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Title: Fiscal sustainability in the OECD. A simple method and some preliminary results¹

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Abstract

This paper contains an assessment of the sustainability of fiscal policy in 19 OECD countries. Based on a simple measure of fiscal sustainability, the results indicate that fiscal sustainability requires an average budget improvement of about 2,3 per cent of GDP. However, fiscal policy is sustainable in the US, the UK, Italy and Canada, while several EMU countries will sooner or later face very substantial tax increases or expenditure cuts.

¹ The views and analyses presented in the working paper series are the sole responsibility of the authors. The papers may therefore include views, which are not necessarily shared by the Ministry of Finance.

1. Introduction

The purpose of this paper² is to assess the sustainability of fiscal policy in 19 OECD countries. Thus, in section 2, we develop a simple measure of fiscal sustainability. The approach involves an assessment of the long-term change in the primary surplus combined with the assumption that the gradual impact of demographic change on government finances can be described by a simple measure of the speed of adjustment. Given these two parameters, the required rate of current fiscal consolidation may be found and compared to the current, structural budget surplus. Also, an adjustment is carried out for the average deviation between the actual and structural surplus over the business cycle.

Our preliminary³ results indicate that, on a GDP-weighted basis, the 19 OECD countries considered should be running surpluses which amount to approximately 2,2 per cent of GDP on average for fiscal policy to be sustainable. Actual policies, in contrast, imply an average structural deficit of 0,1 per cent of GDP in 2000. Sustainability accordingly requires an average budget improvement of about 2,3 per cent of GDP.

The conclusion is therefore that OECD countries face substantial challenges in terms of speeding up fiscal consolidation. A sustainable fiscal scenario requires an almost complete elimination of government gross debt, which is currently standing at 73 per cent of GDP. The sustainable scenario thus implies a long-term debt reduction of about 65 per cent of GDP.

However, this overall picture covers substantial variation between member countries. Specifically, fiscal policy is solidly sustainable in the US, the UK, Italy and Canada. In contrast, several EMU countries will sooner or later face very substantial tax increases or expenditure cuts unless other means - such as, e.g., increased labor force participation - can be employed to improve the structural government budget balance.

2. A Simple Index of Fiscal Sustainability

In this section we develop some simple algebraic expressions which are in turn used in section 3 to assess fiscal sustainability. In addition to facilitating the quantitative analysis, the formulas also provide an intuitive understanding of what fiscal sustainability involves.

The starting point is the government intertemporal budget constraint (1) stating that the present value of current and future primary surpluses, expressed in per cent of GDP and discounted at the growth adjusted market rate of return, must at least be equal to outstanding government liabilities. That is,

$$(1) \quad \int_{s=t}^{\infty} p_s e^{-(i-\gamma)(s-t)} ds \geq b_t$$

where p_s is the time s primary surplus, b_t is initial government debt, while i is the nominal rate of interest and γ the nominal GDP growth rate. To keep things simple, we assume that the nominal rates of growth and interest are constant through time.

² The work in this paper was completed in april 2001

³ Since no account is taken of the consequences of private pensions in this version, except in the case of Denmark

A sustainable fiscal policy is one that just satisfies the constraint in (1). Hence, sustainability implies a sequence of primary surpluses, $\{p_s^*\}_{s=t}^{s \rightarrow \infty}$, that fulfils

$$(2) \quad \int_{s=t}^{\infty} p_s^* e^{-(i-\gamma)(s-t)} ds = b_t$$

The index of fiscal sustainability, which we denote σ , may then be defined as the difference between the actual, time t primary surplus and the primary surplus required for sustainability, i.e.

