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The Costs of Delaying fiscal
Consolidation: A Case
Study for Greece

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Vassiliki Koutsogeorgopoulou and David Turner

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ABSTRACT/RÉSUMÉ

The costs of delaying fiscal consolidation: a case study for Greece

Since 2004, the fiscal deficit has been brought down by over 5% of GDP to below the 3% limit in 2006, which is a major achievement. The government plans a more gradual reduction over coming years so that overall balance or surplus is reached no later than 2010. However, fiscal consolidation should continue, possibly at a more rapid pace than planned, given the high level of government debt, favourable outlook for output growth, and long-term fiscal costs of ageing which are estimated to be among the largest in the OECD. There are as yet no specific proposals to reform pensions, which account for most of the prospective ageing-related increase in public expenditure, although the government is expected to announce reforms following the publication of a report from a Committee of Experts. Delaying fiscal consolidation, particularly the urgently needed pension reform, would have substantial longer-term costs in terms of higher taxes and additional debt service costs, including an increase in the risk premium paid on government debt. In addition, this would heavily skew the tax burden towards future generations. Consolidation should focus on reducing primary spending and on enhancing tax revenues. This can be achieved particularly through increased efficiency of public administration and by measures to tackle tax evasion and further broaden the tax base. Ensuring long-run fiscal sustainability will also require the implementation of wide-ranging reforms in the key area of health care, as well as an early decision to introduce a comprehensive reform of the pension system.

This paper relates to the 2007 Economic Survey of Greece (www.oecd.org/eco/surveys/greece).

JEL classification: H26; H55; H62; H63

Key words: fiscal consolidation; ageing; deficit; debt; spending; revenues; tax evasion; pensions

Les coûts d'un report de la consolidation budgétaire : une étude dans le cas de la Grèce

La réduction du déficit budgétaire, ramené de 5 % du PIB en 2004 à moins de 3 % en 2006, est une réussite majeure. Les autorités prévoient une diminution plus progressive dans les prochaines années jusqu'à ce que le budget soit en équilibre ou excédentaire, au plus tard en 2010. Cependant, l'assainissement budgétaire devrait se poursuivre – peut-être à un rythme plus rapide que prévu - étant donné le niveau élevé de la dette publique, les perspectives favorables à la croissance de la production et les coûts budgétaires à long terme du vieillissement, qui sont parmi les plus élevés de la zone OCDE. Il n'est pas encore prévu d'initiatives spécifiques pour réformer les retraites, principale source de l'accroissement prévisible des dépenses publiques résultant du vieillissement, même si le gouvernement doit annoncer des mesures dans le courant de cette année. Différer l'assainissement des finances publiques, surtout la réforme des retraites qui s'impose d'urgence, entraînerait des coûts à long terme considérables sous forme d'une hausse de la fiscalité et d'un alourdissement du service de la dette, avec notamment une augmentation de la prime de risque appliquée à la dette publique. De surcroît, ceci reviendrait à transférer une lourde charge fiscale aux générations futures. Les efforts d'assainissement devraient tendre surtout à réduire les dépenses primaires et accroître les recettes fiscales. On peut y parvenir par l'amélioration de l'efficacité de l'administration publique en particulier, et en luttant contre la fraude et en prenant d'autres mesures pour élargir la base d'imposition. Pour garantir la viabilité budgétaire à long terme, il faudra aussi engager des réformes d'envergure dans le secteur clé de la santé et décider promptement de lancer une réforme complète du système de retraite.

Ce document se rapporte à l'Étude économique de Grèce 2007 (www.oecd.org/eco/etudes/grece).

JEL classification : H26; H55; H62; H63

Mots clés : assainissement budgétaire; vieillissement; déficit; dette; dépenses; recettes; fraude fiscale; retraites

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THE COSTS OF DELAYING FISCAL CONSOLIDATION: A CASE STUDY FOR GREECE

By Vassiliki Koutsogeorgopoulou and David Turner¹

Introduction

1. Greece has made considerable progress in cutting its fiscal deficit since 2004, although, given the high debt-to-GDP ratio and large prospective costs associated with ageing, further consolidation efforts are required. This paper outlines the areas where there is scope to achieve such fiscal consolidation and demonstrates that there are considerable costs from delaying such action.

2. The remainder of the paper is organised as follows: the next section provides a brief summary of recent fiscal developments together with a discussion of the government's medium term objectives; the following two sections outline areas where there is scope to reduce public expenditure and raise revenue, respectively; this is followed by a model-based simulation exercise which attempts to quantify the costs of delaying fiscal consolidation efforts where the time horizon considered is to mid-century; a final section summarises the main conclusions and policy recommendations. Further details underlying the pension expenditure projections and of the simulation model are provided in Annexes A and B.

3. One important data issue that should be clarified up-front is that the GDP data used throughout this paper do not incorporate the recent upward revision of the *level* of GDP by about 10% in 2000, as this revision was agreed by Eurostat only after the work here was completed.² The latest official Budget and Stability Programme projections also use the old GDP data. Hence to remain consistent with these sources all fiscal ratios (such as deficit and debt as a share of GDP), unless otherwise explicitly noted, are calculated on the basis of the old GDP data.

Recent fiscal developments and medium term objectives

The deficit has been brought down to below 3% of GDP

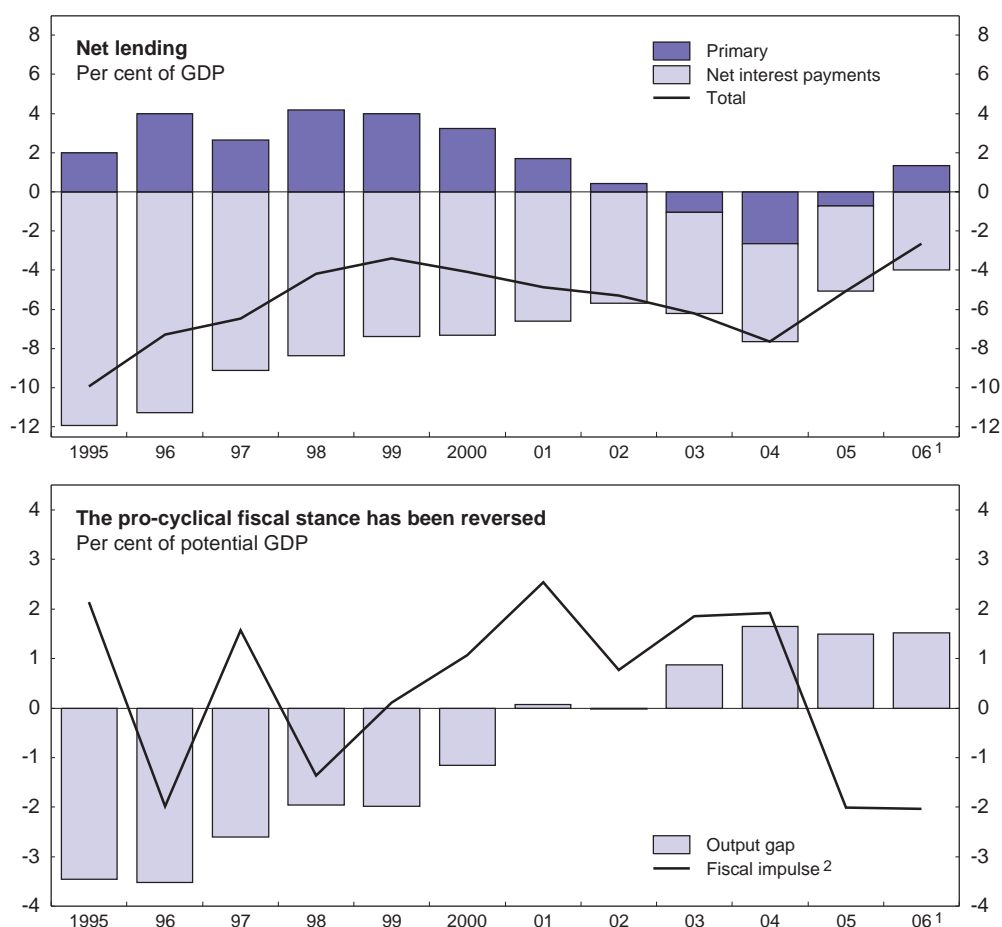
4. Reversing the relentless rise in the deficit since the late 1990s has been the overriding objective of economic policy since the current government took office in March 2004. Following large revisions in the public finance statistics, which raised the general government deficit to above 3% of GDP for every year since 1997,³ Greece was placed under the EU's Excessive Deficit Procedure (EDP) in June 2004, with the requirement to bring the deficit to below 3% of GDP by 2006. The latest official estimates, incorporated in the 2007 Budget, suggest that this requirement has been met with an estimated general government deficit of 2.6% of GDP for 2006, leading to the termination of the EDP (Figure 1). This reduction in the deficit has coincided with a marked reversal of the previously strong pro-cyclical fiscal stance.

5. The swing in the deficit between 2004 and 2006 from 7¾ per cent of GDP to an estimated 2½ per cent of GDP is explained by a combination of factors (Table 1), the largest of which are: a fall in capital expenditure of just under 2% of GDP, much of which is due to the ending of Olympics-related expenditure;⁴ an increase in "other revenues" of about 1½ per cent of GDP partly related to one-off items⁵ and partly to the inclusion of revenues from taking over a bank pension fund, although the latter will lead to future government spending of a roughly similar magnitude spread over a number of years; and a reduction in debt service payments by ¾ per cent of GDP. The sizeable fall in Olympics-related capital

outlays is consistent with government investment reverting to its long-term trend as a share of GDP. However, there may be only limited scope for further reductions as business surveys rate Greece poorly on the adequacy of its basic infrastructure (World Economic Forum, 2006).

