OECD Economics Department Working Papers No. 934

Fiscal Consolidation: Part 3. Long-Run Projections and Fiscal Gap Calculations

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https://dx.doi.org/10.1787/5k9h28p42pf1-en

OECD

Unclassified **ECO/WKP(2012)11**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **10-Jan-2012**

English - Or. English

ECONOMICS DEPARTMENT

ECO/WKP(2012)11
Unclassified

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PART 3. LONG-RUN PROJECTIONS AND FISCAL GAP CALCULATIONS

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ABSTRACT/RÉSUMÉ

Fiscal consolidation
Part 3. Long-run projections and fiscal gap calculations

During the economic and financial crisis, fiscal positions across the OECD countries deteriorated sharply. This raises the question of what level of primary deficit would ensure long-term sustainability and what degree of consolidation is needed. The purpose of this paper is to gauge the scale of fiscal consolidation that will be needed to ensure long-term sustainability. The analysis uses so-called fiscal gaps to provide a simple metric for how much consolidation is needed under a series of different assumptions and scenarios. The aim is to highlight the scale of the problems, how they differ across countries and the uncertainties surrounding the estimates. A first set of results suggest that lower debt targets provide greater room for manoeuvre to react to shocks in the future. A second set of results shows that growth-enhancing structural reforms — especially reforms of pension systems — can mitigate budget pressures resulting from ageing populations and hence contribute to fiscal consolidation. Furthermore, raising efficiency in the provision of health care and education can reduce budgetary pressures. Finally, achieving debt objectives under shocks to interest rates or to government spending would require additional tightening in most of the OECD countries.

JEL classification codes: E62; H50; H68; J11
Keywords: Fiscal consolidation; long-term public finance sustainability; public social expenditure; long-term projections; ageing populations

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Consolidation budgétaire
Partie 3. Projections à long terme et calcul des écarts budgétaires

Durant la crise économique et financière, la position budgétaire des pays de l'OCDE s'est nettement dégradée. La question se pose dès lors de savoir quel niveau de déficit primaire assurerait la viabilité à long terme et quel degré d'assainissement est nécessaire. Ce document a pour objet d'évaluer l'ampleur de l'effort de consolidation budgétaire à consentir pour assurer la viabilité à long terme. L'analyse s'appuie sur les « écarts budgétaires », qui permettent de mesurer simplement l'ampleur de l'assainissement nécessaire suivant divers scénarios et hypothèses. L'objectif est de mettre en lumière l'échelle des problèmes, les différences qui existent d'un pays à l'autre et les incertitudes qui entourent les estimations. Une première série de résultats semble indiquer que des objectifs de dette plus bas offrent une plus grande marge de manœuvre pour réagir aux chocs dans l'avenir. Une seconde série de résultats montre que des réformes structurelles propres à renforcer la croissance – en particulier les réformes des systèmes de retraite – peuvent atténuer les pressions budgétaires dues aux vieillissement des populations et, partant, contribuer à l'assainissement des finances publiques. Par ailleurs, rehausser l'efficience dans la prestation de services de santé et d'éducation peut atténuer les pressions budgétaires. Enfin, des chocs affectant les taux d'intérêt ou les dépenses publiques nécessiteraient un resserrement budgétaire plus sévère dans la plupart des pays de l'OCDE.

Classification JEL : E62 ; H50 ; H68 ; J11
Mots-clés : Consolidation budgétaire ; viabilité des finances publiques à long terme ; dépenses sociales publiques ; projections à long terme ; vieillissement des populations

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FISCAL CONSOLIDATION

PART 3. LONG-RUN PROJECTIONS AND FISCAL GAP CALCULATIONS

by Rossana Merola and Douglas Sutherland [1]

1. Introduction

During the economic and financial crisis, fiscal positions across the OECD countries have deteriorated sharply. In most countries, budget deficits soared as a result of the economic slump, the effect of declining asset prices on revenues and the policy response to the crisis (the stimulus packages and support for troubled financial institutions). Current fiscal positions became unsustainable in most countries with underlying balances often very weak and debt rising rapidly. This raises the question of what degree of consolidation is needed and what level of the primary deficit would ensure long-term sustainability.

Recent work by the Economics Department has assessed the consolidation requirements to stabilise debt by 2025. It suggests that the change in the underlying primary balance of the OECD on average would need to be about 5% of GDP between 2011 and 2025 (OECD, 2011*a*), rising to 8 to 9% of GDP in Japan and the United States.

This paper extends the projection horizon to gauge the scale of fiscal consolidation that will be needed to ensure long-term sustainability by 2050. In addition, this paper also considers lower debt targets, which would provide greater room for manoeuvre to react to shocks in the future. The analysis uses so-called fiscal gaps to provide a simple metric for how much consolidation is needed under a series of different assumptions. The aim of this analysis is to highlight the scale of the problems and how they differ across countries. This paper examines the implications of ageing populations and other spending pressures on public budgets and also assesses to what extent growth-enhancing structural reforms can mitigate these budget pressures and hence contribute to fiscal consolidation. Finally, the paper considers three "threats" to fiscal consolidation: a delay to the start of consolidation, an increase in interest rates and the occurrence of fiscal shocks in order to evaluate the uncertainties surrounding the estimates.

The paper is organised as follows. Section 2 briefly reviews part of the theoretical literature on the optimal level of debt and outlines the case for adopting debt targets as anchors for long-term fiscal policy. Section 3 describes the model and the baseline assumptions underlying the long-run projections and then presents the methodology for computing the fiscal gaps. The simulation results are discussed in section 4. Section 5 summarises the main conclusions.

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1. The authors are members of the Economic Department of the OECD. This is one of the background papers for the OECD's project on Fiscal Consolidation (see Sutherland *et al*., 2012 for the main paper). This paper is a revised version of a document prepared for a meeting of Working Party No. 1 of the OECD Economic Policy Committee held in October 2011. The authors are indebted to the participants of the meeting as well as Jorgen Elmeskov, Peter Hoeller, Lukasz Rawdanowicz and Jean-Luc Schneider for useful comments and suggestions and to Susan Gascard for excellent editorial support.

2. Rationales for debt targets

In the long term, governments have to respect the inter-temporal budget constraint: the discounted value of future government spending must equal the present discounted value of future government revenues. The so-called transversality condition prohibits government from always borrowing to pay its debt.[2] At some point in the future government spending must be backed by government revenues or in a dynamic setting debt cannot grow faster than the interest rate. Moreover, assuming a constant interest and growth rate, a constant deficit to GDP ratio ensures convergence of both the debt and interest payment to GDP ratio to finite values. In this case taxes needed to service interest payments also converge to a finite share of GDP. This implies that the service of recurrent deficits does not lead to an ever rising tax burden, but it leaves open the question of what determines the optimum or maximum sustainable debt ratio. There is a consensus, however, that debt developments must be sustainable, because the perception that fiscal developments are unsustainable will lead to a sharp rise in interest rate risk premia, which worsen the fiscal situation, could have a considerable negative impact on the financial system and finally lead to the default of a country.

Theory suggests various channels by which government debt can affect economic activity and welfare in the long run, but determining the optimal debt level empirically is not straightforward.

- Lower public saving, which is not matched by higher private saving, will raise the interest rate and depress investment. The smaller capital stock implies lower output and income. If government borrowing finances public investment and if it is as productive as private investment, there is likely to be little effect on long-term growth. In the open economy case, higher interest rates will attract capital inflows, which will keep up domestic investment, but foreigners accrue the return on their investment, lowering national income relative to output. CBO (2010) provides a long-term scenario, where a $1 increase in the government deficit would be offset by a rise in savings by only 40 cents. The sharp rise in projected debt due to ageing implies that real GDP *per capita* could be 17% lower, with lower output and higher interest rates implied by crowding out leading to even higher debt. If private savings would offset public dis-saving one to one (Ricardian equivalence holds), there would be no effect on interest rates and overall wealth. In this case, any level of government debt that is sustainable is optimal.
- While the debt service payments themselves are merely a transfer among members of society, the taxes needed to service the debt generate a deadweight loss, which rises more than proportionally with tax rates. One approach to analysing optimal debt levels suggests that due to deadweight losses, tax rates should be held constant over time and government debt should be the shock absorber (Barro, 1979; Lucas and Stokey, 1983; Kirsanov and Wren-Lewis, 2007). If major events, like wars or banking crisis, lead to a large jump in debt, the optimal tax rate has to be reset. This implies that debt is an instrument rather than a target and hence rigid targets could produce sub-optimal outcomes.
- On the positive side, public debt can help overcome imperfections in financial market intermediation (Woodford, 1990). By providing liquid assets, public debt increases the flexibility of the private sector in responding to variations in income and spending opportunities. In this model, higher public debt could lead to higher saving and investment, if investors have to shun productive investment opportunities, because they are liquidity constrained.

The net balance of these opposing arguments will depend on the initial debt level, the debt trajectory and various model parameters. Calibrating a US model and including a negative crowding out effect as

2. The transversality condition does not imply that debt is ultimately repaid or even that debt is constant. It only implies that the growth rate of debt is below the interest rate.

well as taxes that have adverse incentive and wealth effects and a positive liquidity effect, Aiyagari *et al.* (1998) found that the optimal debt/GDP ratio is equal to 2/3, which is close to the post-war average debt/GDP ratio for the US economy.

While it is difficult to estimate optimal debt levels, there are several reasons why high debt levels are problematic:

- High debt levels can induce fiscal policy to become pro-cyclical and less effective.[3] The empirical evidence shows that the fiscal policy reaction to the cycle is highly non-linear with respect to the level of government debt. Estimating fiscal policy reaction functions, Égert (2010) found that fiscal policy becomes pro-cyclical when public debt exceeds 89% of GDP. At intermediate levels of between 30% and 89%, the fiscal policy reaction is either neutral or mildly pro-cyclical and becomes counter-cyclical below 30%. Fiscal policy is thus constrained and a pro-cyclical fiscal policy is pursued at high debt levels. High debt levels can also undermine the effectiveness of fiscal policy. Röhn (2010) found a short-run public/private saving offset of around 40% on average over a sample of OECD countries, which means that a fiscal stimulus or retrenchment is partly offset by the private sector. However, as noted in Box 1, these offsets also appear to depend on debt levels. The offset is larger, when the debt/GDP ratio is above 76%.[4]
- High current and expected future debt can lead to debt financing problems, which can push up interest rates on government bonds. For example, Haugh *et al.* (2009*a*) found that interest rate spreads in the euro area are influenced by the level of the debt service ratio, with the effect being larger when a country has a poor record of fiscal discipline. Market perceptions about future debt developments, the maturity structure of debt and the amount of debt in foreign currency are clearly important in this context, as is revenue raising power.[5] In addition, as recurring defaults in emerging market economies and the recent crisis of some European countries demonstrate, interest rates can react non-linearly to debt. However, the threshold is difficult to pin down. In one study, Égert (2010) found for the G7 (excluding Japan) that the long-term interest rate spread over short-term rates is affected when public debt exceeds 76% of GDP. Below this threshold, changes in public debt did not have a statistically significant effect.
- High public debt levels may have adverse effects on growth and inflation. For example, Reinhart and Rogoff (2010) identified various thresholds: *i)* for both developed and developing countries growth rates fall by around 1% when public debt to GDP exceeds 90%; *ii)* in emerging markets, if the external debt-to-GDP ratio rises above 60%, growth declines by 2%; *iii)* in emerging markets, inflation and public debt levels are strongly correlated. In a similar vein, Caner *et al.* (2010) found a threshold effect at 77% of GDP for a large sample of countries, with again the threshold being lower for emerging markets; Kumar and Woo (2010) found that a 10 percentage point increase in debt reduces annual real *per capita* GDP growth by 0.2 percentage points per year, with the effect being smaller for advanced economies and some evidence for non-linearity

3. One lesson from the recent crisis was that fiscal policy in the upswing preceding the crisis had failed to consolidate sufficiently (Sutherland *et al.*, 2010). Not allowing automatic stabilisers to operate symmetrically was also a problem identified in the early 1990s (Leibfritz *et al.*, 1994).

4. The larger private saving offsets at high debt levels imply lower interest rates, while risk premia at high debt levels imply higher interest rates. As underlying interest rates are largely set in the vast international financial markets, the net outcome is likely to be high interest rates for highly indebted countries. Since the sovereign debt crisis has started, the US and German long-term bond yields have become very low, but those in highly-indebted countries have shot up.

5. Such debt thresholds may be lower for sub-national governments if their revenue raising capacity is circumscribed by tax competition or central government. On the other hand, lending may be relatively unconstrained if financial market participants believe that the central government will bail out regions.

beyond a debt/GDP ratio of 90% of GDP; for the euro area countries, Checherita and Rother (2010) found an inverted U-shaped relationship with a turning point in the growth and debt/GDP ratio relationship between 90 and 100%. They also found a negative linear relationship between the change in the debt/GDP ratio and growth of 0.1 percentage point.

Box 1. **Saving offsets**

When balancing consolidation needs with concerns about the strength of the recovery, Ricardian effects may play some role. There may be offsetting movements of public and private saving. Recent work found that the saving offset is around 40% both in the long and in the short term, which is also consistent with, albeit at the lower end, of other empirical research (Röhn, 2010).[1] However, there is considerable heterogeneity across countries. Furthermore, Ricardian effects depend on:

- The instruments of consolidation. Changes in current revenue are almost fully offset in the long term, whereas offsets to current spending are on average around one third to one half depending on the sample. There is no offset for public investment, perhaps reflecting the expectation of a return on the investment.
- Offsets may also react in a non-linear way. Private saving reactions to fiscal policy appear to depend on debt levels. Saving offsets are stronger the higher the level of government debt consistent with the expectation of an increased likelihood of subsequent consolidation or higher interest payments. As such, Ricardian effects are likely to be stronger now than before the crisis in almost all countries.
- The private saving offsets are stronger when a country is more financially developed. This is consistent with the implication that when borrowing constraints are binding Ricardian equivalence may not hold. This may have implications for Ricardian behaviour in countries where credit markets have been particularly hard hit and households and enterprises face credit constraints.

