit to a surplus of 1.6% over 60 years, while explicit debt declines by almost 100% of GDP over two generations. Although these figures are only illustrative, they are so large that they deserve careful assessment with respect to their policy implications.

Table 3: Overall financial implications of ageing

Period	0	1	2	3	4	change
expenditure/GDP, %	19.2	18.9	22.5	24.3	24.3	5.1
tax rate	31.7	34.8	35.7	35.7	35.7	4.0
public debt/GDP, %	60.0	-8.6	-39.2	-39.2	-39.2	-99.2
net ID/GDP, %	281.3	340.5	362.9	362.9	362.9	81.6
total debt/GDP, %	341.3	331.9	323.8	323.8	323.8	-17.5
budget surplus/GDP, %	-1.9	1.6	1.6	1.0	1.0	3.5

Notes: ID = implicit debt. Further, see Table 1.

7. Possible implications for setting fiscal targets

Consequences of pension reforms for public debt and deficit

We should recall that the fundamental principles of public pensions systems are in the exclusive competence of the Member States in the EU. However, as pensions are the biggest expenditure item in government budgets, they become an object of EU fiscal rules. If and when Member States apply the principle of intergenerational equity along the lines presented above, they might move to partial funding in the mono-pillar pension system, bringing about a significant financial surplus in this part of government accounts. Similarly, if they enter into significant privatisation of their mandatory pension systems, respecting accrued pension rights, a significant proportion of their implicit pension debt might become explicit, bringing about a deficit. As the initial implicit pension debt in most European countries is large, 200-300% of annual GDP, its movements can in realistic and moderate cases be more than 50 percentage points either upwards or downwards over a generation (30 years), depending whether the mono-pillar is maintained or the system is partially privatised. We have shown above that, when also taking other ageing-related expenditures into account, the implication for budget surplus under a mono-pillar system could in a reasonable case be 1.6% of GDP over 60 years, while under one-third privatisation the deficit ceiling of 3% of GDP could easily be breached.

These implications for general government budget balances and debt need to be taken into account when designing the rules for setting fiscal targets, and also when assessing the possible adverse consequences of the EDP ceiling of 3% of GDP for systemic pension reforms.

Both the MTOs under the original SGP set at 'close to balance or surplus' and the provisional MTOs established as a result of the 2005 revision of the SGP, ranging from a deficit of 1% of GDP to balance or surplus, if persistently followed, imply (in most Member States) a reduction in (net) public debt and, hence, safely guarantee the sustainability of (explicit) public debt. This is in the right direction in terms of containing the increase in the financial burden on future generations. This policy line was also endorsed by the Stockholm European Council in 2001 when it called for a rapid reduction of public debt in view of ageing populations.

However, a fundamental question arises here regarding the consistency of public policies: if MTOs set for the general government are based on a rule that does not take due account of the changes in the social security budget brought about by population ageing and pension reforms, those reforms may lose their significance, meaning and intended effects. The first example where this can happen is a pension reform leading to partial funding in the public pension system: if the MTO for the general government is independently fixed at any given number (for example zero), then the surplus in the pension system is squandered by a deficit in other parts of general government. The clear implication, therefore, is that the (planned) surplus in the public pension system should enter as a direct component into the MTO for the general government, thereby making it deviate from zero or any other number set prior to the pension reform.[12]

The second example is partial privatisation of the public pension system: respecting accrued rights and following the *actuarial neutrality rule* for future rights may give rise to a conflict with the excessive deficit ceiling, although how serious this becomes will depend on several other factors. In our stylised examples for one-third privatisation and 60% of GDP initial public debt (Table 2), there is a serious risk that the SGP will not be met.[13]

Lower initial debt gives more room for adjustment. Also, the budget surplus target would be higher under a policy of frontloading taxes to finance the future increase in the costs of healthcare and long-term care. This would counterbalance the negative effect on the budget balance of pension system privatisation. However, the movements induced by partial privatisation can be large, and there may be a rationale to take them specifically into account when setting MTOs. While the revised SGP now recognises the problem with the transitional cost of (partial) privatisation of pensions, the leeway over the 3% of

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[12] If the public pension system is organised as a separate entity, then a separate question arises as to where it should invest. Some authors argue that if pension funds (private or public) invest in government bonds, they are in effect pure PAYG (e.g. Barr, 2004, p.114). Of course, this requires that the government must always issue new debt (i.e. increases the deficit) to accommodate such investment. Whether or not this happens depends on rules and policies. From the perspective of intergenerational equity, investment by a public (private) pension fund in government debt is neutral if net public debt is reduced (kept constant) in response to this investment. Bosworth and Burtless (2004) find that this requirement has been met at state level in the US, while in OECD countries (from 1970-2000) 60-100% of public pension saving at national level was offset by larger deficits in other budgetary accounts.