6. While the deficit reduction achieved since 2004 is welcome, the contribution from reducing current primary expenditure was only about ½ per cent of GDP.⁶ The absence of any evidence of sustained reductions in primary current expenditure is a matter for concern both because there is scope to reduce primary spending as a share of GDP (as discussed further below) and in light of its potential to generate durable fiscal consolidation and better economic performance.⁷

Figure 1. Developments in general government fiscal balances



1. Projections.
2. Measured by the change in the cyclically-adjusted government primary deficit, a positive value represents stimulus.

Source: OECD (2006), *OECD Economic Outlook: Statistics and Projections*, No. 80 - online database.

Table 1. **General government revenues and expenditure**
In per cent of GDP

	Level						Change	
	2004	2005	2006	2007	2008	2009	2004-06	2007-09
Taxes	21.6	21.8	22.0	22.2	22.4	22.7	0.5	0.5
On production and imports	12.8	12.6	13.1	13.4	13.6	13.8	0.2	0.5
On income and wealth	8.7	9.3	9.0	8.9	8.8	8.9	0.2	0.0
Social contributions	14.6	14.4	14.5	14.7	14.9	15.2	-0.2	0.5
Other current revenues	2.1	2.5	3.6	3.0	2.9	2.8	1.5	-0.3
Total current revenues	38.3	38.8	40.1	39.9	40.2	40.6	1.8	0.7
Capital transfers received	2.0	1.7	2.1	2.2	2.2	2.3	0.1	0.1
Total revenues	40.3	40.5	42.2	42.1	42.5	42.9	1.8	0.8
Government final consumption expenditure	16.6	16.4	16.0	15.6	15.2	14.8	-0.5	-0.8
of which: Compensation of employees	12.5	12.1	12.0	11.9	11.8	11.7	-0.5	-0.2
Social transfers other than in kind	17.1	17.4	17.4	17.7	18.1	18.5	0.2	0.9
Primary current expenditure	35.4	35.5	34.9	34.8	34.7	34.7	-0.5	-0.1
Interest	5.3	4.7	4.5	4.3	4.1	4.0	-0.8	-0.3
Total current expenditure	40.8	40.2	39.4	39.1	38.8	38.7	-1.3	-0.4
Capital expenditure	7.2	5.4	5.3	5.4	5.4	5.4	-1.9	0.0
Gross fixed capital formation	4.2	3.5	3.5	3.5	3.5	3.4	-0.7	0.0
Other capital expenditure	3.1	1.9	1.8	1.9	1.9	1.9	-1.2	0.0
Total expenditure	48.0	45.6	44.7	44.4	44.2	44.1	-3.3	-0.4
Balance	-7.7	-5.1	-2.5	-2.3	-1.8	-1.2	5.1	1.2
Gross debt (consolidated)	108.5	107.5	104.1	100.1	95.9	91.3	-4.4	-8.8
Primary surplus	-2.3	-0.4	2.0	2.0	2.4	2.9	4.3	0.9

Source: Ministry of Economy and Finance (2006), "The 2006 Update of the Hellenic Stability and Growth Program 2006-2009", December.

But the debt ratio remains high

7. The general government debt burden (on a Maastricht definition), has fallen from a peak of 114% of GDP in 2001 to around 104% of GDP in 2006 but still remains among the highest in the OECD area and well above the 60% Maastricht reference value. The main reason for this reduction has been strong growth of nominal GDP and the lower interest rate paid on debt, with the primary balance playing a smaller role (Bank of Greece, 2006a). Various financial transactions, which do not affect the deficit but are included in general government debt (the so-called "stock-flow adjustment"), have prevented a faster reduction in indebtedness. The magnitude of this stock-flow adjustment has recently been much smaller than over the 1990s, when it was among the largest in the OECD, though it amounted to 1.7% of GDP in 2006. Given the increasing emphasis being given to debt in European fiscal commitments and that a number of researchers (for example Koen and van den Noord, 2005) and financial market analysts have used stock-flow adjustments as a short-hand measure of "fiscal gimmickry", it is important that current and projected movements in the stock-flow adjustment continue to be explained and there is a clear rationale for the transactions underlying them that goes beyond any immediate effect they may have on reducing the recorded fiscal deficit. Conversely, while providing information on the expected evolution of the aggregate stock-flow adjustment to 2009, the latest Programme does not detail the factors underlying these projected adjustments.

8. In general, a higher level of government debt is associated with increased debt service costs through a higher risk premium on government debt. However, for Greece, EMU membership has considerably reduced such costs; the average risk premium on 10-year bonds (judged relative to German bonds) narrowed from 220 basis points over the three years prior to joining EMU to an average of only 35 basis points since. Nevertheless, a risk premium that is some multiple of 10 basis points (rather than

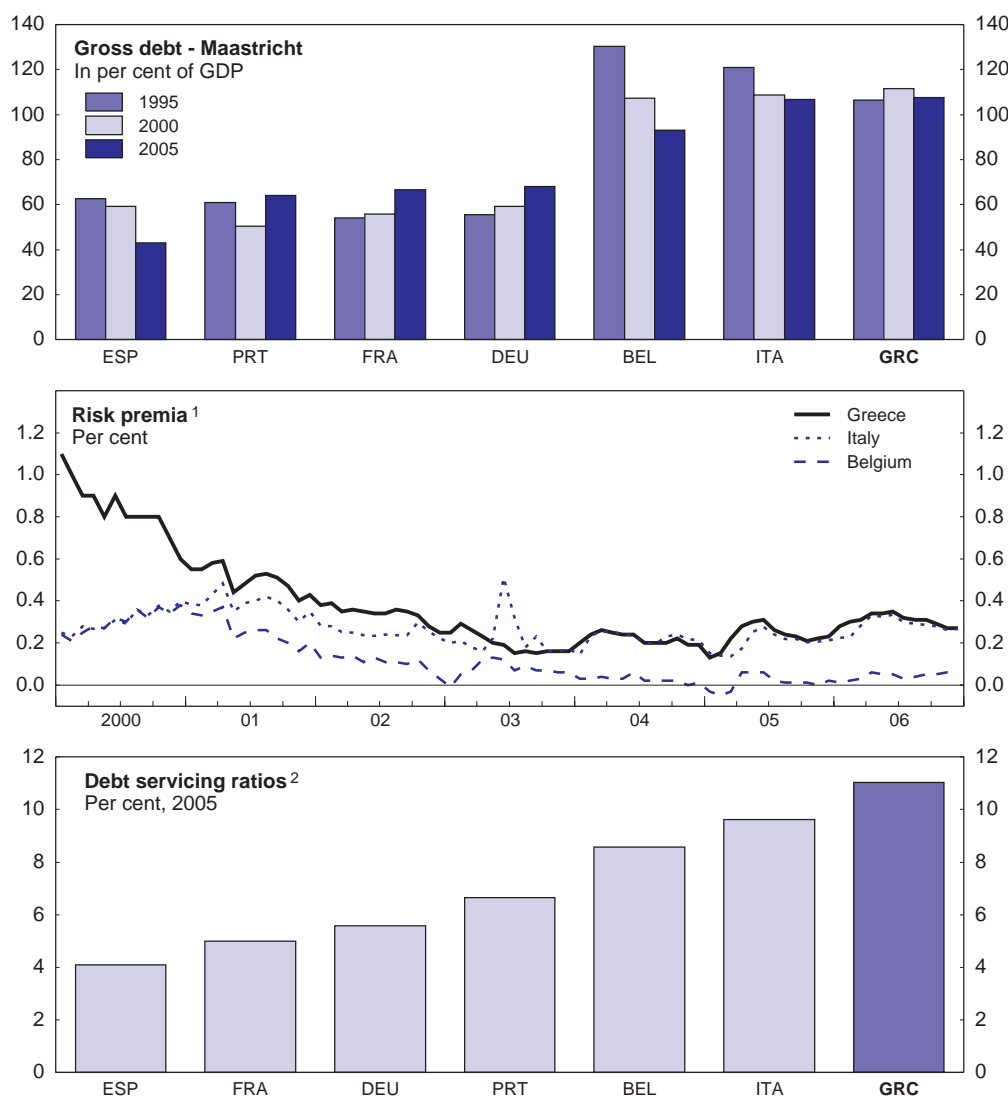
multiples of 100 basis points) can still cumulate to a substantial deadweight debt service cost when debt remains a high share of GDP over a period of decades. On the other hand, even within EMU the risk premium (relative to German bonds) is higher in Greece and Italy than it is in Belgium, despite the fact that all three countries have similar debt-to-GDP ratios (Figure 2). One explanation is that the debt ratio in Belgium has been on a decisive downward trend following substantial primary surpluses – thus financial markets may be anticipating a further sustained fall in the debt ratio. A possible complementary explanation, supported by recent empirical research by Bernoth *et al.* (2004), is that markets focus on the ratio of debt-service to government revenues as a better measure of the government's ability to finance debt. On this basis the relative position of Greece is less favourable than either that of Italy or Belgium (Figure 2, lower panel), perhaps partly reflecting the difficulty which Greece has in extracting tax revenues from GDP given widespread tax evasion. Bernoth *et al.* (2004) also speculate that since the start of EMU the focus of financial markets has shifted from the debt and deficit-to-GDP ratios to the debt-service-to-revenue ratio in the assessment of credit risk, because the latter measure is less amenable to accounting gimmickry, especially as it is not one of the ratios against which European commitments are formally judged. A corollary of the finding that the debt-service-to-revenue ratio is important in determining the risk premium is that, although the recent large upward revision to the level of GDP would significantly reduce the projected deficit-GDP and gross debt-to-GDP ratios (respectively, by around ½ and 20 percentage points in 2006), there may be little improvement in the risk premium paid on government debt.