1. In earlier work by the Economics Department assessing the importance of Ricardian behaviour, de Mello *et al.* (2004) found evidence of partial, but substantial, offsetting movements in private and public saving of about 30-50% in the short term and about 75% in the long term while controlling among other things for the real interest rate, inflation and asset price effects. Other controls include: the old age dependency ratio; the ratio of M2 to GDP; changes in the terms of trade; and the growth rate of *per capita* GDP.

These considerations argue in favour of debt ceilings, with the lower threshold of the various studies suggesting a target of around 75% of GDP, and lower prudent debt targets. The appropriate ceiling would need to take into account a range of other factors, such as demographics or home bias of domestic investors and should therefore be country specific. The prudent debt targets should be lower to create fiscal space. First, debt targets should be anchored in long-term deficit projections that take at least part of the contingent liabilities into account. Second, debt targets should provide a sufficient buffer for governments to cope with events such as banking crisis or climate change adaptation and mitigation costs. While the recent financial market crisis may have a smaller fiscal impact than early estimates suggested, they are still large for the most exposed countries. IMF (2010) estimates the net direct budgetary costs at 2.8% of GDP for the advanced economies, but the total impact due to the sharp recession and lower growth in potential output is much larger.[6] Net public debt increased by about 25% of GDP between 2007 and 2011 and under a scenario of gradual consolidation that would ensure a stabilisation of the debt/GDP ratio over the

6. Focusing on countries that experienced a systemic crisis between 2007 and 2009, Laeven and Valencia (2010) show the average increase in public debt to be 24% of GDP and output losses to be 26% of potential GDP. These estimates are not significantly different from the effects of earlier systemic crisis.

medium term, public debt could rise further by another 20% of GDP (OECD, 2010*a*). Prudent debt targets should thus be considerably lower than 75% of GDP.[7]

3. Model description

The long-run simulations can help illuminate major spending pressures, risks posed by unsustainable debt dynamics, and the appropriate scale of the fiscal response to meet different debt-to-GDP targets. For this purpose, simple country-specific maquettes were built based on the medium-term baseline projections that go to 2025 that were presented in the *Economic Outlook* (OECD, 2011*a*).[8] The advantage of using the medium-term baseline (MTB) is that it provides a path for output to return to potential and a normalisation of interest rates.

Basic structure

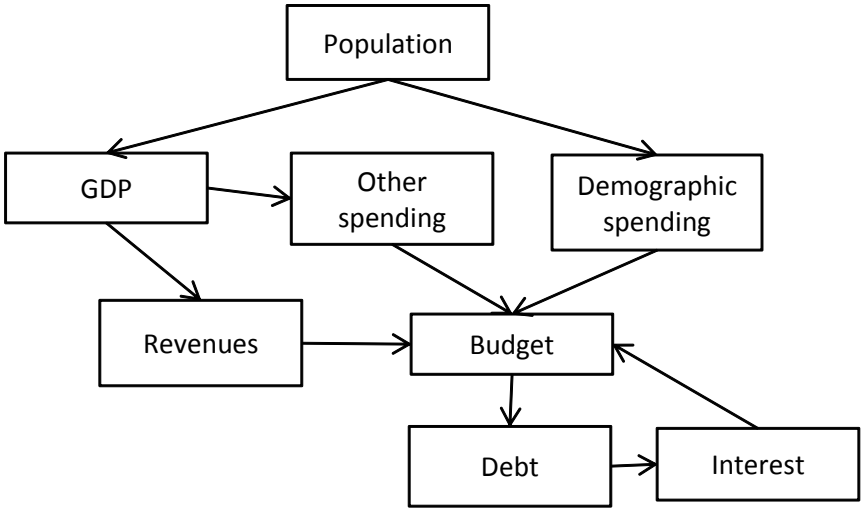
The basic structure of the model consists of the following blocks (Figure 1):

- A demographic block that follows population cohort developments. The demographic block – accompanied with assumptions about labour productivity growth, participation rates, employment rates and inflation — determine potential output growth.
- In the baseline simulation, both revenues and spending are assumed to grow in line with GDP, with the automatic stabilisers operating while the economy moves back to potential. Various assumptions about ageing-related and other spending, principally health and long-term care, can be used to examine the sensitivity of fiscal positions to such spending pressures.
- Interest rates on government borrowing are partly determined by monetary policy. Interest payments are determined by the stock of government debt and an interest rate that is based on a mix of long and short-term rates, with the long-term rate including a risk premium for high levels of government debt.
- The change in net government debt is explained by the primary deficit plus interest payments on the previous period's debt. Gross debt is determined by adding financial assets to the net debt.

7. There have also been episodes in the past, where governments have taken over large amounts of debt, for instance the taking over of the debt of the Treuhandanstalt in Germany.

8. Due to lack of data, Chile, Estonia, Mexico, Israel, Slovenia and Turkey are not included in this analysis. Data for pension spending are not available for Iceland.

Figure 1. Structure of simulation model



Assumptions

Projections over the long-term are necessarily based on several simplifying assumptions. Assumptions are needed to determine the supply side, interest-rate dynamics, and the path of revenue and spending items.

A first major set of assumptions concerns potential output growth. Labour force growth, participation rates and employment rates are taken from the *Economic Outlook*'s medium-term baseline till 2025. From 2025 to 2050, the growth of potential is determined by assumptions concerning labour force growth and participation and employment rates as well as labour productivity. The growth rate of the working age population is assumed for simplicity to be the growth rate of working age cohorts. The data on population developments are taken from the UN population projections (2008 revisions) medium variant, thus assuming that migration continues at past rates.[9] From 2025 onwards, participation rates and employment rates are assumed to remain constant. The medium-term baseline has labour productivity slowly converging from 2015 to 2025, ending up ranging from 1.4 in Denmark to 2.4 in the Slovak Republic. Between 2025 and 2035 labour productivity converges to 1.75% for all countries. The resulting growth rates are shown in Table 1.

A second set of assumptions concerns the determinants of interest rates. The return of output to potential is accompanied by a normalisation of interest rates, such that the risk-free rate is at its estimated natural rate by 2025. Inflation converges to the monetary authorities' target, typically 2% annually. Interest payments are determined by the stock of government debt and an implicit interest rate that is based on a mix of long and short-term rates, with the long-term rate including a premium of 4 basis points for each percentage point of debt in excess of 75% of GDP (Laubach 2003; Egert, 2010; and Haugh *et al.*, 2009). While there is a link between interest rates and high debt levels, the model does not include a link between high debt levels and GDP growth. Japan is assumed to remain unusual, with the very high share of domestic financing keeping the risk premium at only 1 basis point for each percentage point of debt in excess of 75% of GDP (Table 1).

9. Demographic assumptions are typically assessed by introducing high and low versions. Such simulations would require a number of other assumptions. Not only would this represent a potential shock to the labour force, depending on the age structure of migrants and the labour-force participation rates, but would affect ageing-related spending depending on the rights the migrants accrue or have accrued.

Table 1. **Starting points for fiscal policy, average growth and interest rates**

	Starting point, 2012		Average over simulation	
	Gross debt, %GDP	Underlying primary balance % GDP	Effective interest rate	Nominal GDP growth
Australia	31	0.6	6.9	4.8
Austria	82	0.1	4.4	3.5
Belgium	100	0.9	4.7	3.8
Canada	88	-1.8	4.9	4.2
Czech Republic	51	0.3	4.4	4.2
Denmark	60	0.8	5.0	3.5
Finland	66	0.8	4.2	3.9
France	100	-0.6	4.1	3.6
Germany	87	0.6	4.3	3.0
Greece	159	3.5	5.5	3.4
Hungary	81	1.1	5.8	3.2
Ireland	126	-0.4	4.7	4.3
Italy	128	3.3	4.6	3.1
Japan	219	-4.2	3.0	2.2
Korea	33	0.5	4.9	3.2
Luxembourg	24	2.0	4.5	4.9
Netherlands	75	0.0	4.3	3.5
New Zealand	52	-4.0	4.9	3.2
Poland	66	-1.5	5.3	3.2
Portugal	116	3.5	4.6	3.1
Slovak Republic	51	-1.7	5.1	2.8
Spain	75	0.5	4.2	3.5
Sweden	41	2.6	4.7	4.0
Switzerland	37	1.2	2.9	2.9
United Kingdom	93	-3.0	4.6	4.1
United States	107	-5.8	4.6	4.3

The third set of assumptions concerns government spending. In the baseline simulation, both revenues and spending are assumed to grow in line with GDP, with the automatic stabilisers operating while the economy moves back to potential. The maquettes explicitly consider additional pressures on budgets arising from ageing-related and other spending. While reforms to pension and health systems may be the best approach to curb spending pressures, these spending pressures are included in the simulations for two reasons. First, the simulations give an indication of the need for reform. Second, the simulations can highlight the risks associated with postponing consolidation. Spending paths for pensions, health and long-term care are derived from OECD, EU and national sources. In order to isolate the effect of these spending pressures, in the baseline scenario, spending on pensions, health and long-term care are assumed to remain a constant share of GDP. Alternative scenarios show the effect of rising spending.

- The data for the pension spending projections for the EU countries are taken from the European Commission's Sustainability Report 2009, the data for other countries are mainly taken from *Pensions at a Glance* (OECD, 2011), while the figures for the United States come from CBO (2010). These provide spending paths for the baseline projections and can be altered to assess effects of reforms since the estimates were done. In the maquettes, the path of pension spending is phased in so that the profile of spending follows the profile of changes in the old-age dependency ratio. This is highly stylised, but allows the adoption of a common approach for all

countries. The implied spending paths using this assumption are often close to more detailed pension projections from other sources (see appendix).

- For health and long-term care spending, given that only a portion of the projected increase is age-related, the change in spending is phased in linearly (as a per cent of GDP) over the projection horizon to meet projections for spending as a share of GDP in both 2025 and 2050. Table 2 reports pension and health spending projections over the horizon 2010-50.[10] While health spending increases do not vary much across the OECD countries (rising on aggregate by around 2% of GDP when policy actions are assumed to constrain health spending and 4% of GDP for unconstrained health spending), forecasts on pension spending are much more heterogeneous. The increase in pension spending is estimated to be very strong in Luxembourg and Greece (before recent reforms), followed by Spain, Korea and Ireland. On the contrary for Poland and Sweden, the share of pension spending in GDP could decline somewhat.

- Other potential large spending shocks, such as various off-budget and contingent liabilities, also represent an important challenge to budgets. Examples include, responding to natural disasters or decommissioning of nuclear plants. In this case, the source of uncertainty does not stem from ageing populations, but from the lack of data on this kind of shocks and from the difficulty to estimate their size and budgetary impact. Due to these difficulties, these types of shocks are not explicitly taken into account. However, the maquettes are suited for the analysis of the effects of random shocks.

A final assumption is that government financial assets remain constant as a share of GDP.

Using a simple maquette model has a number of drawbacks. These include, *inter alia*, that it cannot take on board demographic uncertainty, the sensitivity of the simulations to assumptions about the effect of the recent crisis on potential output and the absence of an effect of fiscal policy on output.

- Past OECD work has examined the sensitivity of long-run projections to different demographic assumptions and ageing (Oliveria Martins *et al.*, 2005). Ageing depresses growth relative to a scenario with a stable population, especially in countries where pension and labour market policies discourage private saving and employment of older workers. Thus, by magnifying the welfare losses implied by these institutional arrangements, ageing will make the cost of delaying reforms even stronger. As EC (2009*b*) put it: "Demographic change is transforming the EU: longer lives, low fertility and inward migration are its key aspects. The extent and speed of population ageing depends on future trends in these three factors. Demographic factors are subject to less variation than economic factors over the short run. However, especially in European countries, they have exhibited much less stability over the medium term of say, 25 years".[11,12] Where policies are inappropriate to start with, corrective measures can contribute

10. For Australia, Canada, Japan, Korea, New Zealand and the United States, the horizon is 2000-50. For health spending projections the horizon is split into two sub-horizons: 2005-25 and 2026-50.

11. European Commission (2009*b*), *2009 Ageing Report: Economic and Budgetary Projections for the EU-27 Member States (2008-2060),* Brussels.

12. Gonand (2005) assesses the robustness of demographic projections to different assumptions about mortality, fertility and migration in 23 OECD countries. He finds that up to 2030, alternative assumptions concerning future longevity gains would not impact significantly the dynamics of the dependency ratio. Since mortality is relatively low below 70 years, most baby-boomers will still be alive in the 2020s whether life-expectancy increases or not. However, from 2030 on, for countries where national projections embody a dependency ratio of 60% or more in 2050 (Japan, Italy, Spain, Korea, Poland), different assumptions concerning future longevity gains translate into a sensitivity range of around 15 percentage

to offset some of the drag on growth due to ageing. In particular, increasing the retirement age in line with projected longevity gains significantly slows down the increase in the old-age dependency ratios due to ageing.