[13] Note here that the reference scenario is not a pure PAYG mono-pillar system, but a mono-pillar that is first reformed to implement *actuarial neutrality*. The latter would lead to a reduction of the public debt, while the one-third privatisation would turn that around to an increase (compare, for example, panels 2.2 in Tables 1 and 2, respectively).

GDP deficit ceiling is quite limited. Hence, while there might be sound economic reasons for privatisation, it is clear that under otherwise similar policies a country that maintains a mono-pillar system can be much more comfortable with the EDP rules than a country that contemplates and implements partial privatisation of the system. In other words, significant privatisation may lead to an Excessive Deficit and prevent the Member State from adopting the euro. This may create an incentive to abandon or delay a reform to establish a fully funded second pillar.

Measurement and use of IPD estimates

The capital value of accrued-to-date pension rights, labelled here as *IPD*, has a central place in the above framework, and it helps to explain the movements of total government debt and swap between implicit and explicit debt. Obviously, estimating *IPD* is not a straightforward matter. In the 1990s there was some interest in estimating these liabilities (e.g. van den Noord and Herd, 1993), but no systematic updates have been made available since then.

This gap will be filled in a few years' time as the international statistical community is about to finalise its proposals to set up, in the next SNA/ESA revision,[14] new supplementary accounts for accrued public pension liabilities (see Advisory Expert Group on National Accounts (AEG), 2007; also European Commission, 2007, Part II, Section 2.3). Social security pension liabilities will not be inserted into the core accounts, but one of the main pending issues is the treatment of government pension debt vis-à-vis its own employees, which alone can be of the order of 60% of GDP in some EU countries. On the one hand, it is similar to pension liabilities of private sector employers, who are required by law to show it in their balance sheets, and it can be argued that the treatment should be the same for the sake of neutrality, for example, when the cost of labour is compared across sectors. On the other hand, these pensions can be partly or closely integrated with social security pensions, which will be recorded only in the supplementary accounts. How to strike a balance between these conflicting considerations is still a moot point (early 2009). Whatever the solution might be, the supplementary account figures will also be used, depending on the purpose of each exercise. Then, if the definition of public debt were to change to the effect that public

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[14] SNA = System of National Accounts; ESA = European System of Accounts.

debt shifts upwards by 60% of GDP (*IPD* related to government employees), or 200-300% (total *IPD*), the meaning of the reference figures for public deficit and debt would change significantly. The solution could always be that the definitions of public debt and deficit for the purposes of the EDP are different from those for the standard accounts. However, an overall assessment taking into account all the factors required by the Treaty (Article 104) could always benefit from the new data on *IPD*.

Some authors hesitate when it comes to estimating *IPD* and making it public, and are especially worried that it can be confusingly compared to explicit public debt. First, under most public pension systems in Europe, implicit pension rights are not backed by clearly defined explicit commitments. For example, there is often ambiguity about inflation indexation. Second, there is a fear that the official publication of an *IPD* estimate may give those liabilities an explicit nature, so that it becomes more difficult for the government to renege on them. For this reason, Coeuré and Pisani-Ferry (2005) argue against including implicit liabilities in their measure of the net balance position of the government. This worry could be overcome by adding a statement to the official publication of implicit liabilities that the figures are based on current policy and that no legal rights can be extracted from them. Moreover, alternative estimates based on alternative assumptions could be produced to give the baseline figures a less definitive nature.

A counterargument to hesitating to estimate and publish *IPD* is that the process itself would bring about a useful clarification of accrued pension rights. People and politicians may take different views of the content and implications of the prevailing rules on pension rights, but it can even be regarded as a responsibility of the state to clarify its commitments so that private agents are in a better position to plan and execute their own voluntary pension savings. This argument goes beyond pure economic considerations, and needs to be clarified as part of the political process on pension reform. Experts are undoubtedly needed to provide the necessary statistical basis, including clarity about the uncertainty of all estimates.