The government's medium-term objectives should be more ambitious

9. The 2007 Budget and the 2006 update of the Stability Programme target only a modest further reduction of the general government deficit from 2.6% of GDP in 2006 to 1.2% by 2009, consistent with a primary surplus of nearly 3% (Table 1). The projected improvement in the primary balance is mostly achieved through higher revenues (0.7 of the 0.9 percentage points), mainly through increased indirect tax revenue and receipts from social security contributions. Primary current expenditure, on the other hand, remains broadly unchanged as a share of GDP, with a decline in government consumption offset by higher outlays on targeted income support.⁸ The projected primary surpluses, combined with declining deficit-debt adjustments and strong growth rates, are projected to bring down the general government debt ratio by 13 percentage points between 2006 and 2009, to 91% of GDP.

10. These medium term objectives need, however, to be seen in the context that the additional public expenditure associated with ageing to mid-century is estimated to be among the highest in the OECD. Even if the government meets its objective of moving to a fiscal position of balance or surplus by 2010, without a further change in policies demography-related spending pressures would put debt on an explosive path according to a mechanical extrapolation, pushing it up to more than 350% of GDP by 2050. Such an outcome is implausible, but it emphasises that the relevant policy question is not whether further fiscal consolidation is needed, but rather how and when it is best achieved. In this context, Greece is the only euro area country which does not include quantitative long-term fiscal projections as part of its annual Stability Programme. This may be partly explained by the lack of specific proposals to reform pensions, although the government is expected to announce plans for reform following the election in September 2007.

Figure 2. Debt and debt service



1. Long-term interest rate less German rate.

2. Net interest payments as a percentage of current receipts (excluding interest receipts).

Source: OECD (2006), *OECD Economic Outlook: Statistics and Projections*, No. 80 - online database.

Further budget consolidation can be achieved on the expenditure side

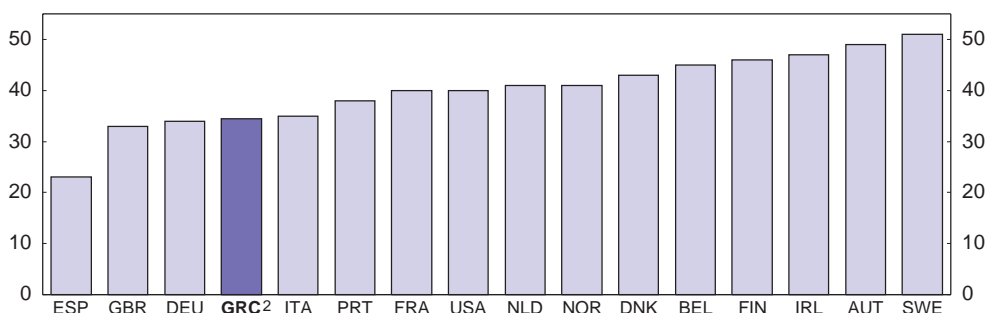
11. The persistent weakness in public finances lies largely on the expenditure side. Aggregate current primary expenditure at around 36% of GDP in 2005 is 5 percentage points of GDP below the euro area average, but this gap has halved over the last decade while the euro area expenditure share has remained relatively stable. Gaining better control over primary spending trends through improved public expenditure management and greater fiscal transparency is essential to provide a basis for a sustained improvement of fiscal performance. Areas of potential saving include improving budgetary control and expenditure management, including over public enterprises, and reducing expenditure on public administration. Above

all, to ensure long-term fiscal sustainability in-depth measures are required to contain spending on health and, especially, pensions. Each of these areas is discussed briefly below,⁹ with further details in the 2007 *Survey*.

Enhancing public expenditure management and improving transparency

12. Improvements in the process of budget preparation, monitoring and evaluation would enhance efficiency in the allocation of public funds, paving the way for stronger and more transparent government finances. Quantitative measures of fiscal transparency suggest Greece ranks low in international comparison, although the positive impact on transparency of recent improvements in the quality and timeliness of fiscal data reporting and from enhanced auditing procedures are not yet reflected in these measures (Figure 3). The full integration of the budgeting process with the programme-based approach, currently still under development, is of major importance for the evaluation of the effectiveness of spending initiatives and should be implemented without a delay.¹⁰ Furthermore, budget planning and control of expenditure would be improved by the introduction of indicative expenditure ceilings that extend beyond each fiscal year and apply to all levels of the public sector (OECD, 2005). While the government has announced its intention to move to a multi-year budgetary framework there is no timetable for its implementation. Empirical evidence suggests that more transparent fiscal procedures would help to lower risk premia and hence borrowing costs (Bernoth and Wolff, 2006).

Figure 3. **An index of fiscal transparency¹**



1. This index captures the degree to which fiscal bookkeeping is being audited and the extent to which the information of this auditing becomes public knowledge.
2. As originally calculated the index for Greece took a value of only 4. However this was based on an incorrect interpretation of the relevant survey responses. The index reported here is recalculated based on the correct responses.

Source: Bernoth, K. and G.B. Wolff (2006), "Fool the Markets? Creative Accounting, Fiscal Transparency and Sovereign Risk Premia", *DNB Working Paper*, No. 103, De Nederlandsche Bank, Amsterdam, June.

Establishing budgetary control over public enterprises

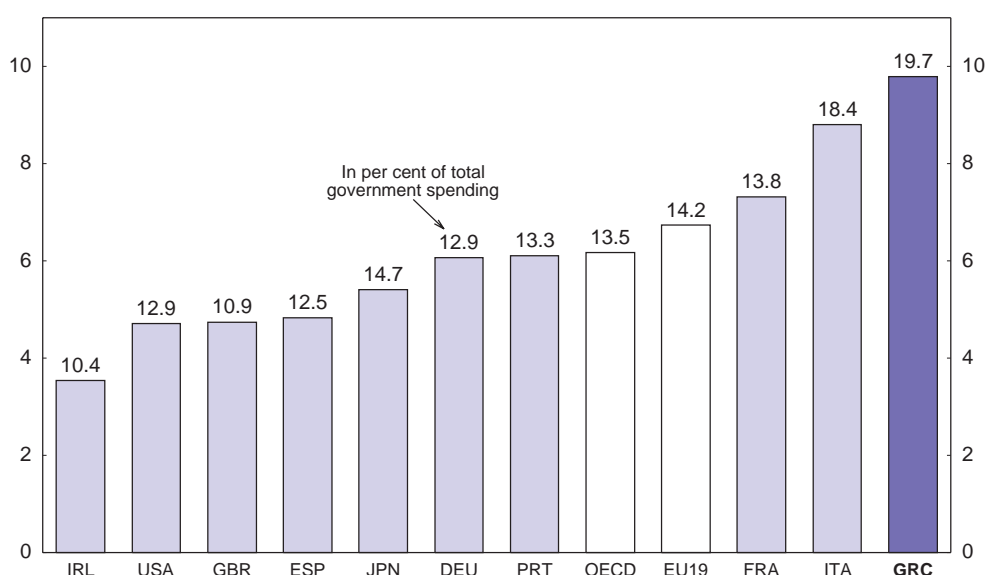
13. There is an urgent need for better control of spending by public enterprises. Based on the latest budget, such companies incurred losses of around 0.6% of GDP in 2005 and 2006 with a similar share projected for 2007. In addition to grants to cover their deficits (such as those to the railways and urban transport organisations, which are not included in general government), the budget is burdened by requirements for capital injections and loan guarantees (Bank of Greece, 2006b). Mainly reflecting the sharp rise in public enterprise borrowing, the outstanding balance of state-guaranteed loans edged up from 6¼ per cent of GDP in 1999 to 9% in 2006, so raising public indebtedness. Aiming to improve the operation of public enterprises should be high on the agenda and recent initiatives, through the introduction of a new institutional framework for public enterprises and organisations, are steps in the right direction.¹¹ An important issue in this regard is the timely application of the new Management Information System –

expected to be introduced in 2008 – that will be linked to the financial departments of the public enterprises, allowing the monitoring of their performance and the evaluation of the outcomes achieved compared with budget targets.

Public administration performance needs to improve further to match best practice

14. Greece is reforming and modernising its public administration. It needs to move faster, however. Expenditure on general public administration was the highest in the OECD in 2004, both in relation to GDP and as a percentage of total government outlays (Figure 4). Moreover, there is no evidence that the quantity or quality of services provided are superior which suggests that substantial reductions in expenditure on public administration can be achieved through greater efficiency. Public efficiency analysis by Afonso *et al.* (2003) concludes that Greece could have achieved the same level of public sector outputs (including administration, health and education) employing only 71% of the inputs it is currently using.

Figure 4. **Expenditure on general public administration**¹
General government sector, in per cent of GDP, 2004²



1. General public services comprising: executive and legislative organs, financial and fiscal affairs, external affairs, foreign economic aid, general services, basic research, research and development, public debt transactions and other general public services.
 2. The EU19 and OECD aggregates are unweighted averages. EU19 covers all EU members that are also OECD members. The OECD aggregate excludes Australia, Canada, Mexico, New Zealand, Switzerland and Turkey.
- Source: OECD (2007), *National Accounts of OECD countries* - online database, February.

15. Improvements in the client friendliness of the public administration and, more recently, changes to lighten the burden of administrative regulations on business, are welcome. Further steps towards simplifying procedures are nevertheless warranted. For example, despite improvements over the past three years, the number of procedures and the time taken for starting a small business are still among the highest in the OECD. More generally, there is often a gap between legislated reforms and their timely implementation. Thus, a focal point of public administration reform should be to ensure that policies are fully and efficiently implemented once the legislation has been passed.