$$(3) \quad \sigma \equiv p_t - p_t^*$$

In order to derive a simple expression for the sustainable primary surplus, we assume that future changes in government net tax receipts take a particularly simple form. Specifically, we consider the case where

$$(4) \quad p_s = p_t - (1 - e^{-\lambda(s-t)}) \Delta \bar{p}$$

Hence, in the long term, the primary surplus declines by $\Delta \bar{p}$. This change comes about gradually and the speed of (exponential) adjustment is described by the parameter λ . These assumptions are convenient because they allow us to assess fiscal sustainability by simply assuming reasonable values of $\Delta \bar{p}$ and λ capturing, respectively, the long run influence of demographic shifts on the government budget and, through the speed of adjustment, the time horizon involved. In the next section, we show how to choose these two parameters. Inserting (4) into (2) produces

$$(5) \quad \int_{s=t}^{\infty} p_s^* e^{-(i-\gamma)(s-t)} ds = \int_{s=t}^{\infty} [p_t^* - (1 - e^{-\lambda(s-t)}) \Delta \bar{p}] e^{-(i-\gamma)(s-t)} ds = b_t$$

Making use of the standard formula for integrating the exponential function yields

$$(6) \quad \frac{p_t^*}{i-\gamma} - \left(\frac{1}{i-\gamma} - \frac{1}{i-\gamma+\lambda} \right) \Delta \bar{p} = b_t$$

From this expression we now obtain the time t sustainable primary surplus as

$$(7) \quad p_t^* = (i-\gamma)b_t + \frac{\lambda}{i-\gamma+\lambda} \Delta \bar{p}$$

Notice how a change in the growth adjusted rate of interest exerts offsetting effects on fiscal sustainability when net tax receipts are expected to decline. A higher rate of interest increases the cost of servicing outstanding government debt liabilities, but at the same time the required rate of fiscal consolidation is reduced because the present value of future spending increases drops. Combining (3) and (7) then gives

$$(8) \quad \sigma = p_t - \left\{ (i - \gamma)b_t + \frac{\lambda}{i - \gamma + \lambda} \Delta \bar{p} \right\}$$

Factoring out the growth-adjusted rate of return in equation (7) produces

$$(9) \quad p_t^* = (i - \gamma) \left[b_t + \frac{\lambda}{i - \gamma + \lambda} \frac{\Delta \bar{p}}{i - \gamma} \right]$$

Equation (9) is useful, because it shows how the required primary surplus may be decomposed into the burden associated with explicit debt and "debt" associated with the future net revenue consequences of current expenditure and tax policies. The latter is computed as the annuity value of the long-term change in the primary surplus times the adjustment factor reflecting the gradual build-up of fiscal pressure. We make use of that decomposition in the next section.

Perhaps more conveniently, we can express the index of fiscal sustainability in terms of the current budget surplus. The current government budget surplus is defined by

$$(10) \quad s_t \equiv p_t - ib_t$$

Using this definition we find the sustainable current surplus as

$$(11) \quad s_t^* = -\gamma b_t + \frac{\lambda}{i - \gamma + \lambda} \Delta \bar{p}$$

An alternative expression for the index of fiscal sustainability is accordingly

$$(12) \quad \sigma \equiv s_t - s_t^* = \{ s_t + \gamma b_t \} - \frac{\lambda}{i - \gamma + \lambda} \Delta \bar{p}$$

We will refer to the terms in curly brackets as "actual rate of fiscal consolidation", and it denotes the time t reduction in the outstanding stock of (explicit) government liabilities, measured in percent of GDP. This reduction reflects the surplus of tax receipts over total expenditures *plus* the erosion of government net debt liabilities implied by nominal GDP growth.

The last term on the right hand side is the "required rate of fiscal consolidation", and it reflects the expected long-term change in government net tax receipts as well as the speed at which this change occurs. The index of fiscal sustainability is then computed by simply comparing actual and required fiscal consolidation.

Finally, we may use these equations to find a simple expression for the long-term change in government debt implied by fiscal sustainability. Once the economy settles in a new steady state, the primary surplus just suffices to keep government debt constant as a share of GDP, i.e.

$$(13) \quad p_{ss}^* = (i - \gamma)b_{ss}$$

Given the assumed time path of changes in the primary surplus, we may alternatively write

$$(14) \quad p_{ss}^* = p_t^* - \Delta\bar{p} = (i - \gamma)b_t + \frac{\lambda}{i - \gamma + \lambda} \Delta\bar{p} - \Delta\bar{p} = (i - \gamma)b_t - \frac{i - \gamma}{i - \gamma + \lambda} \Delta\bar{p}$$

Combining equations (13) and (14) yields

$$(15) \quad b_{ss} - b_t = -\frac{\Delta\bar{p}}{i - \gamma + \lambda}$$

This expression states that the long-run required debt reduction is equal to the projected change in the primary surplus divided by the sum of the growth-adjusted cost of government debt and the speed of adjustment.