Table 2. **Pension and health care spending assumptions**

	Change in pension spending (% GDP)	Change in health and long-term spending (% of GDP)					
		Health Cost containment scenario		Health Cost pressure scenario		Long-Term Care (cost pressure)	
	2010-2050	2005-2025	2026-2050	2005-2025	2026-2050	2005-2025	2026-2050
Australia	1.6	1.5	0.8	1.8	2.4	0.5	1.5
Austria	1.3	1.2	0.8	1.5	2.3	0.6	1.4
Belgium	4.4	1.0	0.5	1.3	2.0	0.6	1.3
Canada	5.8	1.6	0.6	1.9	2.2	0.6	1.5
Czech Republic	3.1	1.3	1.0	1.7	2.4	0.7	1.0
Denmark	0.2	1.1	0.6	1.5	2.0	0.4	1.1
Finland	2.6	1.5	0.3	1.8	1.8	0.8	1.6
France	0.7	1.1	0.6	1.5	2.0	0.4	1.3
Germany	2.1	1.2	0.6	1.5	2.1	0.8	1.1
Greece	0.0	1.3	0.7	1.6	2.3	1.3	1.4
Hungary	1.9	1.2	0.6	1.5	2.1	0.8	1.3
Ireland	5.0	1.3	0.9	1.6	2.4	1.5	2.3
Italy	0.7	1.2	0.7	1.6	2.2	1.3	1.6
Japan	0.6	1.6	0.9	1.9	2.4	1.1	1.1
Korea	8.0	1.8	1.2	2.1	2.8	1.1	2.7
Luxembourg	13.5	1.0	0.9	1.4	2.3	1.3	1.8
Netherlands	3.8	1.4	0.6	1.7	2.1	0.7	1.3
New Zealand	8.0	1.5	0.8	1.8	2.4	0.6	1.4
Poland	-1.6	1.5	0.8	1.8	2.3	1.1	2.1
Portugal	1.4	1.3	1.1	1.6	2.6	0.6	1.4
Slovak Republic	2.8	1.5	1.3	1.9	2.7	0.7	1.6
Spain	3.1	1.3	1.0	1.6	2.5	1.1	1.3
Sweden	-0.6	1.1	0.3	1.4	1.8	0.3	0.8
Switzerland	2.8	1.3	0.3	1.6	1.9	0.4	1.0
United Kingdom	1.4	1.1	0.6	1.4	2.2	0.6	1.3
United States	1.4	1.2	0.4	1.5	1.9	0.4	1.3

Source: OECD (2011), CBO (2010), European Commission (2009*b*) and OECD estimates of 2010 pension reforms for Greece and Spain.

- Projected consolidation needs are sensitive to the uncertainty around the estimates of potential output. Estimates of the nature and the scale of the adverse effects of the recent crisis on potential output vary across the OECD countries, in part because the crisis hit countries in different ways and because countries have different institutional and policy settings that influence the response of potential output, particularly in the labour market (OECD, 2009).[13] This uncertainty is

points around the baseline dependency ratio in 2050. For most of the other countries where national authorities project a dependency ratio of 45-50% (or less) in 2050, the sensitivity bound is still about 10 percentage points. Fertility and migration flows are hard to forecast. A recovery in the fertility rate in those countries where it is currently low would alleviate upward pressures on the old age dependency ratio: the sensitivity range for the dependency ratio in 2050 would be between 5 and 15 percentage points. An effect of similar magnitude is obtained under the assumption that migration flows are twice as large as the official ones.

13. Recent work by the Economics Department suggests that economic crises and particularly financial crises have a detrimental effect on the level of potential output (Furceri and Mourougane, 2009), which could be as large as 3.25% for the median OECD country in 2012.

important to bear in mind given that underlying revenues and spending are used for the long-term revenue and spending patterns.

- Fiscal policy has consequences for output growth. Policy adjustments to restore sustainability can take a variety of forms, which affect decisions on labour and capital supply. In addition, given the choice of a particular policy instrument, different timing options are available. However, to keep the maquettes tractable, they do not distinguish between policy instruments nor assess their potential feedback on output. In this light, the simulations give an indication of the scale of the problem, but not the potential short-run trade-offs in undertaking a fiscal consolidation.

Defining fiscal gaps

The long-run projections are used to determine so-called fiscal gaps (Auerbach, 1994). The fiscal gap shows the *immediate and permanent* improvement in the underlying primary balance that is required to ensure that debt meets a target at a certain point in time. The fiscal gap is related to a number of recent sustainability exercises (Box 2). The work in this paper thus complements other analyses. First, it provides a common framework for both European and non-European countries. Second, various scenarios examine possible threats to and support for fiscal consolidation. Third, it is based on an explicit modelling framework for interest rates, which play an important role for the debt dynamics. Partly as a result of time-varying interest rates, the approach adopted solves the required shift in the underlying primary balance to meet different debt targets explicitly in the model simulations. Fiscal gaps for ensuring gross debt is 50% of GDP in 2050 are reported. This is intended to be illustrative and not normative. Results for a variety of different gross debt targets (returning debt to pre-crisis levels and to 75% and 25% of GDP) are also reported in many of the accompanying tables. A variety of targets is used as different debt targets will be appropriate for different countries. For example, the lower gross debt target may be less compelling for countries with large government financial asset holdings. In other cases, where the public has demonstrated a preference for very low levels of debt a high debt target is clearly inappropriate. The debt targets also show the implications for fiscal policy of being ambitious. The fiscal gaps reveal how much extra fiscal tightening is needed to get debt down to a prudent level (25% and 50% of GDP).

As some governments are already undertaking fiscal consolidation measures, the simulations take fiscal data for 2012 from the *Economic Outlook* projections as the starting point, implying that the tightening is from 2013 onwards. As such, the starting point already embodies expected fiscal tightening (Table 1). In some cases this tightening is substantial. Between the trough (measured by the underlying primary balance) following the onset of the crisis in 2007 and the projected value for 2012, five countries are expected to tighten by more than 5% of GDP (Spain, Greece, Ireland and Portugal), with Greece having a projected underlying primary surplus of 3.5% of GDP in 2012 as compared to a deficit of 8.9% of GDP in 2009.

Box 2. **Relation to other long-term sustainability exercises**

European Commission Sustainability Reports

The European Commission's Sustainability Report (2009*a*) contains analysis that is related to the fiscal gaps presented in this paper. The Report defines ageing-related expenditure to include public spending on pensions, healthcare and long-term care. On the other hand, there are projected declines in education spending and unemployment benefit payments. The calculations are based on the assumption that the old-age dependency ratio will more than double from 25% in 2007 to 54% in 2060 in the EU as a whole (with considerable variation across member states). In addition, potential growth is projected to fall from 2.4% in 2007–20 to 1.3% over 2041–60 due to ageing, with again considerable variation across member states. Finally, the real interest rate is assumed to be fixed at 3%. Since the publication of the 2009 Sustainability Report budgetary positions and policies have changed significantly in some countries (such as Greece).

As a measure of fiscal sustainability, the Commission uses two indicators. A broad so-called S2 indicator consists of two components. The first component corresponds to the necessary once-and-for-all increase in the structural primary balance to offset the debt build-up that would result if the initial 2009 structural primary balance was maintained in the future. The second component corresponds to the necessary once-and-for-all increase in the structural primary balance to offset any debt build-up associated with a future increase in ageing-related expenditure. The Commission's S2 sustainability gap is around 6.5% of GDP for the EU as a whole, but there is significant heterogeneity across countries:

- A large tightening of more than 8% of GDP was estimated as needed for Ireland, Greece, Luxembourg, Slovenia and the United Kingdom. In Greece, Luxembourg and Slovenia the large sustainability gaps are mainly driven by the strong impact of growth in ageing-related spending, while in Ireland, Spain and the United Kingdom the tightening requirements mostly reflect poor initial budgetary positions.

- An adjustment in the range of 4–8% of GDP would be required in Austria, Belgium, the Czech Republic, Finland, France, Germany, the Netherlands, Portugal and the Slovak Republic.

- Smaller adjustments or no adjustment at all would be required in Hungary, Italy, Denmark, Poland and Sweden.

The Commission also calculates a S1 indicator for which debt is constrained to be at most 60% of GDP (in line with the Maastricht criteria) at some pre-set point in time. Numerically the differences between the two indicators can be significant, but they generally point in the same direction.

Fiscal sustainability in Norway

Norway is in the unusual position of having a substantial net asset position, thanks to the exploitation of significant hydrocarbon reserves. By building up a large stabilisation fund, the Government Pension Fund – Global (GPFG), which is expected to stabilise around 2020 at about 240% of GDP), the Norwegian authorities approach sustainability with significant non-tax revenues that are available in the future. Nonetheless, many of the same issues are relevant (though the necessary assumptions about petroleum prices, the remaining life of the hydrocarbon reserves and the future returns of GPFP investments is more complicated than the framework used in this document). The Norwegian Ministry of Finance has estimated a long-term fiscal gap of 6% of GDP. These calculations illustrate how a continuation of present welfare schemes will give rise to an increase in future tax-financing in order to keep public deficits in line with fiscal policy guidelines (an expected return on the GPFG called the 4% path). The projected development in tax levels may be interpreted as an indicator of fiscal sustainability, with a rise indicating a need for consolidation (Finansdepartementet, 2009). These estimates are surrounded with uncertainties and rely on assumptions, such as unchanged participation rates, stable productivity growth and unchanged standards and coverage of publicly financed services. Simulations suggest that increasing labour market participation as part of a pension reform will be very important to ensure the long-term sustainability of the public finances. This requires a number of actions, including completion of pension reforms, rationalisation of the social protection system and reform of the sickness leave and disability systems (OECD, 2010*c*).

4. Results

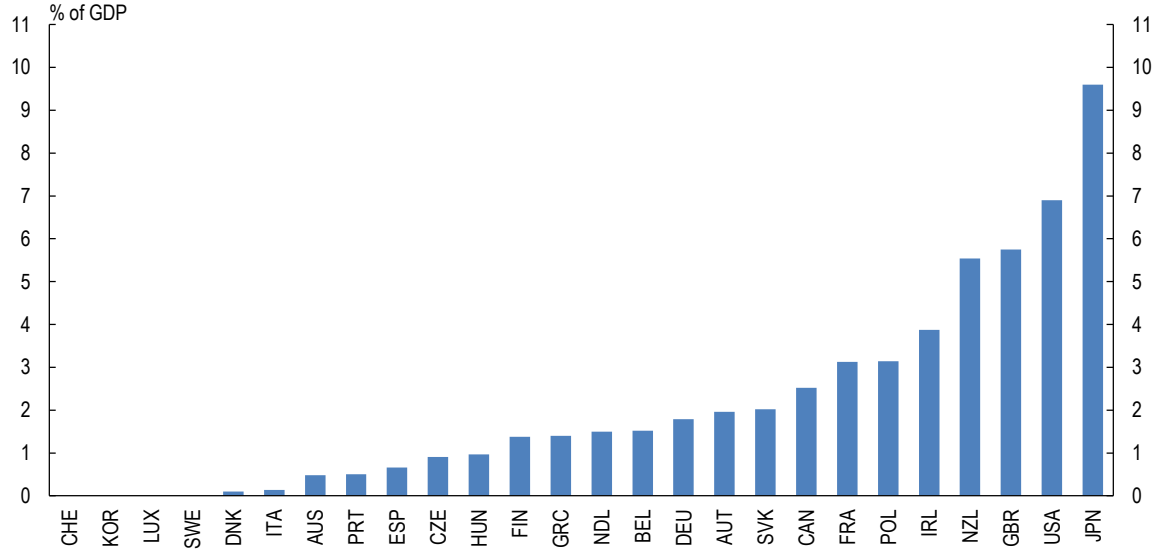
Baseline scenario and different debt ratio targets

In the baseline simulation, primary spending as a share of GDP is assumed to remain constant (pension and health spending does not change over the horizon 2012-50). Up to 2025, the projections for output and interest rates are based on the OECD's medium-term baseline projections. Public revenues and primary expenditure are assumed to grow in line with GDP. The fiscal gap calculations show the size of fiscal consolidation requirements necessary to achieve certain targets.

In the baseline, the debt target is for countries to reduce gross financial liabilities to 50% of GDP by 2050. The baseline simulation shows the immediate and permanent tightening of the primary balance in 2012 needed to reach this target. Considerable differences across countries emerge (Figure 2). Countries differ mainly because of large differences in underlying deficits at the starting point and to some extent the level of initial debt. A number of countries (Switzerland, Korea, Luxembourg and Sweden) do not face any tightening requirements to meet the target. In Italy, even though the initial debt level is very high, debt is already on a declining path at the start of the projection.

Figure 2. **Baseline fiscal gaps**

Change in underlying primary balance as per cent of GDP needed to reduce gross financial liabilities to 50% of GDP in 2050



Note: The change is with respect to the underlying primary balance projected for 2012.

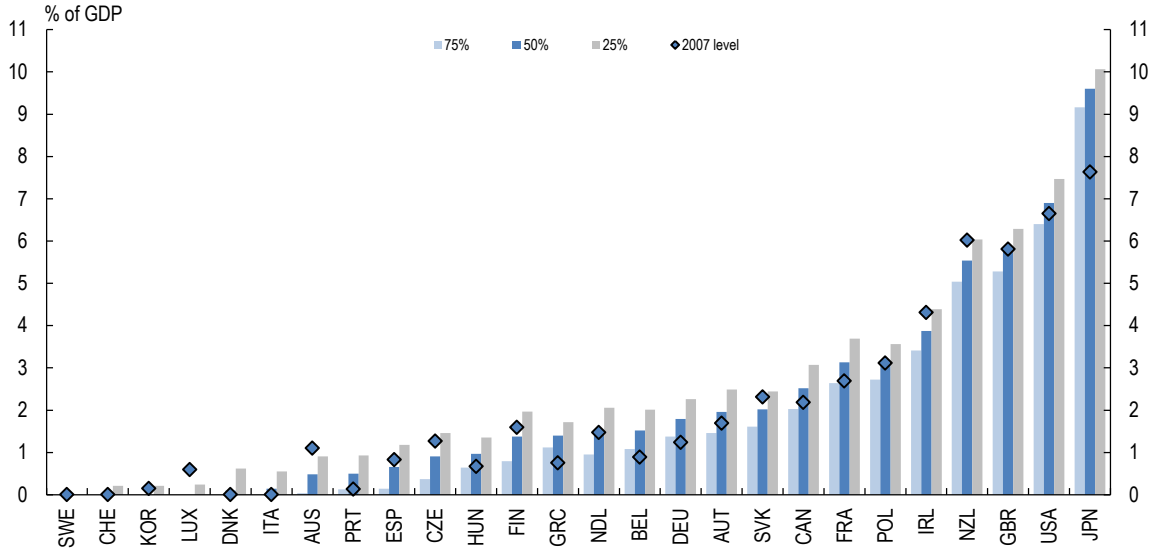
A relatively small tightening (below 3% of GDP) is still required for the rest of the OECD countries, where a sound budget position has already been achieved in the short term. Countries already undertaking large fiscal consolidations (Spain, Greece and Portugal) generally face moderate fiscal gaps. Most of the EU countries (*e.g.* Spain, the Slovak Republic, Poland and France) have targeted a reduction in the overall fiscal deficit to 3% of GDP over the next two to four years. Therefore, the prompt consolidation causes lower interest payments and requires less additional consolidation. In some of these countries, ambitious cuts in public expenditure (*e.g.* the Slovak Republic), higher taxes (*e.g.* Spain) or robust growth (*e.g.* Poland) have supported fiscal consolidation.