Furthermore, a debate is ongoing as to how *IPD* estimates should be interpreted. It is considered that a large *IPD* (compared to explicit public debt) does not necessarily indicate a problem with financial sustainability or intergenerational equity. This is true especially if the *IPD* in not growing, and it should be clearly recognised that the figures for public debt and deficit, including *IPD*, would be of a completely different magnitude

than the conventional national accounting figures hitherto. This simply follows from the change in definition, without any change in the underlying economic meaning. The need to become familiar with a new definition should not, however, be an obstacle to broadening the scope of statistical analysis.

It has also been said that, when a new pure PAYG system is established, the *IPD* is quite small at first and therefore fails to signal a problem of sustainability that might well be looming over the long run (European Commission, 2007, p. 99; Franco, 1995; Blanchet and Ouvrard, 2006). The counterargument to this is that in such a case a projection for *IPD* would give just as much warning as the expenditure projection or any indicator based on it. Thus, not only using the current *IPD*, but also projecting the scale of *IPD* could and should be part of any forward-looking exercise, adding useful information to the pure expenditure projection. *IPD* contains useful additional information as to when the right is accrued and by which age cohort.

Furthermore, it should be understood that the *IPD* is not without qualification a stand-alone indicator of the future pension burden. The way the *IPD* could be part of a policy rule among other factors, as explained in this paper, should in principle remove any worries of misinterpreting *IPD* estimates.

Proposed use of the sustainability gap for setting MTOs

Preparations to take ageing-related implicit liabilities into account when setting MTOs, as requested by the ECOFIN Council in 2005, are currently (early 2009) taking place, with the aim of their being implemented in the 2009 round for the Stability and Convergence Programmes. The *sustainability gap* indicators developed since 2001 form the basis for the ongoing deliberations (European Commission, 2008, pp. 106-109). In brief, for the 'gap' the constant tax rate (possibly adjusted for an ageing-related tax component) fulfilling the intertemporal budget constraint (ITBC) of the government under the (commonly agreed) projection for public expenditures (technically to infinity) is calculated. This is then compared to the current tax rate (or the one planned for the end of the medium-term programme period). It has also been (correctly and usefully) explained that the definition of 'gap' incorporates *open-system pension liabilities*, defined as the present value of projected pension expenditure minus revenue up to infinity. Thus, if the gap is closed by the required increase in the tax rate (or decrease in non-ageing-related expenditures) the present value of revenues covers the present value

of expenditures and the initial net debt. In this way, implicit liabilities are taken into account.[15]

Under this approach, the starting point for setting MTOs is to close the sustainability gap by reducing the difference by half a percentage point per year. This would be an ambitious policy line in most Member States, implying a significant budget surplus and reduction of debt. The problem is that this outcome can be questioned, as the 'closing the sustainability gap' rule may be regarded as too simplistic and therefore fail to take account of various other economic factors. For this reason, and also simply because an ambitious policy adjustment can be considered to be politically unrealistic, proposals have been made to make an ad hoc adjustment to the target and close the gap only partially (European Commission, 2008, pp. 107-108). This would mean in most cases that the burden on future generations would continue to increase.

More specifically, one of the problems with the analytical basis for using the 'gap' is that it does not take account of the different characteristics of succeeding generations with regard to fertility and longevity, or their choices in terms of pension system parameters. Therefore, a scenario where the tax rate is constant does not treat generations equally. Setting the tax rate as constant for the calculation of the 'gap' does not follow from the requirement of fulfilling the intertemporal budget constraint (ITBC) of the government. Many other tax rate paths could do this, and some of them can make a better rule for policy. Thus, as a number of relevant components and factors are missing, an ambitious policy proposal could quite easily be rejected. It is unfortunately not easy to remove this problem as age-cohort-specific data is lacking − *IPD* estimates that become available later will help, but this will take time.

A further broader problem is that starting too narrowly from the expenditure projections may shift the emphasis too much to the revenue side of government budgets while, for a number of Member States, designing pension reform and revising policy rules for other ageing-related expenditures is likely to take priority, and MTOs are likely to be based more on the revised projection of expenditures. In other words, starting from the current baseline expenditure projection and allowing leeway for the 'closing the gap' rule may

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[15] European Commission (2006, Chapter I and Annex I), and (2007, Section 2.3); see also Buti and Nogueira Martins (2006), and Blanchet and Ouvrard (2006).

give a comforting signal and divert attention from the need to reform the policies determining expenditures.