Equations (1) through (15) imply two alternative methods for assessing fiscal sustainability. Using equation (8), one way to proceed is to compare the actual primary surplus with the required primary surplus, which in turn by equation (9) may be thought as the "comprehensive debt burden" associated with explicit debt obligations as well as those implicit in the current fiscal program. Alternatively, we may apply equation (12) and compare actual fiscal consolidation to the required rate of consolidation reflecting the projected future decrease in the primary surplus.

In the next section, we consider both of these measures. In principle, of course, they should yield identical results to the extent that the assumed constant rate of interest is a good approximation to the return on current government financial assets and liabilities and provided the implied asset income flows are adequately accounted for in the government financial balance.

3. Results

In this section we apply equations (8), (9), (12) and (15) in order to assess fiscal sustainability in 19 OECD countries. The results reported in this section are based on a variety of sources. The current fiscal stance - i.e. net government debt liabilities and budget surpluses - are from OECD Economic Outlook 68, December 2000. We use the OECD definition of net government liabilities as the appropriate measure of public debt.

The budgetary consequences of pension expenditures are from the EU Commission. Pension expenditures are summarily adjusted for taxes. The projected increase in government consumption is based on OECD data.

We use budget data for 2000. Since several EU member countries - including Germany and France - have recently legislated tax reform and other measures implying a more lax fiscal stance, our picture of fiscal sustainability will tend to be too optimistic. On the other hand, in this preliminary version, we make no correction for the budgetary consequences of private pensions etc., except in the case of Denmark. This tends to imply an overestimate of the long-term fiscal pressure, especially in countries with effective consumption tax treatment of institutional savings and significant pension and life insurance assets. However, as a first approximation, it may not be unreasonable to assume that these two sources of bias offset each other at least at the OECD level.

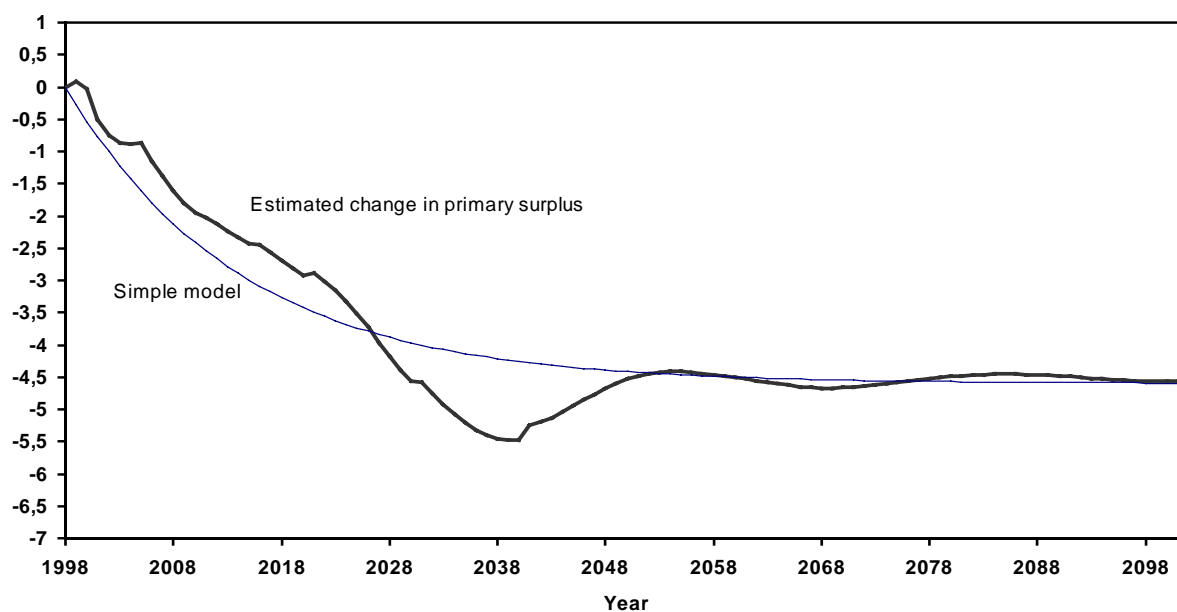
Throughout, a common nominal GDP growth rate of 4 per cent is assumed, while a nominal market rate of interest equal to 6 per cent is used. The growth-adjusted rate of return is accordingly