16. An equally important objective is to reduce over-staffing and raise productivity in the public sector, indispensable not only to enhance the quality of services and assist the government's consolidation policy, but to also contain wage pressures, given that wages in the public sector often play a leading role in

aggregate wage developments. Initiatives underway towards a stronger system of performance evaluation, tighter recruitment procedures, and greater mobility of public servants are therefore welcome and should be implemented without delay. Taking advantage of natural wastage, through policies of partial replacement of retirees from the public sector, would be a step in the right direction.¹²

Ensuring high quality of health care services while containing costs

17. At 5% of GDP, government expenditure on health and long-term care is lower than the OECD average by around 2 percentage points. However, population ageing and non-demographic factors, such as technology and relative-price movements in the supply of health services, and the “cost-disease effect”¹³ in the case of long-term care, will raise costs of provision over time. OECD estimates under a “cost-pressure scenario” suggest that public spending on health and long-term care could more than double as a share of GDP by 2050, approaching the area-wide average in the absence of any policy actions (OECD, 2006). Even under an alternative “cost-containment” scenario, public expenditure on health and long-term care could rise to around 9% of GDP by 2050 (compared with an OECD average of 10%).

18. Improving the efficiency of health care services would help to contain future cost pressures. Despite improvements in recent years, service delivery by the National Health System (NHS) is unsatisfactory, in spite of ample supply.¹⁴ A high level of private spending on health care (out-of-pocket payments are just under half of total health expenditure, among the highest in the OECD) in large part reflects inefficiencies in the public health system that leads to excessive waiting lists, although *ceteris paribus* this may help contain pressures on public expenditure. Quantitative indicators of performance of the health sector, in particular waiting times for different types of surgery and treatment, should be more systematically collected and made publicly available. Previous OECD *Surveys* highlighted the main problems of the public health care system. These include the inefficient operation of public hospitals and the lack of an effective national primary health care system. On-going initiatives to tackle these structural weaknesses have focused on modernising the structure of the NHS, upgrading its management and rationalising health expenditure in critical areas (for details see the 2007 *Survey*). Measures to rationalise public procurement and simplify ordering procedures, along with improvements in public hospital management, are welcome to prevent further hospital debt accumulation in the future.¹⁵ Greater involvement of the private sector through PPPs in areas such as the provision of in-patient services and building of public hospitals may also help to raise efficiency and cost-effectiveness.

19. However, additional measures will be needed to control health care expenditure more decisively and improve the quality of services. These include better pricing and costing mechanisms, and enhanced auditing of social services, which are part of the government’s longer-term reform agenda, announced in 2004. A pricing scheme for the reimbursement of public hospitals for different types of in-patient services, if implemented, would be an important step forward. Regarding primary care, the development of a well-functioning network – indispensable for the reduction of geographic disparities in the provision and coverage of health services and for providing a “gatekeeper” to specialists and out-patient care – would depend largely on the incentive schemes for general practitioners and other medical personnel. International evidence suggests that a more diversified system of payments, including a fee-for-service component (instead of payment entirely by salary or capitation) would reduce waiting lists for elective surgery (Siciliani and Hurst, 2004) and raise the activity rates of physicians (Simoens and Hurst, 2006) while possibly also ensuring that more attention is paid to patients’ preferences. Making hospital management accountable, together with a better pricing system and well-developed primary care, would provide a better basis for containing costs while addressing shortfalls in the quality of health services. Quantitative and qualitative benefits depend critically, however, on the rigorous and timely implementation of the government’s reform strategy.

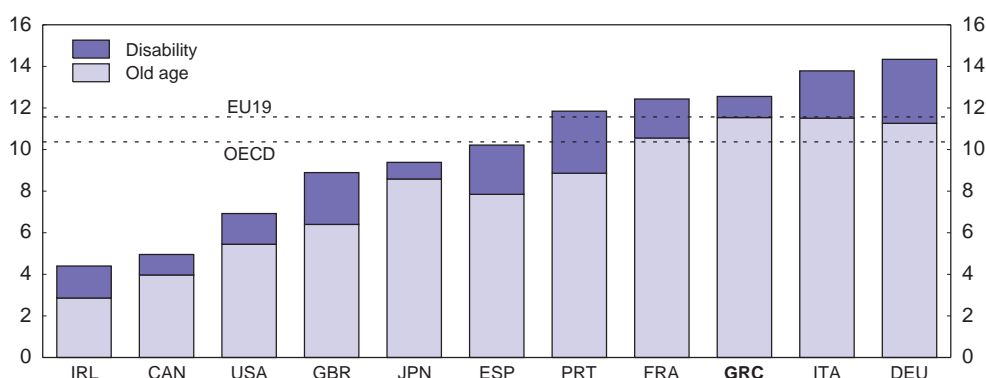
The pension system is a fiscal time bomb

20. Pensions are mostly provided by a large number of earnings-related schemes. They are run by the public sector on a pay-as-you-go defined-benefit basis with practically complete coverage of the population (for further details see Chapter 3 of the 2007 *Survey*). A major pension reform is urgently required primarily to ensure fiscal sustainability, but also to eliminate disincentives to work at older ages as well as to enhance the effectiveness of the system in alleviating poverty.

21. Total public spending on old-age pensions as a share of GDP is currently among the highest in the OECD at around 12½ per cent of unrevised GDP (Figure 5) (using the revised GDP data, such spending would be 11½ % of GDP, which would still rank Greece in the top quartile among all OECD countries). A major concern is that, according to the latest official national projections, the long-run increase in public spending on pensions, at over 10% of GDP to mid-century, is also among the largest in the OECD. Furthermore there is more uncertainty about such projections for Greece than for most other EU countries because they have not been updated recently. In particular, Greece was the only EU15 country which did not take part fully in the recent projection exercise concerning the long-term fiscal costs of ageing conducted by the Economic Policy Committee of the EU (EPC, 2006).

Figure 5. **Public expenditure on pensions¹**

In per cent of GDP, 2003

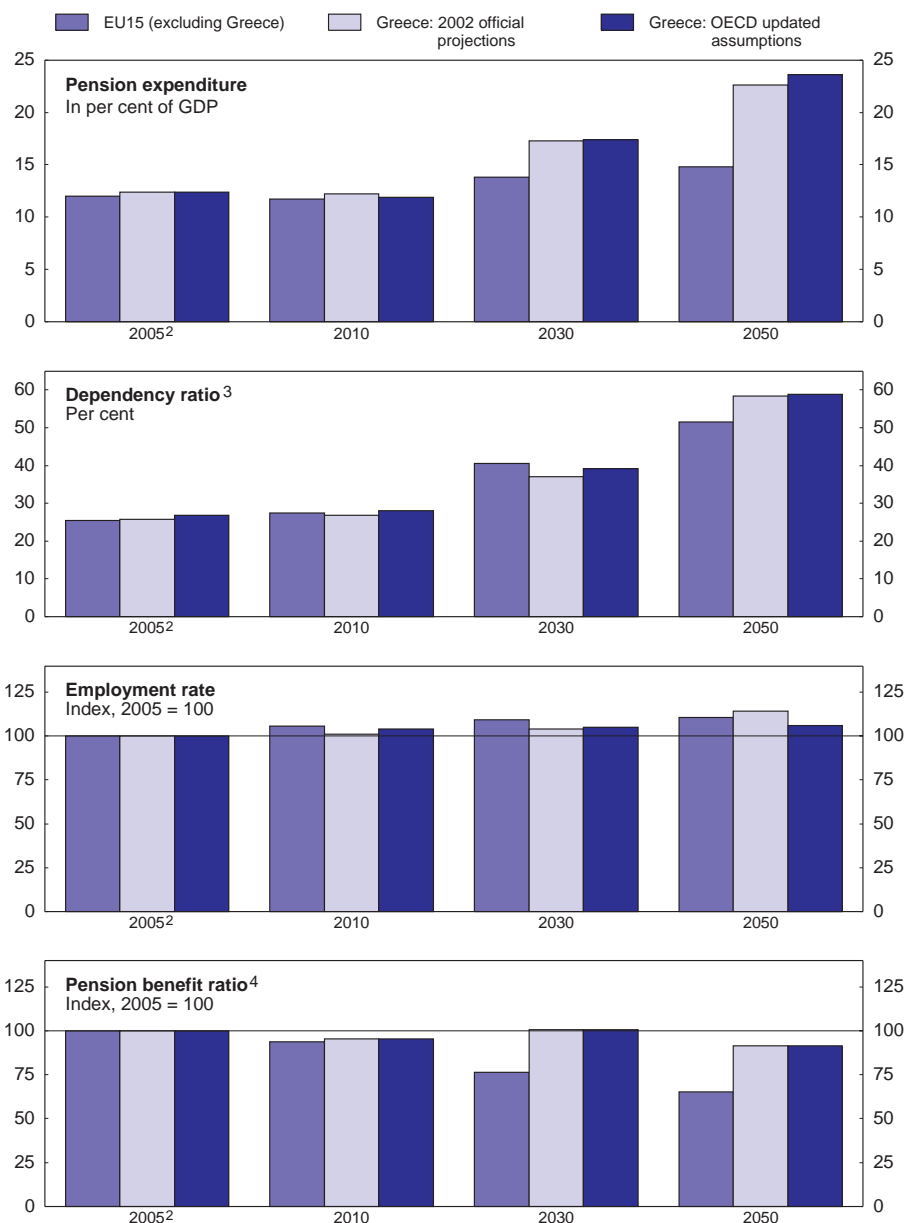


1. Public and mandatory private expenditure. The EU19 and OECD aggregates are unweighted averages. EU19 covers all EU members that are also OECD members, OECD excludes Turkey.

Source: OECD (2006), *Social Expenditure Statistics* – online database, December.

22. Comparing the last official projections, which were made in 2002, with the 2006 EU EPC projections for the EU15,¹⁶ the increase in pension expenditure as a share of GDP to 2050 is 10.2% of GDP for Greece but only 2.8% of GDP for the EU15 (Figure 6, upper panel). A part of this difference is explained by demography: while the old-age dependency ratio more than doubles to 2050 in both the EU15 and Greece, the increase is greater for Greece and adds about 2.5% of GDP to pension expenditure by 2050 (Figure 3.2, second panel). Some of this additional cost is offset by slightly more optimistic employment rate projections for Greece, although the difference is small. An OECD revision of the pension expenditure projections for Greece, which assumes the same profile for the pension benefit ratio as in the 2002 official Greek projections, but uses updated projections for the dependency ratio and the employment rate, implies a slightly larger increase in pension expenditure of 11.2% of GDP to 2050, because of a slightly more pessimistic projection of the employment rate (Annex A).