Countries where underlying fiscal deficits are expected to remain substantial in 2012 face much larger fiscal gaps. For example, the fiscal gaps for New Zealand, the United Kingdom the United States, and Japan exceed 5% of GDP, if they were to reduce gross financial liabilities to 50% of GDP.

To examine the implications of setting a more ambitious target, fiscal gaps for achieving different debt targets were calculated. The fiscal gaps do not change markedly relative to the baseline if alternative debt targets are used, with the exception of returning debt to the pre-crisis level (Figure 3). These scenarios include one where the aim is to meet a debt target of 25% of GDP. The calculations suggest that the extra degree of fiscal consolidation needed to bring debt down to prudent levels is relatively modest if implemented over a long period. If the aim is to return gross debt to the pre-crisis level, consolidation requirements would remain demanding for some countries. Reducing debt to the pre-crisis level is an ambitious goal, because in some of these countries (*e.g.* the United Kingdom, Ireland, New Zealand and the United States) the debt-to-GDP ratio in 2007 was relatively low. At the other extreme, for Japan, returning to the very high pre-crisis debt level is somewhat less onerous, but the fiscal gap is still large.

Figure 3. **Fiscal gaps for alternative debt targets**

Change in underlying primary balance needed so that gross financial liabilities equals 75%, 50% or 25% of GDP or returns to the 2007 level in 2050



Note: The change is from the underlying primary balance projected for 2012.

Net debt targets

The sustainability of general government fiscal positions is often assessed based on gross financial liabilities as opposed to net financial liabilities, which is defined as the difference between financial liabilities and financial assets. However, taking government assets into consideration may indicate that fiscal positions are in better shape. For example, the proceeds from selling financial assets can be used to reduce gross debt, while leaving net debt unchanged. This implies a reduction in debt servicing costs, and possibly reductions in government bond rates, if markets perceive that fiscal sustainability has improved. However, the sale of assets also eliminates income earned on them. The net effect depends, *inter alia*, on the difference between the interest rate paid on debt and the rate of return earned on assets. If the former exceeds the latter, the sale of assets will improve debt dynamics via the net interest payments effect.

A set of simulations was run without changing the basic assumptions but using net debt as a target. If governments aim to meet net debt targets, fiscal consolidation is less challenging due to the lower levels of net debt. In 2009, the (unweighted) OECD average of net debt totalled 22% of GDP, while gross debt stood at 72% of GDP. In ten countries net debt was zero or even negative.[14] Given the lower net debt levels, only a small fiscal consolidation effort is typically required to reach a target of net debt equal to 25% of GDP (Table 3). In some cases, net positions are sufficiently favourable that no consolidation is required, such as in Finland where the large net asset position reflects pre-funding for pension spending.

Table 3. **Fiscal gaps for gross and net financial liabilities targets**

	Baseline Gross financial liabilities target				Baseline Net financial liabilities target	
	2007 level	*75% of GDP*	*50% of GDP*	*25% of GDP*	*25% of GDP*	*0% of GDP*
Australia	1.10	0.04	0.48	0.91	0.43	0.93
Austria	1.69	1.46	1.96	2.49	1.74	2.31
Belgium	0.89	1.08	1.52	2.01	1.58	2.13
Canada	2.18	2.03	2.52	3.07	1.93	2.46
Czech Republic	1.27	0.37	0.91	1.46	0.45	1.04
Denmark	0.00	0.00	0.10	0.62	0.00	0.07
Finland	1.59	0.79	1.38	1.97	0.00	0.02
France	2.69	2.64	3.13	3.69	2.85	3.44
Germany	1.24	1.38	1.79	2.26	1.55	2.05
Greece	0.75	1.12	1.40	1.72	1.25	1.62
Hungary	0.67	0.64	0.97	1.35	0.86	1.29
Ireland	4.31	3.41	3.87	4.39	3.43	3.97
Italy	0.00	0.00	0.14	0.55	0.07	0.52
Japan	7.63	9.16	9.60	10.06	4.93	5.74
Korea	0.15	0.00	0.00	0.21	0.00	0.00
Luxembourg	0.59	0.00	0.00	0.24	0.00	0.00
Netherlands	1.47	0.95	1.50	2.06	1.14	1.74
New Zealand	6.02	5.04	5.54	6.04	5.13	5.68
Poland	3.11	2.72	3.14	3.56	3.00	3.46
Portugal	0.13	0.13	0.50	0.93	0.38	0.84
Slovak Republic	2.31	1.61	2.02	2.44	2.03	2.48
Spain	0.83	0.14	0.66	1.18	0.60	1.16
Sweden	0.00	0.00	0.00	0.00	0.00	0.00
Switzerland	0.00	0.00	0.00	0.21	0.00	0.00
United Kingdom	5.81	5.28	5.75	6.29	5.56	6.15
United States	6.65	6.40	6.90	7.47	6.95	7.59

The effect of pension spending pressures

Despite the reforms introduced during the past couple of decades, many OECD countries continue to face looming fiscal pressures related to the ongoing ageing of their populations. On average in the OECD, public pension spending is projected to increase from 8.4% of GDP in 2010 to 11.4% in 2050 (OECD, 2011*c*), with substantially larger increases in several countries (Table 2).

The implications of such increases in spending in the absence of reform can be assessed with fiscal gaps. The simulations do not take into account taxes on private occupational pension schemes, which in

14. Sometimes, sizeable asset levels reflect the response to the financial crisis, as financial assets in the government sector increased substantially due to the recapitalisation or takeover of financial institutions.

some cases could significantly boosts revenues.[15] The path of projected public pension spending is phased in so that the spending profile follows the profile of the old-age dependency ratio. Including pension spending alters the fiscal gaps for many countries radically relative to the baseline scenario (Figure 4).

- When ageing-related spending is included, debt and debt servicing costs rise in all countries, except in Poland and Sweden. In these two countries, as public pensions drop households need to ensure that their retirement income is supplemented by private saving. In this light, the effects of Poland's recent reforms to the second pillar will need to be monitored to assess the impact on both sustainability of the reformed system and how household saving behaviour reacts.[16]

- In some countries, the increase of pension spending over the next 40 years does not represent a major challenge. For instance, in Denmark, the projected increase in pension spending is of negligible size and the population is "greying" at a slow pace.

- In other countries, where pension spending is expected to increase moderately, the fiscal gap is adversely affected, but the dynamics of pension spending does not put significant additional pressure on public finances (*e.g.* in Germany, France, the United Kingdom, the United States and Japan).

- The rise in consolidation requirements is far more pronounced in those countries where the increase in pension spending as a share of GDP is large (*e.g.* in ascending order Hungary, Switzerland, Finland, the Netherlands, Belgium, and Korea) or very large (Luxembourg). In Finland, while ageing increasingly weighs on the public finances, considerable financial assets have been built up for supporting future pension spending.

- In the Czech and Slovak Republic and Canada, the change in pension spending is quite large. However, pressures on public finances from increasing pension spending are partially muted, because the population in these countries is comparatively young compared with the other OECD countries. Nevertheless, viewed from the end-point of the projections, the share of the elderly will increase considerably beyond 2050, especially in the Czech and in Slovak Republic. Therefore, even though the demographic distribution of the population is not currently putting pressure on fiscal sustainability, these countries are not immune to ageing pressures.[17]

The fiscal gaps of the countries facing the largest pension spending pressures, such as Belgium, the Netherlands and Luxembourg are large and underline the need for prompt reform. In Greece and Spain, reforms of their pension system in 2010 addressed the pressure emanating from this source.

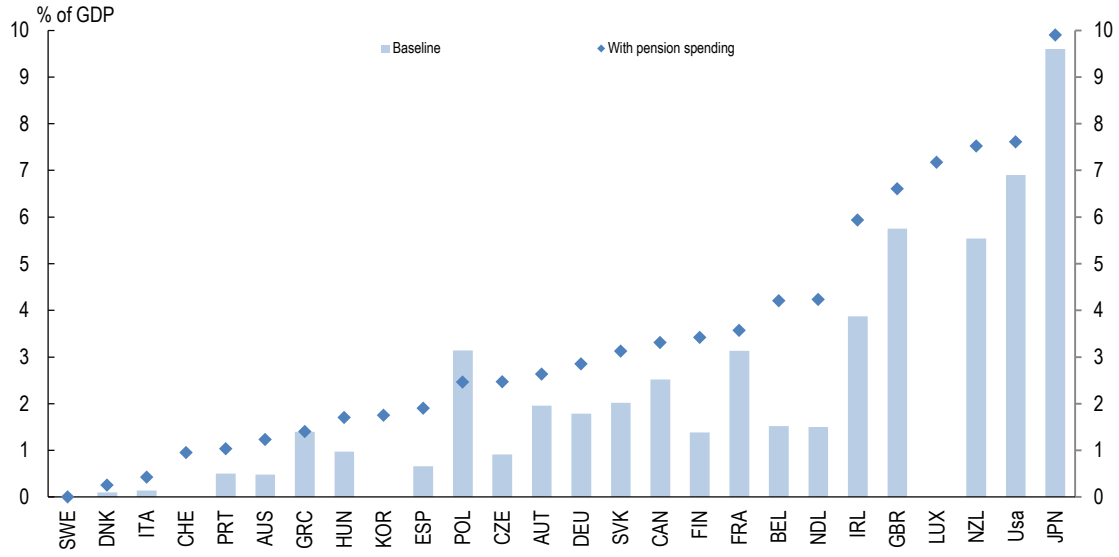
15. Antolin *et al*. (2004) for example estimate that accompanying rising revenues on withdrawal would lead to net fiscal revenues for "exempt, exempt, taxed" (EET) schemes to become less negative and in some cases sharply positive by 2050.

16. In Poland efforts have also been made to reduce the generosity of public-sector pensions, which for some groups have been particularly generous.

17. The Slovak Republic has recently announced reforms of the pension system aimed at reducing future increases in ageing-related spending (*e.g.* the introduction of a stabilisation mechanism in the first pillar).

Figure 4. **Fiscal gaps with pension spending**

Change in underlying primary balance needed to bring debt to 50% of GDP in 2050



Note: The change is from the underlying primary balance projected for 2012.

The effects of health spending pressures

A second source of additional pressures on public spending comes from rising health care costs. In the case of health care spending, higher levels of spending are not necessarily undesirable, but financing higher spending can create difficulties (Hall and Jones, 2007). Rapidly rising health care prices and developments of new costly treatments put upward-pressures on health-care budgets. Spending on health care is already one of the largest public spending items, accounting for more than 15% of general government spending on average in the OECD in 2007. Pressures from spending on long-term care are expected to grow in the future across most OECD countries. Most OECD countries currently allocate between about 1 and 1.5% of GDP to long-term care, but they could at least double by 2050.[18] Changes in spending are phased in gradually so that spending-to-GDP ratios equal estimates of health and long-term care in 2025 and 2050 (Oliveira-Martins and de la Maisonneuve, 2006). Spending does not depend on the ageing profile over the projection horizon.[19]

In the fiscal gap simulations, three cases are distinguished: in the first case (the "low" or cost containment scenario), health care spending increases, but policies are in place that control expenditure growth. In the second case (the "high" or cost pressure scenario), the health spending increase is unconstrained.[20] In the third case, the impact of additional pressures arising from long-term care spending is analysed.

18. Oliveira-Martins and de la Maisonneuve (2006); Duval and de la Maisonneuve (2009); European Commission (2009*b*).

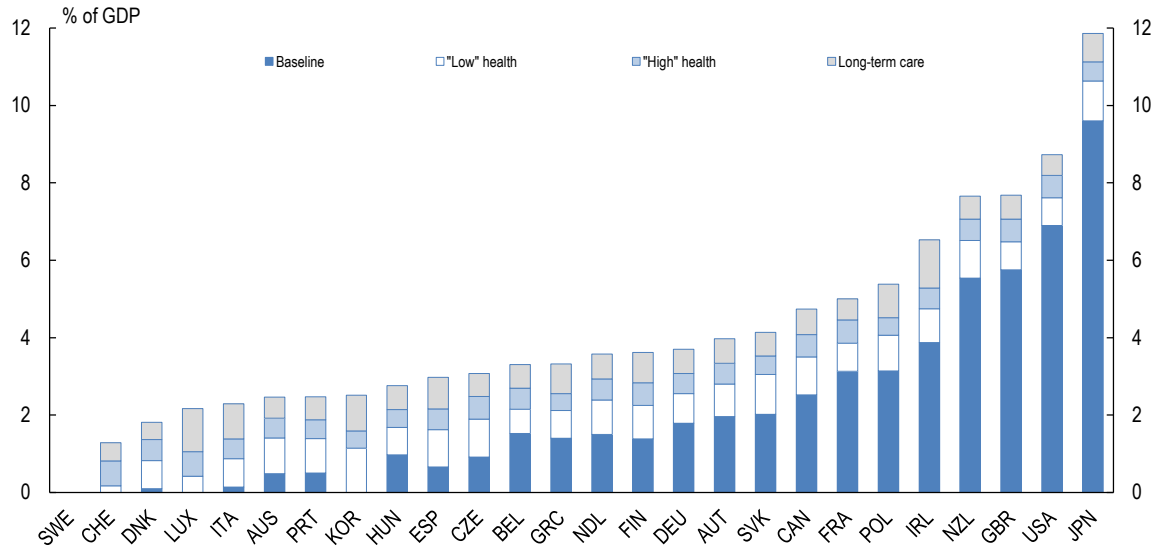
19. Future trends in spending can be affected by a number of factors, of which ageing represents a relatively small share.

20. The "cost-pressure" scenario assumes that, on top of demographic effects, spending grows by 1% per annum faster than income, which would be broadly consistent with observed trends over the past two decades.