In sum, setting MTOs starting from the sustainability gap based on the commonly agreed baseline expenditure projections, whether amended by ad hoc adjustment or not, may not give a solid foundation for establishing MTOs, given in particular that governments need to be able to defend these objectives before their national parliaments. As other factors and broader policy options are missing, further work might still be needed to find a balance between the simplicity of the rule and the need to take complex economic factors into account. The work of statisticians, pension actuaries and economists on *IPD* estimates for now and for the future (under alternative assumptions on the ageing process and policy parameters) could provide further material for striking the necessary balance. It is therefore possible that the methods for taking account of the implicit liabilities to be set in the near future will still be provisional, and improvements will be made when more comprehensive data are made available as a result of *IPD* estimates for the revised national accounts.

8. Wider implications

Based on the ageing-related expenditure projections from the EPC 2006 exercise for an average EU Member State, both the stylised actuarial neutrality rule presented in this paper and the 'closing the sustainability gap' rule would imply a virtual elimination of (net) public debt — the summary example in Table 3 above gives a reduction of around 70% of GDP in 30 years and a further reduction of 30% in the next 30 years. This can be a puzzling result for many observers, and there are several issues that need closer examination.

First, as a significant reduction in public debt is derived from the projections available and the applied *policy rule*, one possible conclusion is that such a scenario is not realistic or desired, and thus something has to give. However, this does not mean that the rule should be rejected, but the outcome could lead to a series of questions as to what should be changed in policies determining the expenditures to arrive at other outcomes that look either more realistic or more politically desirable, or both. This is in essence also the prevailing policy approach as issued by the ECFIN Council: the Member States should

do more to contain expenditures and to reduce public debt (the latter being the same as pre-funding for future expenditures).

Second, there was a 40 percentage point change in the public debt to GDP ratio in the current euro-area countries in the 30 year period 1975-2005 – in the opposite direction. Thus, changes can be quite large over a generation.

Third, the outcome is derived from expenditure projections and policy rules that can be regarded as acceptable, and thus the next step could be to consider whether the drastic reduction in net public debt can be made feasible and realistic. This is not self-evident. For example, public debt instruments can be considered to be available on the market as it is useful for there to be a riskless store of value for private agents (as government paper has been in the Western World for a long time). These provide a benchmark for the rates of more risky assets and liquidity and thereby form a necessary basis for markets to function. Is it then a problem that government (net) debt should go to zero (or negative)? Not necessarily, as the government can still issue debt and play an increasing role as a financial investor. Also, if the move towards establishing public-private partnerships for infrastructure investments were to be partly triggered by the desire to contain the increase in public debt (sparked by SGP rules or not), this reasoning would be reversed and the government would be more inclined to pursue public investment projects without reverting to private financing. Furthermore, partial privatisation of the public pension system is a way of maintaining larger explicit public debt without flouting intergenerational neutrality, as shown above (swapping explicit debt for implicit). These are just brief comments on the various possibilities of dealing with the decrease in explicit net public debt induced by a policy of pursuing intergenerational equity, all of which would require closer examination.

A more complete assessment would require looking into broader macroeconomic consequences. Increased saving in the public sector follows under population ageing from a partial model for the public pension system (both in this paper and in the sustainability gap calculation). In addition, under population ageing people may also save more privately, because, if people spend proportionally more time in retirement when their longevity increases, they will need to save more (if public pensions do not cover all their expenditures). This is implied by an overlapping generations (OLG) model. Increase in aggregate saving means that capital intensity of production increases. The parameters of the public pension system are crucial for the outcome: reduction of the

replacement rate and an increased share of time in retirement increases saving; thus, an increase in the retirement age, for given longevity, reduces saving. To get the basic variables right, one has to note that over the very long term the saving *rate* may decrease: if and when fertility decreases permanently, the rate of growth of the economy will decline, which means that a lower saving *rate* is sufficient to maintain a given, increased capital-output ratio (for a more detailed analysis, see Oksanen, 2009a).