Figure 6. Explaining long-term projections of pension expenditure¹



1. Pension expenditure as a share of GDP can be expressed as the product of the dependency ratio, the pension benefit ratio and the reciprocal of the employment rate (see Annex A).

2. 2004 for the EU15.

3. Population aged 65 and over as a share of the population aged 15 to 64.

4. Average pension expenditure per person aged over 65 relative to output per worker.

Source: European Commission (2006), "The Impact of Ageing on Public Expenditure", European Economy, Special Report No. 1, Economic Policy Committee and European Commission, Brussels; Ministry of Employment and Social Protection and Ministry of Economy and Finance (2005), "The Greek National Strategy Report on Pensions" and (2002) "The Greek Report on Pensions Strategy", Athens.

23. By far the most important reason explaining the larger increase for Greece relative to the EU15 is the different profile of the “pension benefit ratio” (defined as average pension expenditure per person aged over 65 as a share of output per worker) which declines by 8% until 2050 for Greece, but by 35% for the EU15 (Figure 6, lower panel). These changes are most marked for those EU countries which have already enacted major pension reforms (especially Austria, France, Germany and Italy), particularly through making indexation rules less generous as well as increasing statutory retirement ages, curtailing access to early retirement, indexing benefits to longevity and reducing financial incentives to leave the labour force. Given the scale of the spending increase, it is almost inevitable that ensuring future fiscal sustainability will require a reduction in pension income (relative to average wages) over coming decades or else a hefty rise in contribution rates. Given the already high tax burden on labour income, the former seems more reasonable as well as being consistent with pension reforms in other EU countries.

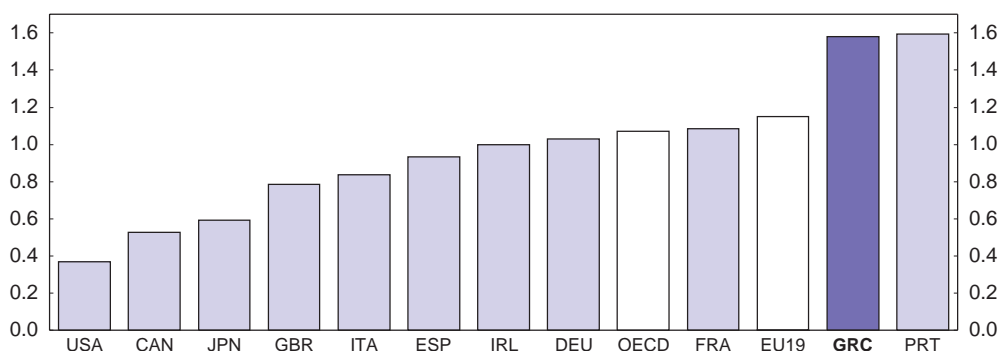
24. Another reason why pension reform is urgent is that financial disincentives to continue working at older ages are among the highest in the OECD, and have led to a low employment rate among older workers. The pension system discourages continued work at older ages because of high statutory replacement rates, with tenuous links between contributions and benefits and a range of special provisions that allow early retirement before the “normal” retirement age of 65. Pensions should be linked to lifetime contributions to remove disincentives while the wide range of early retirement schemes should be phased out. The most blatant case for reform is the favourable conditions granted for early retirement from occupations which are classified as “arduous or unhygienic”. There is a valid argument for preferential treatment when employment in a particular occupation leads to a lower life expectancy. However, the scale on which these provisions are currently granted (40% of all male retirees and 15% of female retirees, under the main employee pension fund) as well as the extensive list of occupations to which they apply, suggests that the current provisions go far beyond such a rationale. Removing current distortions against continued working would in itself make a significant contribution towards ensuring long-run fiscal sustainability and place less of the burden of adjustment on a less generous replacement rate. Calculations reported in the 2007 *Survey* suggest that reforms which eliminated current distortions to encourage early retirement might raise the labour force participation rate by 5%, which in turn would mean that the same level of pension expenditure would be able to support a pension replacement rate around 8% higher than it otherwise would have been. Once the normal age of retirement has been established as a genuine benchmark against which earlier or later retirement is judged and appropriately compensated, then consideration would need to be given to periodically increasing it in line with increases in life expectancy.

Improving revenue collection and broadening the tax base

25. Reforms have been undertaken since 2001 to improve the functioning of the tax system, with particular emphasis on its simplification following the report of a Tax Reform Commission.¹⁷ Efforts under way aim at reducing the tax burden and making the tax system less complex and more competitive by international standards, so as to promote business activity and investment and attract foreign direct investment. A focal point of the reform process is the reduction of tax evasion *via* an upgrading of tax auditing and control mechanisms and the restructuring of audit services.

26. The need to render the tax system more efficient and competitive limits the scope for raising revenue through higher corporate tax rates and/or increasing social security contributions and payroll taxes, especially in view of an already high tax wedge. Consumption taxes have the advantage of being neutral towards saving decisions and create fewer disincentives to work than labour taxes. A conventional argument against them is that they are regressive, although in the case of Greece there is the counter-argument that widespread evasion of direct taxes is probably more prevalent among high income earners. Nevertheless, the ratio of indirect to direct taxation is already high in international comparison and the number of zero or low-rated VAT items in Greece is quite small (Figure 7). While there may be some scope to raise consumption taxes, efforts to raise revenue should focus on tackling tax evasion and a broadening of the tax base by phasing out remaining distortionary exemptions.

Figure 7. Ratio of indirect to direct taxation¹
2005²



1. Taxes on goods and services divided by taxes on income, profits and capital gains.
2. 2003 for Portugal, 2004 for Greece. The EU19 and OECD aggregates are unweighted averages of the latest year of data available. EU19 covers all EU members that are also OECD members.

Source: OECD (2006), *Revenue Statistics 1965-2005*, OECD, Paris.

27. Estimates of tax evasion, although inherently speculative, suggest it may have reached nearly 15% of GDP in 1997, equivalent to nearly two-thirds of that year's budgeted tax revenue.¹⁸ This means that there is considerable scope for cutting tax rates, if evasion can be brought down. Important factors explaining poor tax compliance are the large number of small enterprises and the high share of self-employed workers. Tax administration measures – ranging from the improved organisation of auditing agencies to increased penalties and fines – should therefore be accompanied by other measures to ensure that policy settings are not biased in favour of self-employment and employment in small enterprises.

The costs of delaying fiscal reform

28. Given the initial starting point, particularly with respect to high government debt, and the prospective increase in public expenditure due to ageing (especially on pensions), the relevant policy question is not *whether* fiscal consolidation takes place, but *when*. This in turn raises the issue of the costs of delaying fiscal reform.

29. In order to consider the nature of these costs, as well as attempting to quantify them, a number of illustrative hypothetical scenarios use a simple model based on the identity linking changes in government debt with the primary balance (see Annex B). In the absence of fiscal consolidation the primary balance would steadily deteriorate as ageing-related spending increases. A strong assumption in the model is that the risk premium on government debt rises as the ratio of debt service to government revenues deteriorates on the basis of recent empirical work by Bernoth *et al.* (2004). Once implemented, fiscal consolidation is assumed to take three forms:

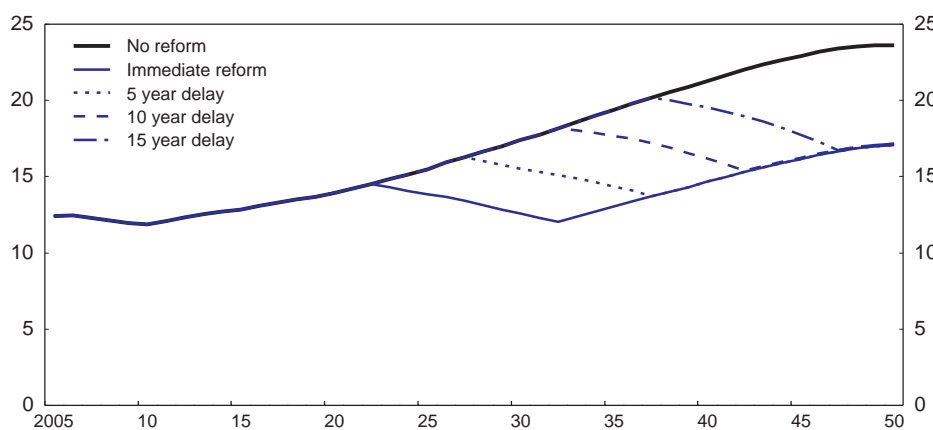
- A reduction in primary expenditure equivalent to 5% of GDP over the ensuing decade. It is often argued that, especially for countries where aggregate taxes are already high, fiscal consolidation will have more favourable macroeconomic effects if achieved through curbing expenditure than tax increases (Cournède and Gonand, 2006). However, beyond a certain threshold, it is likely that the economic and political costs of further reductions in primary expenditure will increase sharply. In the case of Greece, as previously argued, it is likely that substantial reductions in expenditure on public administration can be achieved through greater efficiency. In addition, there is scope to improve the efficiency of the health system, which would help to contain future cost pressures.

- A major pension reform is phased in.¹⁹ However, to capture the fiscal effects of such a reform it is here assumed for illustrative purposes that the reform leads to a change in the “pension benefit ratio” similar to that expected on average across the other EU15 countries (Box 1). This would eventually more than halve the further increase in pension expenditure as a share of GDP.
- Finally taxes are raised to the extent necessary to bring the government gross debt ratio down to a target of 60% of GDP, although subject to the condition that they do not increase by more than 2% of GDP in any one year.