The projected increase in health and long-term care spending by 2050 is on average between 3½ per cent of GDP to around 6% of GDP, depending on the assumptions about the pace of spending growth. As the projected increases are relatively similar the impact on the fiscal gaps does not vary much, but exceeds 1.5% of GDP in Switzerland, the Czech Republic, Canada, New Zealand and Japan when greater cost pressures affect health spending (Figure 5). When health spending is "high" fiscal consolidation becomes somewhat more difficult in all countries except Sweden. In a few countries, the projected increases in long-term care are substantial and add significantly to the fiscal gap, particularly for Italy, Luxembourg, Finland and Ireland, where such spending adds around an additional percentage point of GDP to the fiscal gap.

Figure 5. **Fiscal gaps with health and long-term care spending**

Immediate rise in the underlying primary balance needed to bring gross financial liabilities to 50% of GDP in 2050



Note: "Low" health assumes policy action curbs health spending growth. "High" health is the additional cost pressure in the absence of these policy actions.

The need for structural reform is even more apparent when different spending pressures are combined (Table 4). In the simulations that assess the increases of pension and health and long-term care spending together, the fiscal gap in some countries under-shoots the debt target before the end of the simulation (Figure 6). Without reform, spending pressures would continue to grow beyond the end of the simulation period and thus represents a continued long-term threat to public finances. To some extent, for pensions, the demographic transition will eventually see the acute spending pressure abate though pressure will continue to mount if life expectancy continues to increase and retirement ages do not adjust.

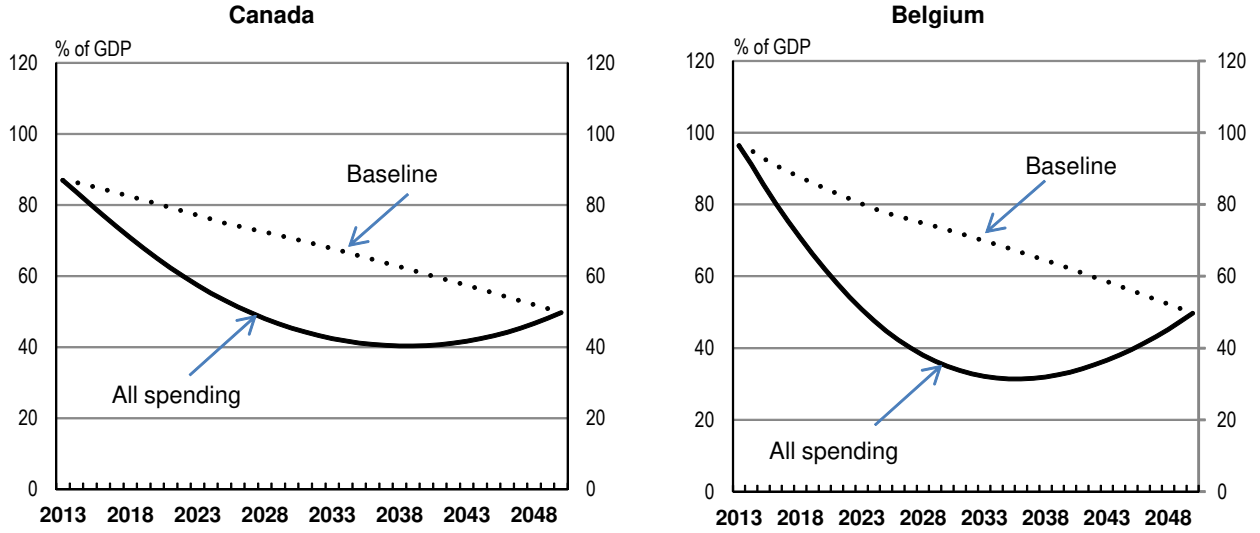
Structural reforms can facilitate fiscal consolidation

Against the background of impaired fiscal positions and the moderate pace of recovery, it is particularly important to implement structural reforms that facilitate fiscal consolidation. Reforms that could help to improve fiscal positions and foster employment growth, without having strong negative effects on near-term activity, include reforms to pension systems (*e.g.* gradually raising the retirement age) and reforms to increase productivity, including in the public sector. Two types of growth-enhancing reforms are considered: a first simulation shows the effect of better labour market performance by removing disincentives for individuals to remain in the labour force at older ages. The second shows the effect of higher labour productivity growth combined with higher efficiency in the public sector. Measures

raising potential output through higher employment usually have a larger impact on fiscal balances than those raising potential GDP through higher labour productivity (OECD, 2010*b*).

Figure 6. **Debt evolution with pension, health and long-term care spending**

Gross financial liabilities, 2013-50



Note: The figures show the evolution of gross financial liabilities for the baseline fiscal gap simulation and for the fiscal tightening to meet the 50% of GDP debt target in 2050 in a scenario with pension, health and long-term care spending.

The effects of delaying the retirement age

Ageing populations are putting pressure on public pensions. However, as a consequence of past pension reforms, the growth of pension expenditure would be much slower than demographic change alone would have implied. However, due to the gains in life expectancy, there is still scope for further reform. Raising the retirement age is on the reform agenda in many countries. Past work by the OECD has warned about the adverse effects of early retirement and measures that encourage labour market withdrawal on labour market performance (Blöndal and Scarpetta, 1998; Casey *et al*., 2004). Such schemes tend to reduce labour force participation of older workers. During the recent crisis, governments have not given in to the temptation to open pathways to early retirement. For instance, while several OECD countries have raised the level and/or duration of unemployment benefits, no specific measures have been taken for older workers (OECD, 2010*b*), but such schemes nonetheless still exist in many countries.

Table 4. **Fiscal gaps for pension, health and long-term care spending**

	Pensions spending increase				Pensions and health spending increase Cost containment scenario				Pensions and health spending increase Cost pressure scenario				Pensions, health and long term care Cost pressure scenario			
	2007 level	*75% of GDP*	*50% of GDP*	*25% of GDP*	*2007 level*	*75% of GDP*	*50% of GDP*	*25% of GDP*	*2007 level*	*75% of GDP*	*50% of GDP*	*25% of GDP*	*2007 level*	*75% of GDP*	*50% of GDP*	*25% of GDP*
Australia	1.85	0.79	1.23	1.66	2.78	1.73	2.16	2.60	3.29	2.23	2.67	3.10	3.83	2.77	3.21	3.64
Austria	2.36	2.11	2.63	3.16	3.20	2.95	3.47	4.00	3.74	3.49	4.02	4.55	4.37	4.12	4.65	5.18
Belgium	3.42	3.68	4.20	4.72	4.07	4.34	4.86	5.38	4.62	4.89	5.41	5.94	5.23	5.50	6.03	6.55
Canada	2.95	2.77	3.31	3.87	3.92	3.73	4.30	4.86	4.51	4.31	4.88	5.45	5.17	4.98	5.55	6.11
Czech Republic	2.82	1.92	2.47	3.01	3.81	2.90	3.45	3.99	4.39	3.49	4.03	4.58	4.98	4.08	4.62	5.16
Denmark	0.00	0.00	0.25	0.77	0.65	0.45	0.97	1.49	1.20	0.99	1.51	2.03	1.64	1.44	1.96	2.48
Finland	3.62	2.83	3.42	4.01	4.49	3.70	4.29	4.88	5.07	4.27	4.86	5.45	5.86	5.07	5.66	6.25
France	3.11	3.06	3.57	4.14	3.81	3.76	4.31	4.90	4.39	4.33	4.91	5.50	4.93	4.87	5.46	6.05
Germany	2.20	2.37	2.85	3.33	2.95	3.13	3.62	4.10	3.47	3.66	4.15	4.64	4.10	4.30	4.78	5.27
Greece	0.75	1.12	1.40	1.72	1.44	1.83	2.12	2.46	1.83	2.23	2.55	2.90	2.55	2.98	3.32	3.70
Hungary	1.37	1.33	1.70	2.09	2.08	2.03	2.42	2.81	2.55	2.50	2.89	3.29	3.16	3.11	3.51	3.90
Ireland	6.43	5.37	5.93	6.52	7.37	6.28	6.86	7.46	7.95	6.84	7.44	8.04	9.24	8.11	8.72	9.33
Italy	0.00	0.06	0.42	0.84	0.30	0.77	1.16	1.60	0.75	1.26	1.68	2.14	1.58	2.13	2.59	3.07
Japan	7.92	9.45	9.90	10.36	8.92	10.48	10.93	11.39	9.40	10.97	11.43	11.90	10.11	11.70	12.16	12.64
Korea	2.14	1.31	1.75	2.19	3.28	2.45	2.89	3.33	3.73	2.90	3.34	3.79	4.65	3.82	4.26	4.70
Luxembourg	8.17	6.52	7.17	7.82	9.00	7.35	8.00	8.65	9.63	7.98	8.63	9.28	10.75	9.10	9.75	10.41
Netherlands	4.20	3.67	4.23	4.80	5.09	4.56	5.12	5.68	5.63	5.11	5.67	6.23	6.28	5.75	6.31	6.88
New Zealand	8.00	7.02	7.52	8.01	8.97	7.99	8.49	8.99	9.52	8.54	9.04	9.53	10.12	9.14	9.64	10.14
Poland	2.43	2.04	2.46	2.87	3.34	2.95	3.37	3.79	3.81	3.42	3.84	4.26	4.67	4.28	4.70	5.12
Portugal	0.63	0.63	1.03	1.48	1.49	1.50	1.94	2.41	1.97	1.98	2.44	2.92	2.56	2.57	3.04	3.52
Slovak Republic	3.40	2.70	3.12	3.53	4.43	3.73	4.14	4.55	4.91	4.21	4.62	5.03	5.52	4.83	5.24	5.65
Spain	2.06	1.37	1.90	2.42	3.01	2.33	2.85	3.37	3.55	2.87	3.39	3.91	4.37	3.68	4.20	4.73
Sweden	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Switzerland	1.06	0.13	0.95	1.77	1.85	0.91	1.73	2.55	2.48	1.55	2.37	3.19	2.96	2.02	2.84	3.66
United Kingdom	6.67	6.08	6.60	7.16	7.40	6.79	7.34	7.90	8.00	7.37	7.93	8.50	8.62	7.99	8.56	9.12
United States	7.34	7.08	7.61	8.20	8.06	7.78	8.34	8.94	8.63	8.32	8.92	9.53	9.17	8.86	9.47	10.08

Note: For Greece and Spain, the table reports the pre-reform fiscal gaps.

Population ageing has led to a substantial "greying" of the working age population in OECD countries. As a consequence, aggregate participation and employment rates are expected to decline and old-age dependency ratios to rise (Burniaux *et al*., 2003). Therefore, pension reform is required to put the public finances on a sustainable footing.[21] Indeed, some countries facing the fastest growth in pension spending have begun to reform their pension systems.[22] There are a number of approaches to managing pension spending, including tightening the access for a public pension through raising the retirement age and reducing access to early retirement and other pathways to early retirement such as through disability pensions. Postponing the retirement age is desirable for various reasons:

- Raising the retirement age would curb the rise in ageing-related spending while at the same time generating higher tax revenues to finance it. Moreover, postponing retirement could be particularly effective in achieving medium-term consolidation, without negative effects on demand in the short run.

- Raising the retirement age would increase labour force participation and employment of older workers and hence stimulate output.[23]

In the fiscal gap simulations that explore the consequences of raising the retirement age, the effective retirement age is gradually increased so that by 2050 individuals are working five years longer (Figure 7 and Table 5).[24] The impact of delaying retirement can be considerable. In those countries where fiscal gaps are large as a consequence of pension spending (namely, Belgium, Luxembourg and the Netherlands), the reduction in the fiscal gap can be several percentage points. The results also suggest that the improvement of the fiscal balance is mainly due to containing pension spending rather than the gradual effect through expanding the labour force.

21. In the case of Luxembourg the increasing number of cross-border workers who will reach retirement age creates a particular problem. The short-term financing of the pension system is currently supported by a low old-age dependency ratio, as well as by contributions paid by relatively young cross-border workers. In the future, both factors will reverse and pension costs are anticipated to increase substantially.

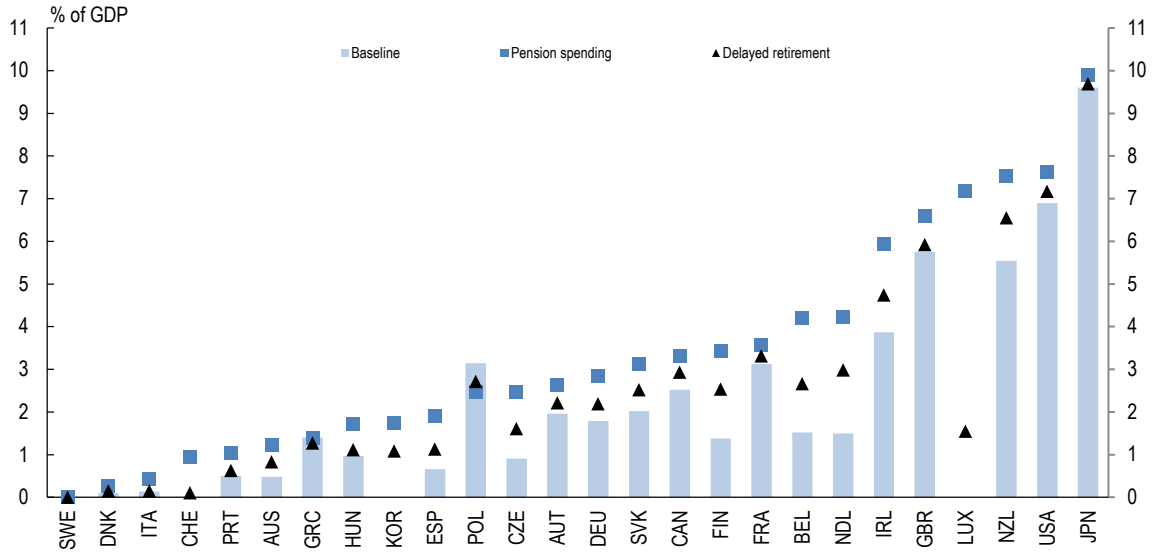
22. For example, Greece has started implementing a pension reform. In May 2010, the Greek government approved a bill aimed at reforming the country's ailing social security system. The statutory retirement age for women will be raised by five years to 65 immediately to match the current retirement age for men. The government will introduce financial penalties and disincentives for early retirement. These measures are aimed to increase employment and GDP and hence tax revenues and to lower social benefits. Following the reform, the estimates suggest there will be no further increase in pension spending as a percent of GDP, instead of projections that suggested a fiscal gap of almost 12% of GDP before the reform.