2 per cent. At the end of this section, we perform a sensitivity analysis in order to highlight how interest rate changes - and hence, e.g., the monetary policy of the ECB - affect the long-term fiscal outlook.

We focus next on how to select the speed of adjustment, λ . *Figure 1* below displays the projected change in the general government primary surplus in Denmark from 1998 to 2100. As indicated by the thin curve, the time path of primary surpluses may be fairly accurately approximated by assuming a speed of adjustment of 6 per cent. Computing the implied present value of the changes in net tax receipts yields 172,6 percent of GDP for the former method and 175,9 percent in the simple model case. I.e., the present value of the annual deviations between the two methods cancels out to a very large extent.⁴

Below we use an adjustment speed of 6 per cent for all countries. This is done to simplify the computations. Of course one could approximate country specific values of λ , but it does not seem obvious that our maintained working hypothesis with respect to a common value of λ is a significant source of bias.

Figure 1. Change in Primary Surplus of General Government Sector in Denmark. Per Cent of GDP at market prices.



Note: In the exponential case, the key parameters are chosen to match the time path of the estimated change in the general government primary surplus. This requires setting $\lambda = 6$ percent and $\Delta\bar{p} = 4,6$ percent of GDP. The estimated impact on the primary surplus corresponds to the numbers published in Ministry of Finance (2000), augmented by the supplementary labor market pension scheme (ATP) for which a forecast was provided by the Ministry of Economic Affairs.

⁴ The numbers reported here are slightly different from the implicit debt shown in table 3. The reason is that the above present values are computed in discrete time, whereas the equations in section 1, and therefore the results in the tables, are based on continuous time expressions.

Before turning to a detailed examination of fiscal sustainability, it is useful to consider the "rules of thumb" presented in *table 1*. The numbers are calculated using equations (9), (12) and (15) and show, first, the implicit government net debt obligations associated with a 1 per cent of GDP long run decline in the primary surplus. With the assistance of equation (9), we see that this is equivalent in terms of the required primary surplus to a 38 per cent of GDP increase the outstanding stock of explicit government net debt.

Second, by equation (9), a 1 per cent of GDP long run decline in the primary surplus that kicks in with the 6 per cent speed of annual adjustment requires a current rate of fiscal consolidation equal to 0,75 per cent of GDP under a sustainable fiscal policy.

Third, the parameter values we use below imply that, as equation (15) says, the long-term government debt reduction under a sustainable fiscal strategy is 12,5 times the long-term budget impact. Hence, a country facing, say, a 5 per cent of GDP decline in the primary surplus - which in fact is quite close to the GDP-weighted OECD average - should aim at cutting government debt by slightly more than 60 per cent.

Table 1. Three Useful "Rules of Thumb" for Evaluating Fiscal Sustainability

	(Per cent of GDP per one percentage point long term change in primary surplus)
Implicit debt	37,5
Required current fiscal consolidation	0,75
Required long term debt reduction	12,5

Table 2 shows the results based on the current structural surplus, i.e. equation (12). The index of fiscal sustainability is computed by subtracting the required rate of fiscal consolidation from the adjusted structural surplus. The adjustments carried out capture both the dilution of the debt burden due to nominal growth and the average deviation between the structural and the actual surplus.