Box 1. Assumptions regarding the modelling of pension reform

Public expenditure on pensions to mid-century is expected to rise by over 11% of GDP. A major reason why this projected increase is much larger for Greece than for other EU countries is that pensions decline by much less relative to output per worker. This is in turn related to the absence of major reforms in the last decade. To quantify this difference a profile for pension expenditure is generated by imposing the same decline in the pension benefit ratio as is expected for the rest of the EU15. This suggests that the saving on pension expenditure from reform on a similar scale to that adopted in the rest of the EU15 would be 6½ per cent of GDP, although pension expenditure would still rise by 4¾ per cent of GDP between now and 2050. The timing of any expenditure reductions would obviously depend on the speed with which any reform is announced and subsequently phased in, allowing for the fact that large and/or sudden changes to pensions are inequitable and hence undesirable (Barr and Diamond, 2006) and in any event likely to be politically difficult to implement. The illustrative projections in Figure 8 assume there is no effect on pension expenditure in the 15 years following the announced reform, effectively grandfathering at least all workers in their fifties when the reform is introduced, with the change in the benefit ratio then being introduced gradually over the following 10 years. It should, however, be emphasised that ensuring fiscal sustainability is not the only reason for reforming the pension system. Reforms should also aim to reduce disincentives to continue working, as well as to reduce administrative costs by reducing fragmentation of the system, and both factors would further reduce pension expenditure as a share of GDP.

Figure 8. Future pension expenditure depends on the timing of reform
In per cent of GDP



30. Four scenarios are considered, corresponding to an immediate start to fiscal consolidation (in 2007) and after a delay of 5, 10 and 15 years, with the main results summarised in Figure 9 and Table 2. The main costs of delaying fiscal reform are:

1. *Deadweight debt service costs from delaying fiscal consolidation rise disproportionately with the length of the delay.* The increased borrowing associated with delayed consolidation inevitably raises debt service costs, but a part of this debt service, here referred to as the “deadweight”

component, is attributable entirely to the risk premium. Delaying five years rather than acting immediately increases cumulative deadweight interest payments by 1½ per cent of GDP, whereas delaying 10 or 15 years raises this deadweight cost by 4½ and 16% of GDP, respectively. The main reason for this is the progressive rise in the risk premium; delaying 5 years has little effect on the risk premium and the increase in debt is minimal, delaying 10 years leads to an increase in the risk premium of 9 basis points, whereas delaying 15 years implies an increase of 42 basis points, with the gross debt ratio reaching a peak of 168% of GDP.

2. *The tax burden on future workers rises disproportionately with the length of delay.* If fiscal consolidation is implemented immediately or with only a five year delay then the average tax rate faced by workers over the next two decades is much the same as over the two decades prior to 2050. However if fiscal consolidation is delayed 10 or 15 years then future workers will pay higher average taxes than current workers by an average equivalent to 3½ per cent and nearly 11% of GDP, respectively.
3. *Delaying fiscal consolidation is likely to severely constrain the use of automatic stabilisers during a cyclical downturn.* If fiscal consolidation is immediate then the deficit would be kept under 3% of GDP over the entire period, whereas delaying progressively lengthens the period of time in which the deficit is close to, or exceeds 3% of GDP.
4. The need for a larger and more sustained improvement in the primary balance increases progressively with the length of delay in beginning consolidation. This in turn may mean that sustained fiscal consolidation becomes less and less politically feasible. Thus, immediate fiscal consolidation requires a sustained improvement in the primary balance of 4½ per cent of GDP over a 4-year period, well within the historical experience of OECD countries. Conversely, delaying 15 years would require a sustained improvement in the primary balance of 16% of GDP over 12 years, which has no precedent among OECD countries.

31. Finally, there are a couple of features which have *not* been included in the model, which if they had, would tend to further accentuate the costs of delaying fiscal consolidation:

- Higher taxes may have a detrimental effect on labour supply and/or capital accumulation (Cournède and Gonand, 2006). Thus delaying fiscal consolidation, because it implies higher average taxes, may adversely affect potential growth with detrimental consequences for the underlying fiscal position.
- While the risk premium included in the current modelling exercise does increase non-linearly with the debt service ratio, the extent of this non-linearity is quite modest. Moreover the empirical experience on which this is based does not include a debt ratio of the order of magnitude which might occur if fiscal consolidation was substantially delayed. For example if financial markets came to expect that the debt-to-GDP ratio might approach 200% of GDP, then the punitive risk premium might substantially exceed that modelled here.

Furthermore, one benefit of pension reform not modelled here is that there could be a major reduction in the disincentives to continue work at older ages which are inherent in the current system. This could lead to increases in the employment rate of older workers and hence higher GDP, which in turn would further improve fiscal sustainability.

Figure 9. Alternative fiscal consolidation scenarios

In per cent of GDP

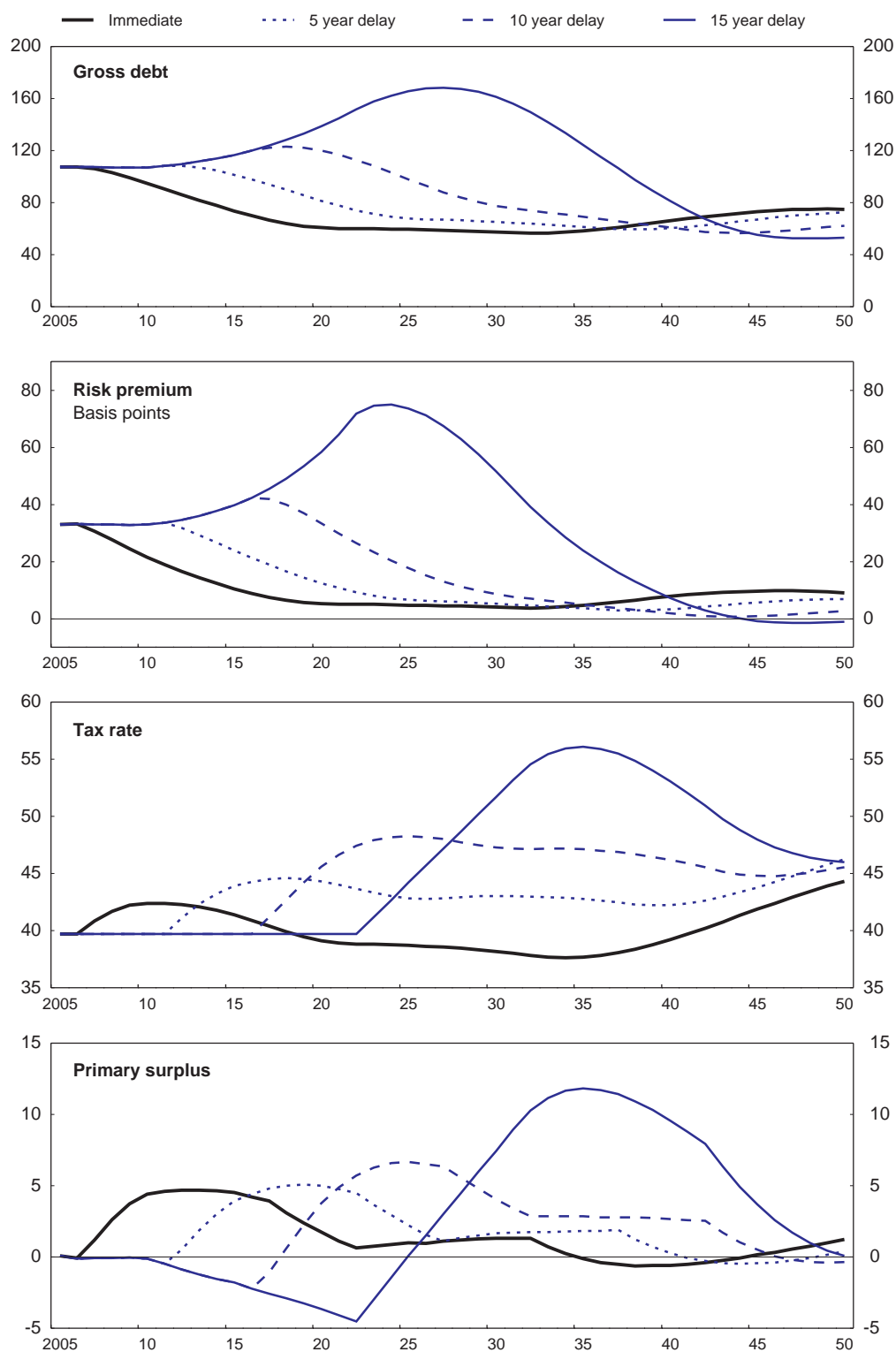


Table 2. **The costs of delaying fiscal consolidation**

	Units	Immediate	5-year delay	10-year delay	15-year delay
Peak gross debt ratio	% of GDP	108	108	123	168
Peak risk premium	Basis points	33	34	42	75
Cumulative deadweight debt cost	% of GDP	3.2	4.7	7.6	19.1
Difference in average tax rate between 2028-50 and 2005-27	% points of GDP	-0.5	1.0	3.4	10.7
Number of years in which total budget deficit exceeds 3% of GDP	Years	0	5	13	20
Peak fiscal consolidation effort (improvement in primary balance)	% of GDP	4.5% over 4 years to 2010	5.3% over 6 years to 2017	8.5% over 7 years to 2023	16.1% over 12 years to 2034

32. In summary, there would appear to be a “window of opportunity” over the next five years for implementing fiscal consolidation, which would need to include announcing the phase-in of a major pension reform. Postponing action beyond this window is likely to lead to a progressive escalation of cost in terms of: an increased risk premium on government debt; higher deadweight debt service costs; a more unfair inter-generational distribution of taxes; reduced ability to use automatic stabilisers in an economic downturn; and greater political costs in terms of the sustained effort that would eventually be needed to get fiscal policy back on track, as well as likely negative feedback effects on the rest of the economy.