23. Duval (2003) examines the impact of early retirement incentives embedded in pension systems and other social transfer programmes on the labour force participation of older workers.

24. While the labour force expands with the gradual increase, to maintain simplicity unemployment rates and participation rates are assumed to remain unchanged. Only pension spending is assumed to change over the horizon (health spending is kept constant).

Figure 7. **The effects of delaying the retirement by five years on fiscal gaps**

Change in underlying primary balance needed to bring gross financial liabilities to 50% of GDP in 2050



Note: The change is from the underlying primary balance projected for 2012.

Table 5. **Fiscal gaps with delaying retirement**

	Gross debt target			
	2007 level	*75% of GDP*	*50% of GDP*	*25% of GDP*
Australia	1.49	0.38	0.83	1.29
Austria	1.92	1.67	2.21	2.77
Belgium	1.94	2.15	2.66	3.19
Canada	2.56	2.40	2.93	3.51
Czech Republic	1.99	1.03	1.61	2.19
Denmark	0.00	0.00	0.15	0.68
Finland	2.74	1.91	2.53	3.15
France	2.84	2.79	3.31	3.90
Germany	1.56	1.71	2.19	2.70
Greece	0.57	0.97	1.27	1.61
Hungary	0.79	0.75	1.11	1.51
Ireland	5.23	4.22	4.74	5.33
Italy	0.00	0.00	0.15	0.58
Japan	7.56	9.21	9.69	10.18
Korea	1.50	0.60	1.08	1.55
Luxembourg	2.59	0.88	1.55	2.23
Netherlands	2.94	2.39	2.98	3.56
New Zealand	7.05	6.03	6.55	7.06
Poland	2.67	2.24	2.71	3.17
Portugal	0.22	0.22	0.63	1.09
Slovak Republic	2.83	2.07	2.52	2.97
Spain	1.30	0.57	1.13	1.69
Sweden	0.00	0.00	0.00	0.00
Switzerland	0.22	0.00	0.10	0.95
United Kingdom	5.98	5.42	5.92	6.48
United States	6.91	6.65	7.17	7.78

The effects of higher economy-wide productivity and government efficiency

The concern that high unemployment becomes entrenched and leads to a permanent post-crisis reduction in potential output, together with the need to strengthen confidence in the sustainability of the public finances, raise the urgency of enacting well-designed, growth-enhancing structural reforms and of increasing the efficiency of the public sector. Therefore, two types of structural reforms are analysed: structural reforms boosting output growth and structural reforms enhancing the efficiency of the public sector.

Labour productivity growth can be stimulated by a variety of policies that raise investment in human and physical capital, and reduce inefficiencies in labour allocation. Recent work by Bouis and Duval (2011) estimated that the overall potential GDP gain for the average OECD country from undertaking product and labour market reforms might come close to 4.5% and 10% at 5 and 10-year horizons, respectively, compared with a no-reform baseline scenario. Therefore, there seems to be ample room for structural reforms to offset permanent GDP losses from the recent crisis. They also find that most of the continental European countries would reap the largest benefits from reforms.

The impact of stronger productivity growth can be examined using fiscal gaps. In the simulations, productivity growth is assumed to increase by ¼ of a percentage point relative to the baseline throughout the simulation. Productivity growth will have a mechanical effect on the fiscal gap through the denominator. Compared with the baseline results, stronger productivity growth reduces fiscal gaps only modestly, with the effects generally larger for countries with large debt to GDP ratios (Figure 8, Table 6).[25] This is largely due to the assumption that revenues and spending are constant shares of GDP with the consequence of a sustained imbalance in the underlying budget balance often more important than the initial debt positions over a long period.

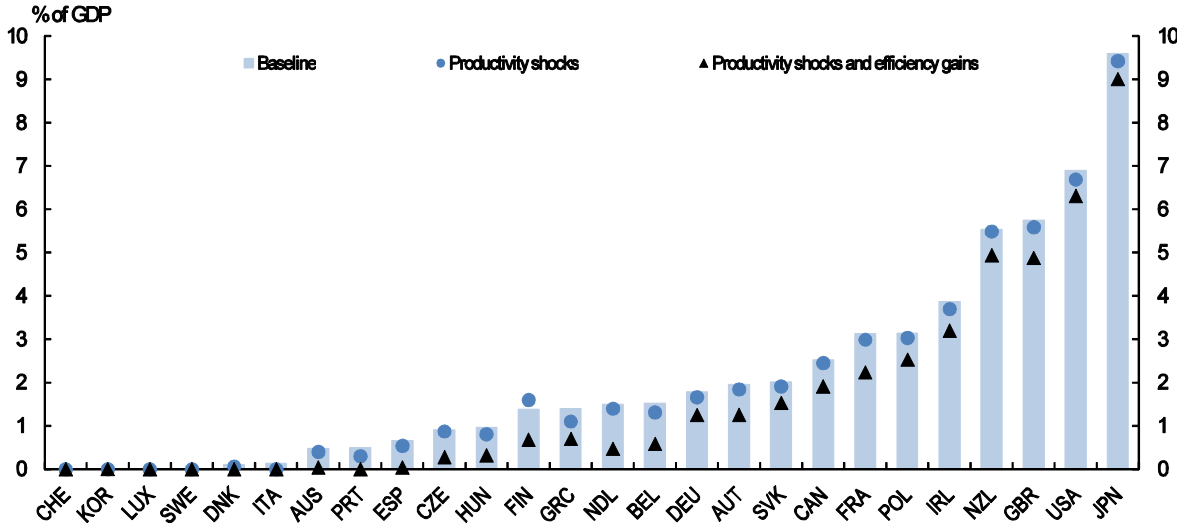
An additional set of simulations assesses how reform of the public sector, combined with policies boosting labour productivity, affects fiscal gaps. It is assumed that, in addition to structural reforms that permanently boost labour productivity growth by 0.25 percentage point, governments also adopt measures that increase efficiency in the public sector. In particular, non ageing-related spending decreases linearly over the simulation by 0.5% of GDP and education spending by 0.4% of GDP.[26] This assumption implies that, as result of the increase in productivity, spending still rises in comparison with the baseline scenario that does not entail any productivity gain. If government spending rises less fast than GDP, the gains from higher growth could be substantial. Reforms to increase productivity in the public sector would improve fiscal positions considerably in many countries. When efficiency gains in the public sector are reaped, several countries would no longer need a fiscal tightening to reach the 50% gross financial liabilities-to-GDP ratio. For the countries with the largest fiscal gaps, while stronger productivity growth would help, the required fiscal tightening remains large.

25. In the case of Finland and for some simulations for Korea, the large holdings of government assets fall as a share of GDP, when productivity increases. The assumption of holding the asset ratio constant in the simulations then causes gross debt – and hence the fiscal gap – to rise.

26. The potential gains from improving service delivery in the primary and secondary education sectors are estimated to be between 0.5% to 1% of GDP in Italy, Germany, the United Kingdom, Sweden and the United States (OECD, 2011*a*). OECD analysis, comparing the efficiency of health systems across different countries, suggests that there is a considerable potential for efficiency gain. Estimates suggest that the public spending reduction could amount to 2% of GDP on average for the OECD area and more than 3% of GDP for Greece, Ireland and the United Kingdom (Joumard *et al.,* 2010).

Figure 8. **Fiscal gaps with productivity shocks and spending efficiency**

Change in underlying primary balance needed to bring gross financial liabilities to 50% of GDP in 2050



Note: The change is from the underlying primary balance projected for 2012. In the simulations, interest rates remain at their baseline level and government financial assets are assumed to remain constant as a share of GDP. Labour productivity is permanently boosted by 0.25 percentage point. Government spending efficiency gains are assumed to reduce spending by 0.9% of GDP by 2050.

Table 6. **Fiscal gaps including changes to labour productivity and government efficiency**

	Labour productivity				And government efficiency			
	Gross financial liabilities target				Gross financial liabilities target			
	2007 level	*75% of GDP*	*50% of GDP*	*25% of GDP*	*2007 level*	*75% of GDP*	*50% of GDP*	*25% of GDP*
Australia	1.09	0.00	0.40	0.88	0.73	0.00	0.04	0.52
Austria	1.54	1.29	1.84	2.41	0.98	0.77	1.26	1.83
Belgium	0.63	0.84	1.31	1.85	0.00	0.16	0.59	1.11
Canada	2.08	1.91	2.45	3.05	1.57	1.41	1.91	2.50
Czech Republic	1.26	0.28	0.87	1.47	0.67	0.00	0.28	0.88
Denmark	0.00	0.00	0.06	0.63	0.00	0.00	0.00	0.00
Finland	1.82	0.96	1.60	2.24	0.90	0.05	0.68	1.32
France	2.50	2.45	2.99	3.60	1.80	1.75	2.24	2.82
Germany	1.05	1.20	1.66	2.17	0.67	0.82	1.25	1.75
Greece	0.38	0.79	1.10	1.46	0.00	0.40	0.70	1.04
Hungary	0.48	0.44	0.81	1.22	0.02	0.00	0.32	0.72
Ireland	4.19	3.20	3.70	4.28	3.66	2.72	3.20	3.75
Italy	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0.00
Japan	7.26	8.94	9.43	9.94	6.85	8.52	9.01	9.51
Korea	0.28	0.00	0.00	0.33	0.00	0.00	0.00	0.00
Luxembourg	0.75	0.00	0.00	0.38	0.27	0.00	0.00	0.00
Netherlands	1.37	0.80	1.40	2.02	0.44	0.00	0.47	1.08
New Zealand	6.02	4.95	5.49	6.04	5.47	4.40	4.94	5.49
Poland	3.00	2.57	3.03	3.49	2.50	2.07	2.53	2.99
Portugal	0.00	0.00	0.30	0.77	0.00	0.00	0.00	0.27
Slovak Republic	2.23	1.46	1.91	2.37	1.84	1.08	1.53	1.98
Spain	0.72	0.00	0.54	1.11	0.22	0.00	0.04	0.61
Sweden	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Switzerland	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
United Kingdom	5.65	5.07	5.59	6.18	4.94	4.41	4.88	5.44
United States	6.41	6.14	6.69	7.31	6.04	5.78	6.31	6.91

Threats to consolidation

Further scenarios consider which countries are exposed to various threats to fiscal consolidation efforts. The analysis considers three "threats": a delay to the start of consolidation, an increase in interest rates and the occurrence of fiscal shocks.

Delayed consolidation

Choosing the pace of consolidation needs to balance consolidation requirements with the effects of fiscal retrenchment on aggregate demand. While most European countries have started to consolidate in 2010 or 2011, the United States and Japan have decided to adopt new stimulus measures and to delay fiscal consolidation. The model helps shed light on the cost of delaying fiscal consolidation. The main costs of delaying fiscal consolidation are:

- Debt service costs rise with the length of delay, especially the component that is attributable to the risk premium.[27]

- Delaying fiscal consolidation is likely to constrain severely the use of the automatic stabilisers during an economic downturn. If fiscal consolidation is frontloaded, then the deficit would be quickly brought down to a given target (*e.g.* 3% for the EU countries), whereas delaying lengthens the period of time in which deficits exceed the target.

- Delaying fiscal consolidation could make fiscal consolidation more difficult, because it risks a strong financial market reaction at some point and would require a larger and more sustained improvement in the primary balance later on.[28]

A set of fiscal gap calculations examine the consequences of delaying the fiscal consolidation on fiscal gaps. For this simulation a delay of two years was implemented, with the simulation extended by two years to 2052 so that the comparison with the baseline is for identical durations.[29] The simulations show that for most countries a short delay has little effect on the necessary fiscal tightening (Figure 9). However, in a few cases, such as Japan, New Zealand, the United Kingdom and the United States, even a short delay would require these countries to permanently tighten the underlying primary balance over one-third of a percentage point of GDP. Another way to examine the consequences of delay is by phasing in the fiscal gap tightening more gradually. The example of the United States (Figure 11) shows that too gradual a tightening would allow adverse debt dynamics to develop so that further fiscal tightening would be required to bring debt down to prudent levels.

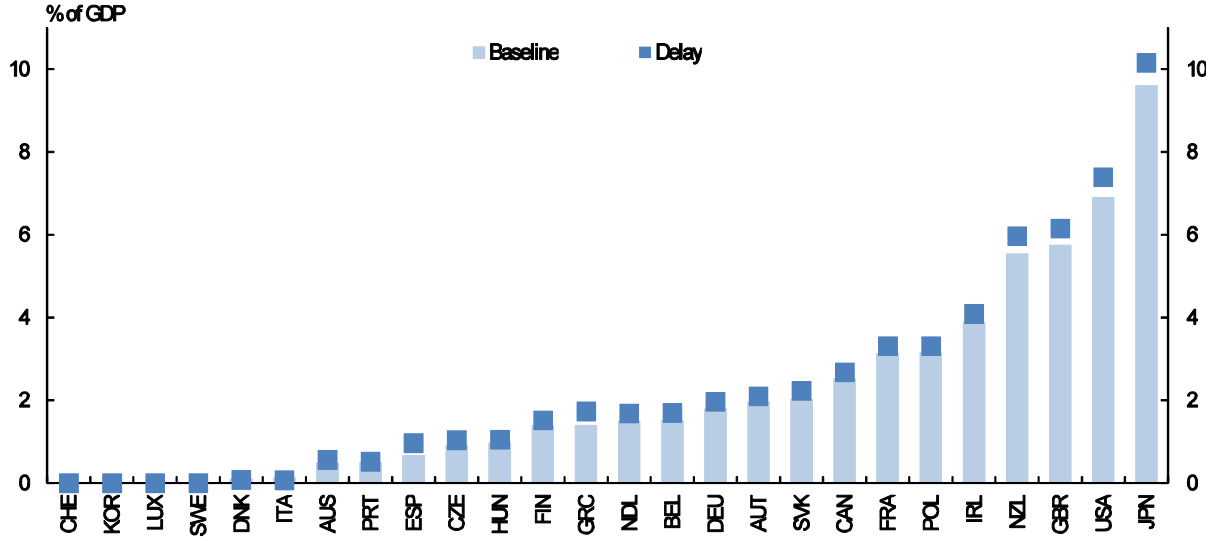
27. As the recent experience in Europe has shown, foreign investors have become increasingly concerned about large fiscal deficits and the ability of governments to pay for spiralling debt loads. In spite of the IMF financial support package for Greece, for instance, financial markets have not been convinced that additional financing will overcome structural deficiencies.