In 2000 the average structural budget deficit is equal to 0,1 percent of GDP. I.e., this is the budget deficit that would arise at full employment. It would also be equal to the average budget deficit over the business cycle if fluctuations were symmetric. However, perhaps due to e.g. asymmetric price rigidities, downturns tend to be more persistent than expansions. And this must be taken into account when fiscal sustainability is assessed. For the OECD countries as a whole, the average annual deviation between the actual end structural budget deficit amount to 0,24 per cent of GDP, but - not surprisingly - the deviation is much larger for the EMU countries than for the US, and in between these extremes for the remaining countries.

Table 2. Fiscal Sustainability in 19 OECD Countries. Current Surplus Method. Per Cent of GDP in 2000.

	Structural Budget Balance	Average Deviation ²⁾	Growth adjustment	Adjusted structural balance	Long term impact on primary balance			Total	Required structural balance	Fiscal sustainability
					Pensions	Govt cons	Other ¹⁾			
Australia	0,60	-0,25	0,45	0,80	2,25	2,50	0,00	4,75	3,56	-2,76
Austria	-1,70	-0,48	1,93	-0,26	1,22	3,00	0,00	4,22	3,16	-3,42
Belgium	0,30	-0,48	4,07	3,89	2,91	3,00	0,00	5,91	4,43	-0,54
Canada	2,10	-0,32	2,68	4,46	2,55	2,50	0,00	5,05	3,79	0,68
Denmark	2,50	-0,38	1,08	3,20	2,55	3,00	-0,94	4,61	3,46	-0,26
Finland	3,90	-0,48	-1,22	2,20	3,76	3,00	0,00	6,76	5,07	-2,87
France	-1,60	-0,48	1,71	-0,38	3,01	3,00	0,00	6,01	4,51	-4,88
Germany	-0,70	-0,48	1,67	0,48	3,44	3,00	0,00	6,44	4,83	-4,35
Greece	-0,60	-0,48	4,11	3,02	3,20	3,00	0,00	6,20	4,65	-1,63
Ireland	4,10	-0,48	1,49	5,11	3,96	3,00	0,00	6,96	5,22	-0,11
Italy	-0,60	-0,48	3,99	2,91	0,27	3,00	0,00	3,27	2,45	0,46
Japan	-5,20	-0,24	1,74	-3,69	4,59	3,00	0,00	7,59	5,69	-9,39
Netherlands	-0,10	-0,48	1,79	1,21	4,68	3,00	0,00	7,68	5,76	-4,55
Norway ³⁾	-1,40	-0,38	-2,22	-4,00	2,40	3,00	0,00	5,40	4,05	-8,05
Portugal	-2,00	-0,48	2,24	-0,25	4,45	3,00	0,00	7,45	5,58	-5,83
Spain	-0,10	-0,48	1,72	1,14	7,47	3,00	0,00	10,47	7,85	-6,71
Sweden	2,70	-0,38	0,08	2,40	0,97	3,00	0,00	3,97	2,98	-0,57
UK	2,40	-0,38	1,30	3,33	-0,76	3,00	0,00	2,24	1,68	1,64
USA	1,70	0,00	1,73	3,43	2,00	2,00	0,00	4,00	3,00	0,43
Average	0,33	-0,40	1,60	1,53	2,89	2,89	-0,05	5,74	4,30	-2,78
GPD-wghtd average	-0,06	-0,24	1,84	1,54	2,62	2,57	-0,01	5,18	3,89	-2,34

Sources: OECD Economic Outlook 68, december 2000, EU Commission and Ministry of Finance

- Notes:*
- 1) Includes the future budgetary impact of current legislation, private pensions and other factors such as, e.g., natural resource tax revenues. In the current version this adjustment is carried out for Denmark only.
 - 2) Average deviation between structural and actual surplus over the period 1982-2000. The EMU average is used for member countries while the EU average is used for remaining European countries.
 - 3) The results reported in the table does not take into account petroleum tax revenue etc.

The current effective rate of fiscal consolidation is approximately 1,5 percent of GDP on average. However, the required rate is 3,9 percent of GDP. As table 2 shows, the structural budget shortfall from a sustainability viewpoint is therefore 2,3 percent of GDP.