Summary of main findings and recommendations

33. Greece has made commendable progress in cutting its fiscal deficit over the last few years, although, given the high debt-to-GDP and large prospective costs associated with ageing, further consolidation efforts are required. A summary of recommendations how such consolidation might be achieved is detailed in Box 2 with detailed recommendations regarding pension reform in Box 3 (a more detailed discussion and analysis underlying the recommendations for pension reform can be found in Chapter 3 of the *Survey*). The quantification of the costs of delaying fiscal consolidation efforts underlines the case for front-loading policy actions. It is, however, difficult to assess current government fiscal objectives – at least balancing the budget no later than 2010 – in the absence of any proposals for dealing with the longer term costs of ageing. Achieving budget balance by 2010 might be an adequate platform for ensuring future fiscal sustainability, *if* also accompanied by reforms which would ensure the containment of future spending pressures on health, and especially, pensions.

Box 2. Summary of recommendations regarding fiscal policy

Aggregate fiscal policy

- Fiscal consolidation should continue, possibly at a more rapid pace of deficit reduction by ½ per cent of GDP, taking advantage of strong economic growth.
- A long-term fiscal scenario should be published annually to show how fiscal policy will cope with the expected increased spending pressures from ageing to mid-century and to raise public awareness of the need for adjustments.
- Medium-term fiscal objectives should include a specific target for the debt-to-GDP ratio which should be given as much weight as the deficit target.

Budget and debt

- Primary spending trends should be monitored closely; there is particular scope to reduce public spending as a share of GDP on public administration, financial assistance to public enterprises as well as military spending. Reforms to public health and pension systems (considered below) are both required to contain future spending pressures.
- The process of budget preparation, monitoring and evaluation needs to be improved by moving swiftly toward a programme-based budget structure that identifies clearly the government's objectives and enables an assessment of outcomes in a medium-term budget framework.
- Enhance fiscal transparency by further reducing "stock-flow adjustments", and clearly explaining the rationale for them when they are necessary.
- Ensure that the directorate of fiscal audit is adequately staffed with qualified employees.
- Conduct fiscal risk analysis, especially with regard to government loan guarantees or contingent liabilities involved in public-private partnerships, and report the results in the budget documents.

Public administration

- International comparison suggests there is scope for major savings in expenditure on public administration. This can be achieved by: further simplifying procedures; a timely and rigorous implementation of the recent provisions for an increased *ex ante* control of the quality of new laws; and a stronger system of performance evaluation, tighter recruitment procedures, and greater mobility of public servants through the prompt approval and application of the *New Code of Civil Servants*.
- Policies of only partial replacement of retirees from the public sector would be advisable.

Public enterprises

- Implement rigorously the 2005 law on the improvement of the operation and efficiency of public enterprises and organisations. The timeframe for the application of the new Management Information System – enabling monitoring of the performance of the public enterprises and the evaluation of the outcomes achieved compared with budget targets – should be respected.

Health care

- Implement speedily, and on the basis of a clear timeframe, the announced reforms to tackle the shortcomings of the health care system, including the inefficient operation of public hospitals and the lack of an effective national primary health care system, in order to contain costs and improve the quality of service provision.
- A modern system of public procurement should be implemented rapidly. Better pricing and costing mechanisms, together with enhanced auditing of social services, are essential for expenditure restraint.
- The rapid development of a well-functioning network of primary care is indispensable for containing health care spending by providing a "gatekeeper" to specialists and out-patient care. A more diversified system of payments, including fee-for-service arrangements, would be advisable.
- Quantitative performance indicators for the health care sector, in particular waiting times for different types of surgery and treatment, should be more systematically collected and made publicly available.

Tax reform

- Recent efforts to curb tax evasion should continue and controls should be intensified. The tax system should be simplified further to reduce compliance costs and incentives for tax evasion.

Box 3. Recommendations for pension reform

There are a range of possible options for reform. However, one way or another, many of the following will need to be implemented:

- To ensure fiscal sustainability statutory replacement rates, which are high in international comparison, need to be reduced by lowering accrual rates, although consideration should be given to raising accrual rates beyond the official retirement age. The scale of the required adjustment will depend on how successful other reforms are in reducing disincentives to continue working.
- Pensions should be based on lifetime earnings, as in the case of self-employed, rather than on the last five years' earnings as at present (for employees insured after 1992), in line with the majority of OECD countries.
- The length of a worker's career should not be allowed to override eligibility conditions based on age of retirement.
- Reducing overall pension expenditure while more effectively tackling poverty in old age is likely to mean that any safety net pension benefit will be available only at the official age of retirement in place of the current minimum pension arrangements which severely distort incentives to retire early. There is a range of options for the safety net pension; it might for example be means-tested (through expanding EKAS) or alternatively could be universally available subject to legal residency requirements or could even be based on current minimum pensions (but only available at the official age of retirement).
- The conditions for early retirement from occupations which are "arduous or unhygienic" should be restricted to those occupations where there is clear evidence that such work reduces life expectancy.
- Special conditions which encourage early retirement of mothers with dependent or handicapped children should be ended, and any support through public expenditure made independently of the system of retirement income.
- Access to a disability pension should be strictly enforced on medical criteria, judged by independent and specialised doctors.
- Some indexation rule for uprating pensions should be established (at present the uprating is discretionary and has varied considerably year-to-year and with the level of the pension). Given the need to reduce the generosity of pension benefits, awarded pensions might be routinely indexed to consumer prices or some mixed index of prices and earnings.
- Periodically increasing the normal age of retirement in line with increases in life expectancy.
- Ideally it would make sense to switch the basis for self-employed pensions from notional to actual earnings or some proxy measure such as turnover. A prerequisite for such a change would be further improvement in the tax auditing of the self-employed. If such a switch is not feasible, then the level of notional income bands against which the self-employed make contributions would need to be raised.

Accompany public pension reform with further encouragement of private pension arrangements through incentives to employees and employers as well as strong regulation and supervision based on OECD principles.

NOTES

1. This paper is based on the OECD Economic Survey of Greece published in May 2007 under the authority of the Economic and Development Review Committee (EDRC). The authors would like to thank Val Koromzay, Andrew Dean, Peter Hoeller and many Greek government officials for useful discussions and/or comments. Special thanks to Desney Erb for technical assistance and to Celia Rutkoski and Didi Claassen for secretarial assistance.
2. The revision initially proposed by the Greek authorities was for an upwards revision to GDP of 25%, but Eurostat have only accepted a smaller revision by just under 10%.
3. The revision of the fiscal data was the result of the fiscal audit performed by the current government when it took office in March 2004, in close collaboration with Eurostat. The revisions were largely explained by an under-recording of military expenditure and an over-estimation of the surplus of social security funds. For a detailed discussion see OECD (2005).
4. Around € 2 billion expenditure (equivalent to approximately 1¼ per cent of GDP) in the Public Investment Programme for 2004 was Olympics-related infrastructure projects.
5. The Budget for 2006 incorporated temporary revenue measures, equivalent to 0.6% of GDP, including dividends and sale and extension of concession rights (airports, roads and casinos), but only measures equivalent to 0.4% of GDP were implemented.
6. For both 2005 and 2006 primary spending incorporated non-recurring items. These include in 2005 an additional € 345 million (0.19% of nominal GDP) primary spending for covering past obligations to the Agricultural Bank of Greece. In 2006, they include additional spending on the first instalment of the refund to pensioners of past contributions on behalf of the Solidarity Account of Social Security Funds (LAFKA), amounting to € 130 million (0.07% of GDP), and spending on elections for local government. Taking into account these items, the current primary spending was cut by 0.86% of GDP over these two years.
7. Alesina and Perotti (1996); Alesina and Ardagna (1998); and Alesina and Bayoumi (1996). Von Hagen *et al.* (2002) also find that the likelihood of sustaining consolidation efforts rises when governments tackle politically sensitive budget items such as transfers, subsidies and government wages.
8. For 2007, these include an increase in farmers' pensions and the special means-tested supplementary payment to low income pensioners, as well as the refund of the contribution on behalf of LAFKA.
9. There should also be scope for further reducing military expenditure which as a share of GDP was the highest in the euro area and 1½ per cent of GDP above the euro area average in 2004, although this is not discussed further here.
10. The budget does not contain a classification of expenditure by programme or activities, except for EU co-financed capital expenditure. Appropriations are by inputs and they do not include any statements of the objectives or the goals of expenditure (IMF, 2006).
11. The 2005 law defines as public organisations those legal entities under private law, the annual budget of which is financed at least by 50% by the state or by legal entities under public law. In general, the recent law aims at improving efficiency of such firms through a closer monitoring of their activities by the competent ministries and requirements for the preparation of business and operational plans, transparent

and accountable corporate governance, and the adaptation of private-sector industrial relations (Bank of Greece, 2006b).

12. There is no formal rule determining the proportion between new hires in the public sector and employees leaving the sector. Human resources requirements are assessed and evaluated by a three-member ministerial committee approving hiring in the public sector on the basis of the data provided by each organisation.
13. That is, the relative price of long-term care increasing in line with average productivity growth in the economy because the scope for productivity gains in long-term care is more limited (OECD, 2006).
14. The number of physicians per head of population is among the highest in the OECD (OECD, 2005).
15. In 2005, the government proceeded with the restructuring of the accumulated debt to hospital suppliers, amounting to around € 2.1 billion (1.1% of GDP for 2006) over 2001-04.
16. The 2002 Greek projections of pension expenditure are taken from the 2002 Greek Report on Pensions Strategy which included updated demographic projections relative to those used in the 2001 EU EPC report on the fiscal effect of ageing.
17. For a discussion see OECD (2005).
18. Estimates are based on Tatsos (2001). The Bank of Greece is of the view that tax evasion is “actually larger” (Bank of Greece, 2006a).
19. The desirable features of any pension reform are discussed in detail in Chapter 3 of the 2007 OECD *Economic Survey of Greece*.