28. Cournède (2007) finds that even a short delay increases the political cost of consolidation quite markedly. Moreover, he highlights the importance of setting a deadline for consolidation: policy-makers facing an infinite time horizon will find it politically optimal to postpone adjustment indefinitely.

29. The model was extended assuming that GDP growth was purely driven by productivity growth in the final two years of the simulation.

Figure 9. **The effect of delaying fiscal tightening on fiscal gaps**

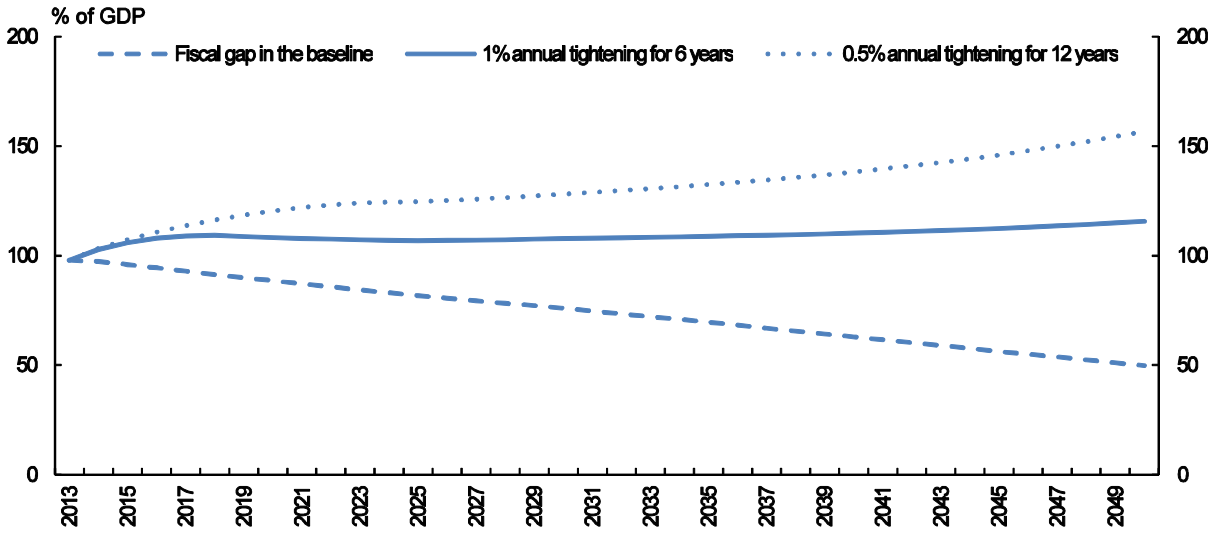
Change in the underlying primary balance needed to bring gross financial liabilities to 50% of GDP in 2050 or 2052



Note: The terminal debt target in the baseline is for 2050. In the delay simulations the fiscal tightening is delayed by two years and the terminal debt target is set for 2052.

Figure 10. **The pace of fiscal tightening**

Evolution of gross financial liabilities for the United States when the underlying primary balance is tightened so that debt is 50% of GDP in 2050 and the consequences of phasing in the same tightening more gradually



Higher interest rates

Together with the level of the primary balance, debt dynamics are also strongly influenced by interest rates, through the effects on debt service. Over most of the past decade, long-term interest rates in the major OECD countries have been unusually low. While this may partly reflect global factors including lower inflation (Bernanke, 2005; Corden, 2009), it is also a reflection of policy rates that have been unusually low for much of this period, and in retrospect possibly even too low in some cases (Ahrend, Catte and Price, 2006), while risk was under-priced. However, the normalisation of financial conditions

and policy rates is likely to involve a general increase in long-term interest rates. Moreover, high and rising government debt are adding upward pressure on long-term government bond yields.

To assess the effect of higher interest rates, the source of the shock (that is, whether the shock hits the short-term interest rate or the risk premium on the risk-free interest rate) is not distinguished. The aim is to evaluate to what extent an interest rate shock has a negative effect on debt sustainability. For this purpose, the interest rate paid on debt is assumed to increase first by 50 basis points and then by 100 basis points. No other changes to the baseline model were assumed. Table 7 reports fiscal gaps to achieve the 50% gross financial liabilities target as well as the impact on debt levels in the absence of corrective action. Without policy action, debt would considerably for those countries with high debt (*e.g.* Japan and Greece) or running large structural deficits (*e.g.* the United Kingdom, Ireland, New Zealand and the United States).[30]

Table 7. **Increases in borrowing costs**

	Fiscal gap, % of GDP					Gross financial liabilities, increase by 2020, % of GDP			
	With risk premia			Without risk premia		With risk premia		Without risk premia	
	Baseline	+50bp	+100bp	+50bp	+100bp	+50bp	+100bp	+50bp	+100bp
Australia	0.5	0.7	0.8	0.7	0.8	1.4	2.9	1.0	3.0
Austria	2.0	2.3	2.6	2.4	2.7	3.5	7.0	3.3	6.8
Belgium	1.5	1.9	2.3	1.9	2.3	4.1	8.3	3.9	7.9
Canada	2.5	2.9	3.2	2.9	3.2	3.9	7.9	3.7	7.5
Czech Republic	0.9	1.2	1.4	1.3	1.5	2.2	4.5	2.2	4.5
Denmark	0.1	0.4	0.7	0.4	0.7	2.8	5.7	2.8	5.7
Finland	1.4	1.7	1.9	1.9	2.1	2.6	5.2	2.6	5.2
France	3.1	3.5	3.9	3.9	4.3	4.3	8.8	4.2	8.5
Germany	1.8	2.2	2.5	2.2	2.6	3.9	7.9	3.7	7.6
Greece	1.4	2.0	2.6	2.2	2.8	6.6	13.5	6.2	12.6
Hungary	1.0	1.3	1.7	1.6	1.9	3.8	7.8	3.7	7.5
Ireland	3.9	4.3	4.8	4.8	5.3	5.3	10.8	5.0	10.2
Italy	0.1	0.6	1.1	1.1	1.6	5.1	10.4	4.9	10.0
Japan	9.6	10.3	11.0	10.7	11.3	9.2	18.7	9.0	18.2
Korea	0.0	0.0	0.2	0.0	0.0	1.3	2.7	1.3	2.7
Luxembourg	0.0	0.0	0.0	0.0	0.0	1.2	2.3	1.2	2.3
Netherlands	1.5	1.8	2.1	2.0	2.3	3.3	6.7	3.2	6.5
New Zealand	5.5	5.8	6.0	5.8	6.0	3.0	6.1	2.9	5.9
Poland	3.1	3.4	3.7	3.8	4.0	3.2	6.4	3.2	6.3
Portugal	0.5	0.9	1.4	1.2	1.6	4.6	9.4	4.4	9.0
Slovak Republic	2.0	2.3	2.5	2.3	2.5	2.4	4.8	2.4	4.8
Spain	0.7	0.9	1.2	1.1	1.4	2.8	5.7	2.8	5.7
Sweden	0.0	0.0	0.0	0.0	0.0	1.5	3.0	1.5	3.0
Switzerland	0.0	0.0	0.0	0.0	0.0	1.3	2.6	1.3	2.6
United Kingdom	5.8	6.1	6.5	6.7	7.1	4.7	9.5	4.5	9.1
United States	6.9	7.3	7.7	7.9	8.3	5.1	10.3	4.8	9.8

Note: The debt increase is relative to the baseline simulation assuming no tightening of the underlying primary balance.

The effects of fiscal shocks

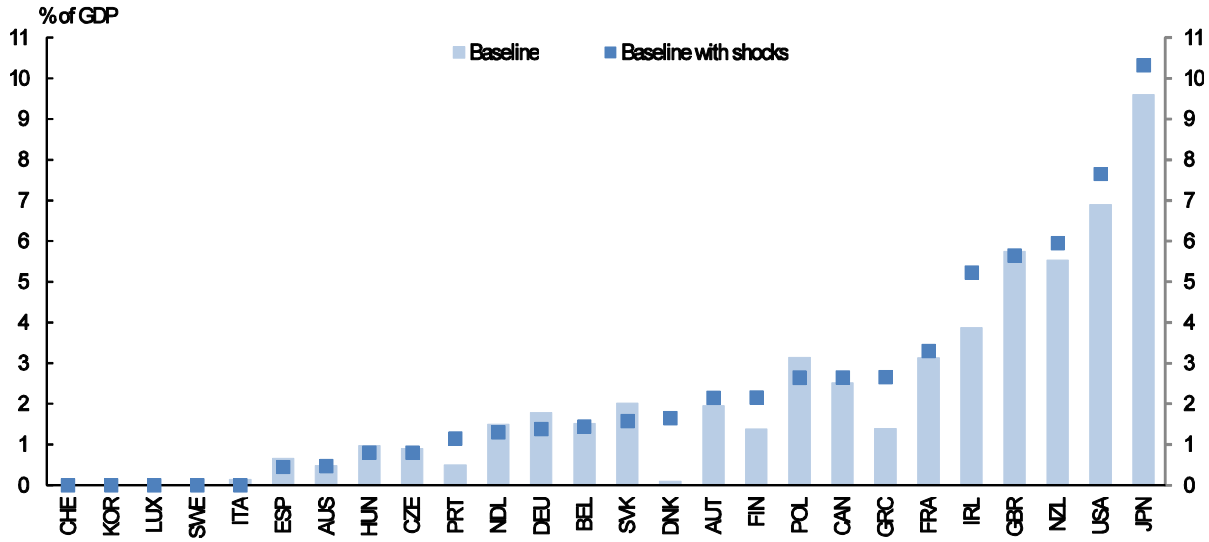
Further simulations examine the effects of random shocks to government spending. For example, governments may need to deal with contingent liabilities that arise as a result of a banking crisis or other shocks.

30. The increase in Japanese debt is relatively constrained, despite the high fiscal gap, due to the assumption of a low risk premium on Japanese debt.

The first set of scenarios uses country-specific shocks to debt to examine the potential threats to consolidation requirements. The shocks are taken from the country's own history (including the recent crisis) of changes in debt, such as one-offs and valuation effects that are not explained by budget balances, interest rates, inflation and growth. The simulations use these error terms to create a distribution of possible debt outcomes and then calculate the fiscal gaps.[31] The fiscal gaps are calculated as the additional tightening (or smaller tightening if past shocks have tended to be favourable) that is required to meet a 75% probability of reaching the terminal debt target (Figure 11). The results from these stochastic simulations show that a handful of countries would require stronger tightening (Portugal, Denmark, Greece, Ireland, the United States and Japan). In most other countries considering debt shocks does not make much difference, possibly reflecting that positive and negative shocks cancel out. In other cases, such as Germany, past debt shocks have tended to be slightly beneficial.

Figure 11. **Fiscal gaps from stochastic simulations**

Change in underlying primary balance needed so that debt is 50% of GDP in 2050 and change needed to ensure meeting this target with 75% probability when the baseline is hit by shocks



Note: The change is from the underlying primary balance projected for 2012.

The second set of scenarios examines shocks calibrated on the distribution of shocks for all OECD countries (Table 8). The approach is similar to the country-specific shocks, but the shocks are drawn from the distribution of one-offs (but not valuation) shocks to debt.[32] While most observations are close to zero the distribution is highly skewed with a few very large one-off additions to debt. The fiscal gaps are calculated as the additional tightening that is required to meet a 75% probability of reaching the terminal debt target. In general, the additional tightening is not substantial to meet these types of shocks, adding a little under ½ per cent of GDP to the fiscal gap. But due to the highly skewed distribution of shocks setting a higher probability threshold for meeting the debt target raises the desirable fiscal tightening further.

31. The fiscal gap is the average from 500 separate stochastic simulations.

32. The distribution is taken from the estimates of one-offs used to calculate underlying fiscal balances in *OECD Economic Outlook* 89 (OECD, 2011*a*).