This average covers substantial differences between countries. Thus, the fiscal policies of the US, the UK, Italy and Canada are sustainable. By far the most favorable position is that of the UK. Given the fairly modest long-term budgetary impact of ageing, as well as the current budget surplus, the UK government could cut taxes by 1,5 per cent of GDP without jeopardizing the financing of welfare state programs in the long run.

A group of countries including Greece, Belgium, Sweden, Denmark and Ireland face moderate sustainability problems requiring fiscal adjustment in the order of magnitude 0,1-0,5 per cent of GDP.

Among the remaining countries, including the majority of the Euro countries and Japan, several face very substantial problems. Even before the recent significant tax cuts in Germany and France, these countries would have to increase net taxes by 4,5-5 percent of GDP in order for fiscal policy to be sustainable. In particular, the recent focus on the fiscal stance in Ireland seems quite misplaced in the light of the huge fiscal imbalances appearing in other EMU member countries.

Cyclical inflexibility, as indicated by the average deviation between structural and actual deficit, accounts for about one-tenth of the weighted average sustainability gap. Hence, improving the

functioning of labor markets would make a - perhaps overlooked - contribution to the long term solvency of fiscal programs through reducing cyclical asymmetries.

Alternatively, fiscal sustainability may be evaluated using the primary surplus, i.e. equation (8). This is done in *table 3*. Although the numbers change somewhat, the overall picture is remarkably similar. The differences between the two alternative ways of computing σ are shown in *table 4*.

GDP-weighted average government net debt liabilities are 46 per cent of GDP in 2000. However, the implicit debt obligations reflecting the future budgetary consequences of current legislation, amount to 194 per cent of GDP. "Official" net debt thus amounts to only one-fifth of the effective debt burden and hence the required primary surplus.

Table 3. Fiscal Sustainability in 19 OECD Countries. Primary Surplus Method. Per Cent of GDP in 2000.

	Actual primary balance	Deviation actual-structural	Average deviation	Structural primary balance	Government net debt			Debt burden			Fiscal sustainability
					Explicit	Implicit	Total	Explicit	Implicit	Total	
Australia	2,30	0,30	-0,25	1,75	11,20	178,13	189,33	0,22	3,56	3,79	-2,03
Austria	1,80	0,10	-0,48	1,22	48,20	158,06	206,26	0,96	3,16	4,13	-2,91
Belgium	6,20	-0,40	-0,48	6,12	101,80	221,51	323,31	2,04	4,43	6,47	-0,35
Canada	6,60	0,40	-0,32	5,88	67,10	189,38	256,48	1,34	3,79	5,13	0,75
Denmark	4,70	0,20	-0,38	4,12	26,90	172,99	199,89	0,54	3,46	4,00	0,12
Finland	5,30	0,10	-0,48	4,72	-30,40	253,50	223,10	-0,61	5,07	4,46	0,25
France	1,50	0,20	-0,48	0,82	42,70	225,30	268,00	0,85	4,51	5,36	-4,54
Germany	4,30	2,10	-0,48	1,72	41,70	241,50	283,20	0,83	4,83	5,66	-3,95
Greece	6,20	-0,40	-0,48	6,12	102,70	232,50	335,20	2,05	4,65	6,70	-0,59
Ireland	5,80	1,50	-0,48	3,82	37,30	261,00	298,30	0,75	5,22	5,97	-2,15
Italy	5,90	0,50	-0,48	4,92	99,80	122,63	222,43	2,00	2,45	4,45	0,47
Japan	-4,50	-0,80	-0,24	-3,94	43,60	284,63	328,23	0,87	5,69	6,56	-10,50
Netherlands	4,90	1,70	-0,48	2,72	44,80	288,00	332,80	0,90	5,76	6,66	-3,94
Norway	12,30	15,40	-0,38	-3,48	-55,50	202,50	147,00	-1,11	4,05	2,94	-6,42
Portugal	1,70	0,50	-0,48	0,72	55,90	279,23	335,13	1,12	5,58	6,70	-5,99
Spain	3,10	-0,20	-0,48	2,82	43,10	392,63	435,73	0,86	7,85	8,71	-5,90
Sweden	5,50	0,70	-0,38	4,42	2,00	148,80	150,80	0,04	2,98	3,02	1,41
UK	4,90	0,30	-0,38	4,22	32,60	84,15	116,75	0,65	1,68	2,34	1,89
USA	4,90	0,60	0,00	4,30	43,20	150,00	193,20	0,86	3,00	3,86	0,44
Unweighted average	4,39	0,90	-0,40	2,79	39,93	215,07	255,01	0,80	4,30	5,10	-2,31
GPD-weighted average	3,23	0,80	-0,24	2,48	46,04	194,42	240,46	0,92	3,89	4,81	-2,33

Table 4. Comparing the Two Methods. Per Cent of GDP in 2000.