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ANNEX A. PENSION EXPENDITURE PROJECTIONS

This annex explains why the projected increase in public pension expenditure for Greece is so large compared with other EU15 countries and also explains how the 2002 official projections have been updated by the OECD to take account of more up-to-date demographic projections and alternative labour market projections.

Comparing official Greek and EU15 pension projections

The last official Greek projections, which were made in 2002, are here compared with the 2006 EU EPC projections for the EU15. The 2002 Greek projections of pension expenditure are taken from the 2002 *Greek Report on Pensions Strategy* which included updated demographic projections relative to those used in the 2001 EU EPC report on the fiscal effect of ageing. For the purposes of this comparison the share of pension expenditure in GDP is decomposed into three components as follows:

$$(1) \quad \frac{\text{Pension expenditure}}{\text{GDP}} = \text{Pension benefit ratio} \times \text{Dependency ratio} \times \frac{1}{\text{Employment rate}}$$

where:

$$\text{Pension benefit ratio} = \frac{\text{Pension expenditure} / \text{Population 65+}}{\text{GDP} / \text{Employment}}$$

$$\text{Dependency ratio} = \frac{\text{Population 65+}}{\text{Population 15-64}} \quad \text{Employment rate} = \frac{\text{Employment}}{\text{Population 15-64}}$$

The increase in pension expenditure as a share of GDP to 2050 is only 2.8% of GDP for the EU15 as compared to 10.2% of GDP for Greece (Figure 3.2, upper panel). A part of this difference is explained by demography: while the old-age dependency ratio more than doubles to 2050 in both the EU15 and Greece, the increase is greater for Greece and adds about 2.5% of GDP to pension expenditure by 2050 (Figure 3.2, second panel). Some of this additional cost is offset by slightly more optimistic employment rate projections for Greece, although the difference is small.

By far the most important reason explaining the larger increase in pension expenditure for Greece relative to the EU15 is the different profile of the “pension benefit ratio” (defined as in expression (1)) which declines by 8% until 2050 for Greece but by 35% for the EU15 (Figure 3.2, lower panel). The much larger decline in the benefit ratio in the EU15 reflects both a fall in the average pension relative to the average wage, as well as a decline in the number of people receiving a pension relative to the population aged over 65. These changes are most marked for those EU countries which have already enacted major pension reforms (especially Austria, France, Germany and Italy), particularly through making indexation rules less generous as well as increasing statutory retirement ages, curtailing access to early retirement, indexing benefits to longevity and reducing financial incentives to leave the labour force.

Updating official Greek pension projections

The pension expenditure projections for Greece were updated by assuming the same profile for the pension benefit ratio as in the 2002 official Greek projections, but using updated projections for the dependency ratio and the employment rate (represented by the third bar in each set in Figure 3.2). The updated demographic projections are the most recently available from *Eurostat* from which labour force participation projections are derived following the OECD method described in Burniaux *et al.* (2004). It projects participation by age group and sex and, in particular, allows for a cohort effect which tends to increase female participation. To derive a projection for the employment rate it is further assumed that the unemployment rate gradually falls to 7% (the same assumption adopted in the recent EU EPC exercise). The resulting projections for pension expenditures are slightly higher than suggested by the 2002 official Greek projections, rising by 11.2% of GDP to 2050, because of a slightly more pessimistic projection of the employment rate.

ANNEX B. THE MODEL USED TO GENERATE THE FISCAL SIMULATIONS

This annex describes the model which is used for the fiscal simulations. It is based on the familiar relationship between net debt and the primary balance:

$$(1) \quad b = \frac{(1+R)}{(1+g)} \cdot b_{-1} + e + age - t$$

where b is net debt, t is the aggregate tax rate and e is primary expenditure (all expressed as a share of GDP), g is the growth rate of GDP, R is the real interest rate paid on government debt and age is an extra term representing additional spending pressures which arise in the future from ageing.

The additional spending pressures are from health care, long-term care and pensions. The first two are quantified using the “cost-pressure scenarios” described in OECD (2006), which for Greece implies an additional 6½ per cent of GDP in spending by 2050. The increase in pension spending is based on reform scenarios described in Box 1 and Annex A. Absent any pension reform, pension expenditure would increase by 11.2% of GDP by 2050, whereas with a major reform it increases by 4¾ per cent of GDP by 2050. The low pension expenditure track is only fully reached 25 years after the change is first announced.

Once fiscal consolidation is implemented, it is assumed to take three forms:

- A reduction in primary expenditure equivalent to 5% of GDP over the following ten years.
- A major pension reform is phased in along the lines laid out above, eventually more than halving the further increase in pension expenditure as share of GDP.
- Finally taxes are used as the residual instrument to steadily bring the government (gross) debt ratio down to 60% of GDP, although subject to the condition that they do not increase by more than 2% of GDP in any one year. This is implemented through a rule for the tax rate in a form common in large-scale macro models that track the accumulation of assets (see for example Bryant and Zhang, 1996), which reacts to deviations of the stock of debt from a target level as well as to the recent rate of increase in debt:

$$(2) \quad \Delta t = \alpha_1 (b_{-1} - \bar{b}) + \alpha_2 \Delta b_{-1} \quad \alpha_1 = 0.025, \quad \alpha_2 = 0.20$$

For the sake of greater plausibility this reaction function is subject to the caveat that the increase in the tax rate cannot exceed a certain ceiling (in this case 2% of GDP) in a single year. While it is not very uncommon for there to be tax hikes, on a cyclically-adjusted basis, of more than 2 percentage points of GDP in a single year, it is unusual for this to occur over a run of consecutive years.

The interest rate is determined as the sum of an exogenous component, which may be thought of as the real interest rate on German government debt, and a risk premium:

$$(3) \quad R = \bar{R} + Risk$$

The risk premium term is modelled as a non-linear function of the ratio of debt service to government revenue:

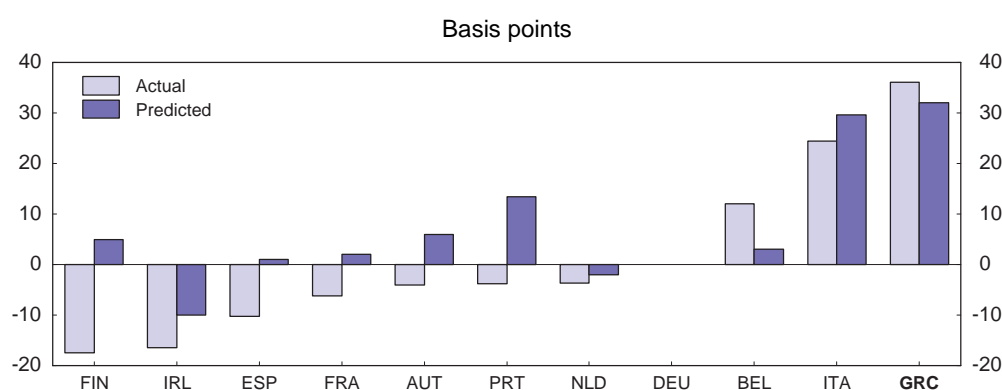
$$(4) \quad Rrisk = \beta_0 + \beta_1 \left(\frac{R \cdot b}{t} \right) + \beta_2 \left(\frac{R \cdot b}{t} \right)^2$$

The empirical basis for the risk premium equation

The form and parameterisation of equation (4) for the risk premium is based on the empirical work by Bernoth *et al.* (2004) who examine bond yield differentials among EU Eurobonds, explicitly allowing for a break with the formation of the EMU. A number of fiscal variables, including both the deficit-to-GDP and debt-to-GDP ratios, reflecting the government's quality as borrower are considered in the empirical analysis. The fiscal variable which is found to have the most explanatory power in the post-EMU period is the ratio of debt service to government revenue. It is argued that this variable is closer in spirit to measures of borrower quality commonly used in corporate finance, and also allows for the fact that governments in different countries differ in their ability to raise revenues from a given GDP. Certainly such considerations help to explain why the risk premium (relative to German bonds) is much higher in Greece and Italy than it is in Belgium, despite the fact that all 3 countries have similar debt-to-GDP ratios. The authors also speculate that financial markets may perceive that deficit-to-GDP and debt-to-GDP ratios have less information content because they are part of the official assessments of the sustainability of government finances and therefore more prone to creative accounting.

Both the debt service ratio and the square of this term are found to be statistically significant in equations explaining the risk premium in the post-EMU period, implying a non-linear relationship. The estimated coefficients suggest that "a debt service ratio of 5% above Germany's results in a yield spread of 3.75 basis points, while a debt service ratio exceeding Germany's by 10% results in a yield spread of 15 basis points". While other variables are found to be significant in explaining the risk premium – in particular the "time to maturity" of the government bond issue – these are ignored for the purposes of this modelling exercise, and the difference between the current actual risk premium and that expected on the basis of the current debt service ratio is absorbed in the constant term in (4). However, at least for Greece, the debt service ratio appears to explain reasonably closely the current risk premium (Figure A.1).

Figure A.1. **Actual versus predicted risk premium**¹



1. The actual risk premium is the difference between the interest rate on 10 year bonds of the country concerned and Germany in July 2006. The predicted risk premium is the author's calculation using the coefficients estimated by Bernoth *et al.* (2006) and debt service figures for 2005.

Source: Calculations based on OECD (2006), *OECD Economic Outlook: Statistics and Projections*, No. 79 - online database and Bernoth *et al.* (2004), "Sovereign Risk Premia in the European Government Bond Market", *Working Paper*, No. 369, European Central Bank, Frankfurt.

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