The increase in the capital-output ratio leads to further questions: does it mean that the marginal product of capital decreases, and, if so, is it possible for it to fall below the rate of growth of the economy so that the economy is no longer dynamically efficient? If that were the case, then current consumption could be increased without hurting the consumption of future generations. As to how likely this is to happen will depend on investment opportunities globally. Global savings increased in the last 10-15 years to the extent that Ben Bernanke (2005) called it "global saving glut", with the consequence that real interest rates decreased to close to zero and equity and house prices boomed, especially in the US (and in most European countries). For Bernanke the US current account deficit was partly a consequence of the saving glut in the rapidly ageing industrial countries (especially in Germany and Japan) and in the emerging economies (notably China), but in the longer term, according to him, the financial institutions in the developing world could be made to function more properly so that investment risks would be reduced and capital would start flowing in a more natural direction, i.e. to them rather than from them to the US. In short, for our purposes here, saving due to pre-funding the future ageing-related expenditures in the Western World does not necessarily make it excessive if and when the global financial system improves and makes good use of those savings. This is a big 'if and when' in early 2009, and it does not concern only the developing world but also the US and the rest of the old industrial world.

Whatever the event, if under the assumptions regarding demography and pensions and other ageing-related expenditures intergeneration equity (under actuarial accounting) seems to lead to higher than optimal saving, then it is not self-evident that intergeneration equity should be abolished and the current generation should consume more and leave a rising burden to future generations. The alternative is to increase the retirement age. This would reduce saving and help to eliminate the possible "saving glut", and still achieve intergenerational equity. We thus come once more to the need to take an all-embracing look at setting policy parameters for the pension system and other

public expenditures and the rule for how to share the financial burden across generations, i.e. the path for taxes. This then gives the targets for government deficit and both explicit and implicit debt.

9. Concluding remarks

This paper has explored the issue of setting medium-term objectives for government budgets under the EU Stability and Growth Pact (SGP) and ageing populations. The purpose of the EU fiscal rules and the economic analysis behind them has evolved a lot since the Maastricht Treaty was agreed in 1991. The deficit ceiling of 3% of GDP was designed first to set a benchmark to identify gross errors in fiscal policy, but, to make the single currency project credible and acceptable, it was soon given a more binding status. The primary purpose of 'close to balance or surplus' rule as specified in the original SGP adopted in 1997, was to reduce the risk of breaching the 3% ceiling. This was the same objective for all countries, and therefore it gave no guidance and economic rationale for determining a possible surplus target, although it did not exclude the possibility that the Member States might pursue more ambitious policies (although it may have made it more difficult to find national support for a significant surplus, as the reference target from the EU and in most Member States was zero).

When the SGP was revised in 2005 it was commonly accepted that Member States differed appreciably, and economic reasoning required making the budgetary objectives country-specific. However, the provisional MTOs for the first four-year period did not make any great differentiation and remained close to the original figures. This was accepted, as the "criteria and modalities" for taking account of the implicit liabilities related to ageing populations were not yet duly developed, and hence further work was required to establish such criteria, which are scheduled for implementation in the 2009 fiscal programme updates.

In this paper we have noted that the Member States differ a lot with regard to their ageing-related expenditures, and that their public pension systems are very different in particular. As their commitments, understood as the accrued implicit pension debt, are large in all countries, the differences in level and the projected change under current policies are also large. To make sense of the magnitudes involved we need a benchmark. The *actuarial neutrality rule*, meaning that succeeding generations are treated equally in

the sense of actuarial values for benefits and pension contributions paid by each generation, can serve this purpose. The role of experts is not to dictate that policies in the real world should follow this rule — this is to be determined by the political process — but to provide a framework for identifying a wide range of policy options and their implications. Our examples show that, under *actuarial neutrality,* the fiscal targets indeed vary considerably, depending on possible pension reforms.

Three main results emerge from our analysis with stylised data:

(1) Based on the projection of ageing-related expenditures mimicking the EU average, the *neutrality rule* would imply a significant budget surplus for several decades; the provisional MTOs under the revised SGP set in the range from -1% of GDP to balance or surplus do not therefore seem to be sufficiently ambitious.