	Current surplus method	Primary surplus method	Difference
Australia	-2,76	-2,03	-0,73
Austria	-3,42	-2,91	-0,51
Belgium	0,54	0,35	0,19
Canada	0,68	0,75	-0,07
Denmark	-0,26	0,12	-0,39
Finland	-2,87	0,25	-3,12
France	-4,88	-4,54	-0,34
Germany	-4,35	-3,95	-0,40
Greece	-1,63	-0,59	-1,04
Ireland	-0,11	-2,15	2,04
Italy	0,46	0,47	-0,01
Japan	-9,39	-10,50	1,12
Netherlands	-4,55	-3,94	-0,61
Norway	-8,05	-6,42	-1,63
Portugal	-5,83	-5,99	0,15
Spain	-6,71	-5,90	-0,81
Sweden	-0,57	1,41	-1,98
UK	1,64	1,89	-0,24
USA	0,43	0,44	-0,01
Average	-2,78	-2,31	-0,46
GPD-weighted average	-2,34	-2,33	-0,01

The required long term gross public debt reduction implied by equation (15) is shown on *table 5*. On average, gross government liabilities are almost eliminated under a sustainable fiscal strategy. In several countries, including France and Germany, financing the long run increase in government spending even requires the public sector in these countries to acquire positive gross asset positions.

Table 5. Required Long Run Debt Reduction. Per Cent of GDP.

	Base year gross debt	Long run debt reduction	Long run gross debt
Australia	25,40	59,38	-33,98
Austria	64,10	52,69	11,41
Belgium	110,70	73,84	36,86
Canada	105,90	63,13	42,78
Denmark	50,40	57,66	-7,26
Finland	43,50	84,50	-41,00
France	64,60	75,10	-10,50
Germany	59,60	80,50	-20,90
Greece	102,70	77,50	25,20
Ireland	37,30	87,00	-49,70
Italy	112,00	40,88	71,13
Japan	112,30	94,88	17,43
Netherlands	57,40	96,00	-38,60
Norway	26,10	67,50	-41,40
Portugal	55,90	93,08	-37,18
Spain	69,70	130,88	-61,18
Sweden	56,20	49,60	6,60
United Kingdom	53,50	28,05	25,45
United States	59,50	50,00	9,50
Average	66,67	71,69	-5,02
GPD-weighted average	72,57	64,81	7,76

Finally, we consider briefly the consequences of changing the interest rate assumption. Using a nominal rate of return of 7 per cent produces the results reported in *table 6*. On average, fiscal sustainability is largely unaffected by changes in the interest rate. This reflects two offsetting influences. On the one hand, a higher interest rate raises the burden associated with the government's outstanding net debt liabilities. On the other and, the present value of future spending increases is reduced which in turn reduces the burden associated with government implicit debt.

However, the impact of interest rate changes varies substantially across countries. Countries with relatively large explicit net debt burdens are adversely affected. These countries include Belgium, Greece and Italy, where permanent increases in the primary surplus of 0,5-0,7 percent are required. Sweden, Norway and Finland, in contrast, with low or negative net government debt positions, face a less stringent requirement for fiscal sustainability.

It is worth pointing out that the interest rate and growth enter symmetrically, but with opposite sign, in equation (8). This implies that the results concerning interest insensitivity carries directly over to the case of a higher growth rate: Fiscal sustainability is approximately unaffected. Again, substantial cross-country variation occurs. A country with a relatively large explicit debt burden will tend to gain, while a country with a relatively large implicit debt will have to tighten fiscal policy to maintain sustainability. This latter effect comes about because, when fiscal policy is sustainable and future changes in the primary surplus are negative, part of the future fiscal burden is covered through current taxes. And, relative to current GDP levels, higher future GDP levels imply that the share of current tax receipts devoted to debt reduction should increase.