Table 8. **Fiscal gaps with shocks to debt**

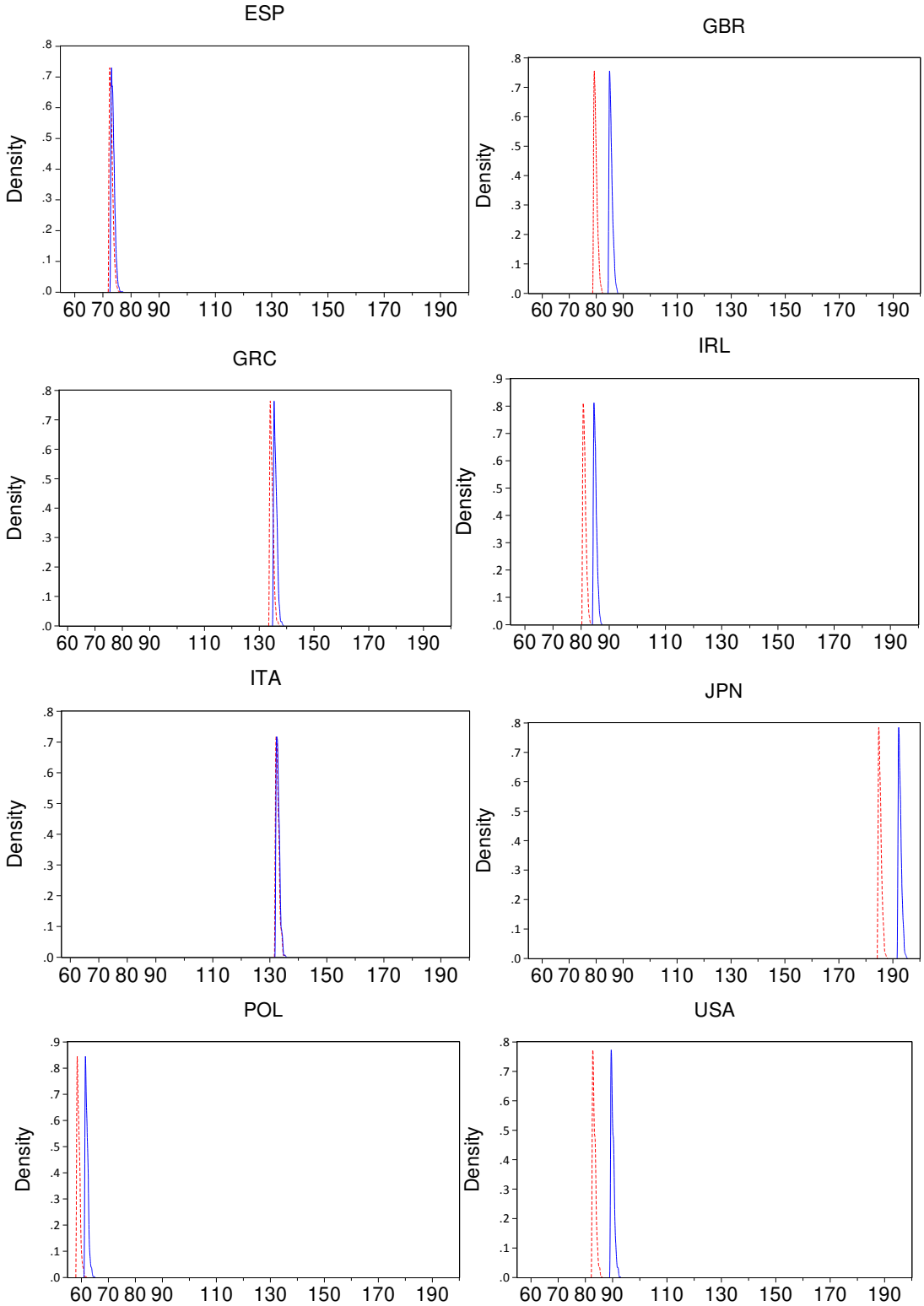
With the gross debt target ensuring gross financial liabilities are 50% of GDP in 2050

	Baseline	Country specific shocks	OECD one-off shocks
Australia	0.48	0.47	0.90
Austria	1.96	2.15	2.40
Belgium	1.52	1.45	1.95
Canada	2.52	2.65	3.00
Czech Republic	0.91	0.80	1.35
Denmark	0.10	1.65	0.60
Finland	1.38	2.16	1.80
France	3.13	3.30	3.75
Germany	1.79	1.39	2.25
Greece	1.40	2.66	1.88
Hungary	0.97	0.80	1.50
Ireland	3.87	5.23	4.35
Italy	0.14	0.00	0.75
Japan	9.60	10.33	10.05
Korea	0.00	0.00	0.45
Luxembourg	0.00	0.00	0.45
Netherlands	1.50	1.30	1.95
New Zealand	5.54	5.95	6.00
Poland	3.14	2.65	3.68
Portugal	0.50	1.15	1.05
Slovak Republic	2.02	1.58	2.55
Spain	0.66	0.45	1.05
Sweden	0.00	0.00	0.00
Switzerland	0.00	0.00	0.30
United Kingdom	5.75	5.65	6.30
United States	6.90	7.65	7.31

The third set of scenarios assesses whether large contingent liabilities over the next few years might threaten the fiscal consolidation process. The distribution of spending shocks is computed by extracting government spending shocks randomly from a positive Gaussian distribution and by simulating the model 1 000 times. The average shock (over the 1 000 simulations) to hit the baseline is 3.5% of GDP. In one scenario, fiscal policy remains unchanged as in the baseline and in a second scenario fiscal policy is tightened to meet the target of reducing gross financial liabilities to 50% of GDP. Figure 12 shows the distribution of the debt-to-GDP ratio in 2011. The implementation of fiscal tightening moves the distribution of debt towards lower values in all the countries shown in the figure. However, the improvement in the debt distribution is particularly marked in those countries where consolidation requirements are more demanding (such as the United Kingdom, Ireland, Japan, Poland and the United States). This group of countries benefits from a prompt fiscal consolidation, especially the United States and Japan. However, some high-debt countries, – such as Spain, Greece and Italy – require a more substantial fiscal consolidation to put debt on a downward trajectory, as there is little improvement in the distribution of debt.

Figure 12. **The effect of spending shocks**

Distribution of debt-to-GDP ratio in 2011 (% of GDP)



Note: The solid line represents the distribution of the debt-to-GDP ratio when no fiscal consolidation is implemented; the dotted line represents the distribution of the debt-to-GDP ratio when governments undertake a fiscal tightening to achieve the 50% debt target.

5. Concluding remarks

The fiscal gap calculations show that considerable differences exist across OECD countries in their need for fiscal consolidation. These large differences arise largely due to differences in underlying deficits at the starting point and to some extent the level of initial debt. While a number of countries (*e.g* Korea, Luxembourg, Sweden and Switzerland) have already achieved sound fiscal balances, other countries, where underlying fiscal deficits are expected to remain substantial in 2012 (*e.g.* Japan, New Zealand, the United Kingdom and the United States) face much larger fiscal gaps. The various scenarios presented in this paper suggest that in several OECD countries, the fiscal challenges are exacerbated in the long term by spending pressures related to pension, health care and long-term care. Against this backdrop, growth-enhancing structural reforms can contribute to fiscal consolidation. For example, increasing the retirement age can boost labour utilisation, while at the same time mitigating the budget pressures resulting from ageing populations Furthermore, moving to best practice in the provision of health care and education can reduce spending pressures. Finally, shocks to interest rates or to government spending would require a stronger tightening in most of the OECD countries. Lower debt targets provide greater room for manoeuvre to react to this type of shocks in the future.

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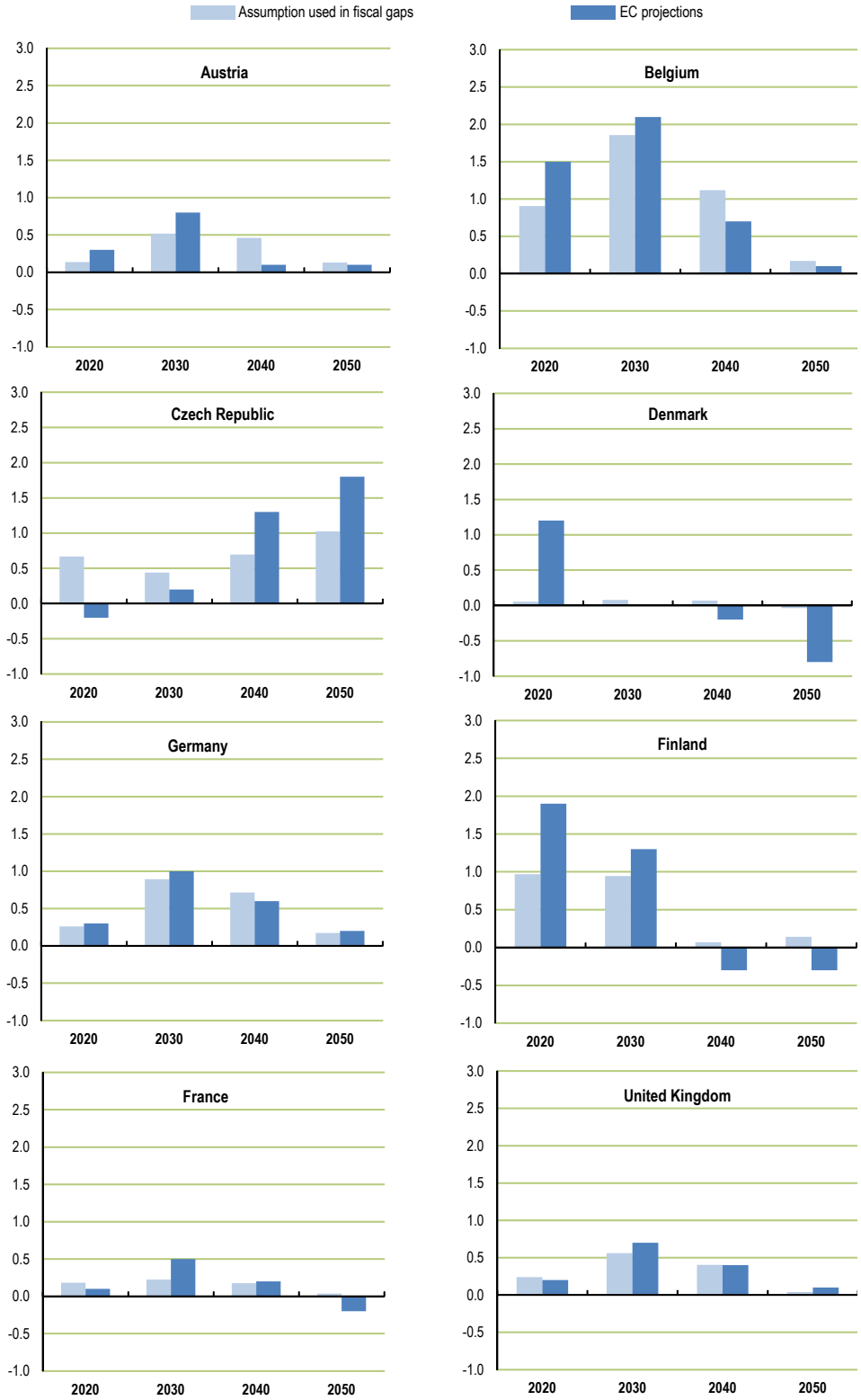
Appendix

Pension spending projections

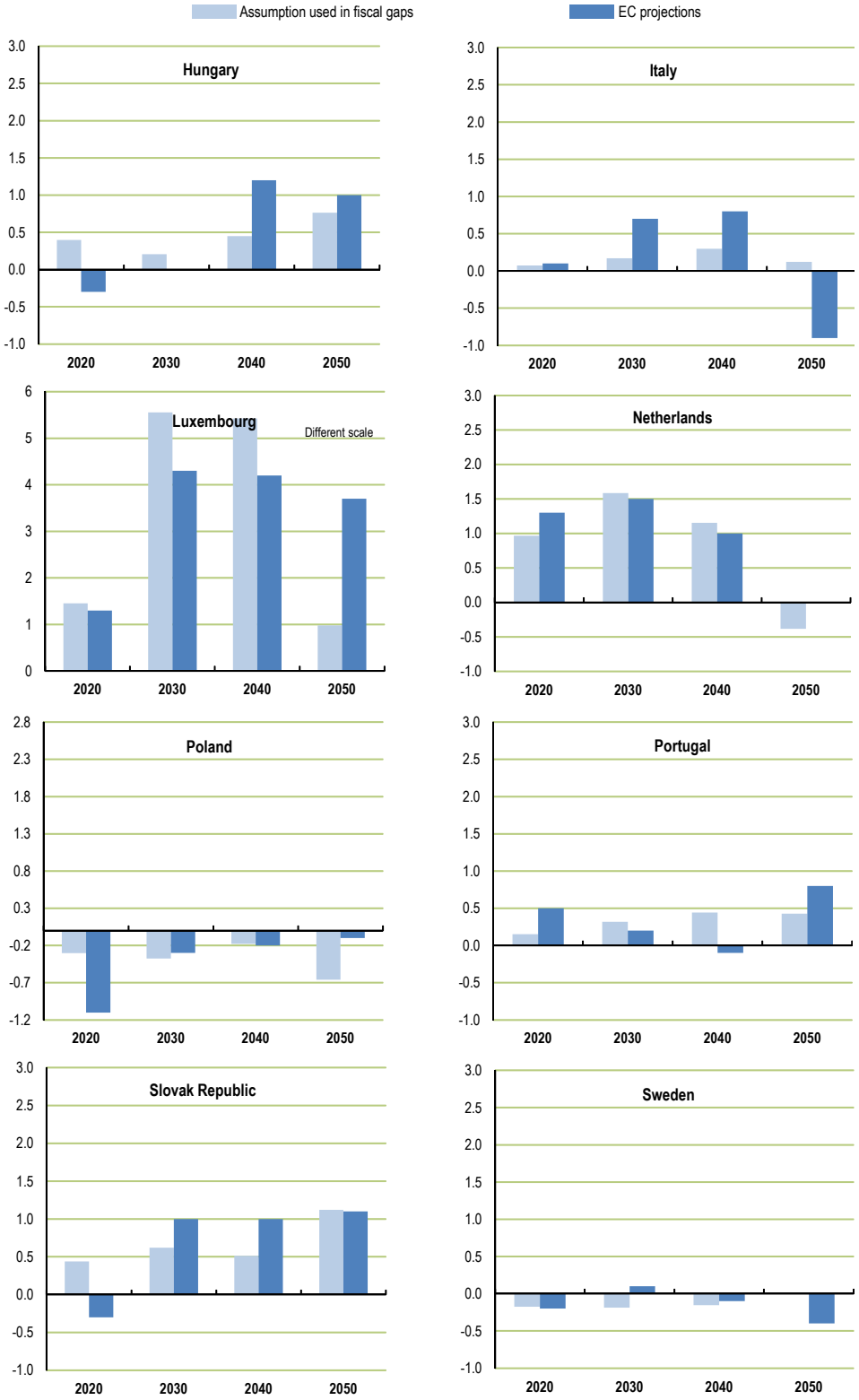
Change in pension spending as a per cent of GDP over the preceding 10 years



Source: EC (2009) and OECD calculations.

Pension spending projections, *continued*

Change in pension spending as a per cent of GDP over the preceding 10 years



Source: EC (2009) and OECD calculations.

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