(2) Significant (but realistic) partial privatisation of public pension systems can lead to a conflict with the excessive deficit ceiling of 3% of GDP, and in any case a country that maintains a mono-pillar system can be much more comfortable with the SGP rules than a country that contemplates and implements partial privatisation of the system. This can be regarded as one of the harmful side effects of fiscal rules. A remedy could entail a change to the Protocol on the Excessive Deficit Procedure (EDP) annexed to the EU Treaty, which could be made by a unanimous decision of the EU Council if considered appropriate. — For this consideration the issue of swapping implicit debt for explicit may be raised with regard to its consequences for the other countries, as the total amount of explicit public debt would increase. Assessing this would involve earlier deliberations regarding the foundations of EU fiscal rules when it was considered that excessive borrowing by any country harms the others as financing is drawn from a common pool (this was specifically directed towards Italy with its high indebtedness and the fact of being a relatively large country). However, the arguments about a limited common pool are not necessarily decisive in a case where the debt increases as a result of privatisation of pensions: assets are accumulated in the second pillar, providing additional supply of funds to the common pool. Of course, implicit pension debt and explicit public debt are not perfect substitutes, but the negative effects of a swap on other countries' economies would probably be insignificant. The question of privatisation of pensions also relates to the provision of the EU Treaty that the fundamental principles of social security systems are in the exclusive competence of each Member State.

(3) In setting targets for budget balance, giving too much weight to the prevailing expenditure projection might divert attention from reforming the policies that determine those expenditures. It would be even more questionable to adjust the otherwise well-founded targets downwards by an ad hoc leeway without considering changes in the policies determining expenditures. This would not be in line with the call by the ECOFIN Council in 2006 to combine the reforms of expenditure policies and a reduction in public debt, meaning that the framework for policy design should be able to handle both the expenditure and revenue side of government budget, identify policy options and give quantitative expression to them. The actuarial neutrality framework and the estimates for the implicit debt to be made available for the revised national accounts can serve this purpose. The political processes would benefit from wider options for pension reforms than are often available, as reform proposals often remain piecemeal. To be open to a wider range of options, not only would proposals for reforms to move to partially funded and privatised pension systems be useful, but drastically reforming the rules of the first pillar might also be worth considering. One such option is the so-called notional defined benefit (NDC) system where the contribution rate is fixed and the benefits adjust automatically to reflect demographic change. The advantage of this system is that, under population ageing, for a given retirement age the benefit level reduces and thus there is an incentive to postpone retirement and to continue building up pension rights. An increase in the retirement age as a result of this incentive or other measures adapted to each particular set of national pension system rules may be the key to reforming pensions in European welfare states and to otherwise conducting sound fiscal policies vis-à-vis future generations.

Postscript

Medium-term objectives for government budgets form the link between the initial conditions (especially explicit public debt) and long-term developments in public expenditures. The framework presented in this paper, based on the principle of treating succeeding generations neutrally, is one possible specification for this link, explicitly incorporating more than just the 'closing the sustainability gap' rule, which is based on technical assumptions regarding the tax rate and expenditure projections. However, whatever their differences, given the prevailing projections on expenditures, both imply a drastic reduction of public debt. This might look puzzling in the light of the financial crisis of 2008-09. We now recognise that not only are the projections into the future over

several decades uncertain, but also the initial conditions may not be known: we do not know yet what the consequences of today's crisis will be on economies as a whole, and specifically, what the rescue operations will finally cost governments and thereby the tax payer. However, sooner or later government finances need to be put back on a sound track. Although keeping financial institutions functioning requires a lot of attention, a policy line for future fiscal policies also needs to be set. For this, combining the present conditions and future commitments, notably those related to population ageing, in an integrated framework can be regarded as useful. The SGP is the institutional set-up at EU level for assessing the policies of the Member States and designing corrections if need be, for the sake of the Member States and in the common interest. MTOs are the key variable building the bridge between the present and the future. As there is now more uncertainty about economies than for a long time, a clear framework is needed more than ever, notably for establishing the methods for setting targets for the fiscal position in the medium term. This task was not only triggered by the current crisis, however; it was already included in 2005 when the SGP was revised and country-specific budgetary targets were set only provisionally. Fulfilling this task is an opportunity to look carefully into the economic rationale for setting such targets. The criteria and methods for doing this would benefit from clarity with regard to the principles of how succeeding generations are treated by public policies, covering both ageing-related public expenditures and their financing.

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