Table 6. Interest Rate Sensitivity of Fiscal Sustainability. Per cent of GDP in 2000.

	Baseline required primary surplus			Required primary surplus at 1 ppt higher interest rate			Effect on fiscal sustainability		
	Explicit debt	Implicit debt	Total	Explicit debt	Implicit debt	Total	Explicit debt	Implicit debt	Total
Australia	0,22	3,56	3,79	0,34	3,17	3,50	-0,11	0,40	0,28
Austria	0,96	3,16	4,13	1,45	2,81	4,26	-0,48	0,35	-0,13
Belgium	2,04	4,43	6,47	3,05	3,94	6,99	-1,02	0,49	-0,53
Canada	1,34	3,79	5,13	2,01	3,37	5,38	-0,67	0,42	-0,25
Denmark	0,54	3,46	4,00	0,81	3,08	3,88	-0,27	0,38	0,12
Finland	-0,61	5,07	4,46	-0,91	4,51	3,59	0,30	0,56	0,87
France	0,85	4,51	5,36	1,28	4,01	5,29	-0,43	0,50	0,07
Germany	0,83	4,83	5,66	1,25	4,29	5,54	-0,42	0,54	0,12
Greece	2,05	4,65	6,70	3,08	4,13	7,21	-1,03	0,52	-0,51
Ireland	0,75	5,22	5,97	1,12	4,64	5,76	-0,37	0,58	0,21
Italy	2,00	2,45	4,45	2,99	2,18	5,17	-1,00	0,27	-0,73
Japan	0,87	5,69	6,56	1,31	5,06	6,37	-0,44	0,63	0,20
Netherlands	0,90	5,76	6,66	1,34	5,12	6,46	-0,45	0,64	0,19
Norway	-1,11	4,05	2,94	-1,67	3,60	1,94	0,56	0,45	1,01
Portugal	1,12	5,58	6,70	1,68	4,96	6,64	-0,56	0,62	0,06
Spain	0,86	7,85	8,71	1,29	6,98	8,27	-0,43	0,87	0,44
Sweden	0,04	2,98	3,02	0,06	2,65	2,71	-0,02	0,33	0,31
United Kingdom	0,65	1,68	2,34	0,98	1,50	2,47	-0,33	0,19	-0,14
United States	0,86	3,00	3,86	1,30	2,67	3,96	-0,43	0,33	-0,10
Average	0,80	4,30	5,10	1,20	3,82	5,02	-0,40	0,48	0,08
GPD-weighted average	0,92	3,89	4,81	1,38	3,46	4,84	-0,46	0,43	-0,03

4. Concluding remarks

On average, at approximately 1,5 percent of GDP, current fiscal consolidation in the OECD countries is insufficient to cover the expected rise in spending on welfare state programs. The shortfall equals about 2,3 percent of GDP, but sustainability problems are heavily concentrated among core EMU member states and Japan. These countries accordingly face significant fiscal challenges in the longer term. The results therefore also imply that the current trend towards a more lax fiscal stance in several EU countries may contribute to future government solvency problems unless matched by - current or future - cuts in government spending.

Total government debt, taking into account both net assets and the future budgetary implications of welfare state programs in place, is equal to almost 2,5 times OECD GDP. Servicing these obligations requires maintaining primary surpluses averaging over the business cycle slightly less than 5 per cent of GDP.

Future revisions should focus on, first, taking into account the budget implications of private retirement savings and means-testing of government transfers. So far, this has only been done for Denmark. Second, more detailed projections, especially with respect to government consumption, could be included. Third, the tax treatment of public pensions should be examined, where in this paper we have only made very rough adjustments for the taxation of transfers. Finally, the time path of the budget impact, as captured through the adjustment speed parameter, could be made country specific in order to capture the consequences of different patterns of demographic dynamics across countries.

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