THE ROLE OF FISCAL INDICATORS IN SETTING FISCAL POLICY IN THE UK

Robert Woods[*]

1. Introduction

1. The UK's current fiscal policy framework was established over 1997 and 1998. It is based on five key principles: transparency, stability, responsibility, fairness and efficiency. These were set out in the *Code for Fiscal Stability*,[1] which was given legal underpinning by the 1998 Finance Act. The formulation of the Code reflected moves in other countries, such as New Zealand and Australia, which aimed to provide a more coherent and credible framework for fiscal policy with stronger reporting requirements.[2]

2. The *Code* requires that the Government must "state and explain its fiscal policy objectives and the rules by which it intends to operate fiscal policy over the life of the Parliament." In line with the *Code*, the Government has set out its fiscal objectives, as follows:

- Over the *medium term*, to ensure sound public finances and that spending and taxation impact fairly within and between generations; and
- Over the *short term*, to support monetary policy and, in particular, to allow the automatic stabilisers to help smooth the path of the economy.

3. Again in line with the *Code*, the Government has set out how these objectives will be implemented through two fiscal rules, against which the performance of fiscal policy can be judged. The fiscal rules are:

- The golden rule: over the economic cycle, the Government will borrow only to invest and not to fund current spending; and
- The sustainable investment rule: public sector net debt as a proportion of GDP will be held over the economic cycle at a stable and prudent level. Other things being equal, net debt will be maintained below 40 per cent of GDP over the economic cycle.

4. The *Code* also sets out a number of reporting requirements that have driven the development of the fiscal indicators explained in this paper. The *Code* names

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The views expressed in the paper are those of the author and do not necessarily represent the views of HM Treasury.

I am very grateful for contributions from Andrew King, Dan Levy, Donna Leong and Joshua Fleming.

[1] HM Treasury (1998), *Code for Fiscal Stability*.

[2] See Balls and O'Donnell (2002), Chapters 8-10, for further information.

nine specific fiscal indicators that must be reported.[3] In addition, it requires the Government to:

- include any other such indicator as is required to judge achievement against the Government's fiscal policy objectives and rules and against the Government's European commitments, in particular the Stability and Growth Pact.
- present illustrative projections of the outlook for the key fiscal aggregates for a period of not less than 10 years into the future, based on a range of plausible assumptions, so as to shed light on the inter-generational impact and sustainability of fiscal policy.
- present an analysis of the impact of the economic cycle on the key fiscal aggregates, including estimates of the cyclically-adjusted position.

5. The *Code for Fiscal Stability* was approved by Parliament on 9 December 1998. The following November, the Treasury published a paper, "Analysing UK Fiscal Policy",[4] the aim of which was to provide a guide to the range of fiscal indicators used, focusing on decisions regarding the key fiscal aggregates, rather than individual spending or taxation policies, important though they are. Over subsequent years, the Government has continued to enhance the transparency of the fiscal framework through reporting on new fiscal indicators, such as "core debt", and the publication of detailed fiscal analysis, in particular on long-term fiscal challenges and the accuracy of recent fiscal projections.

6. This paper begins by considering the main indicators currently used in setting fiscal policy as presented in each Budget and Pre-Budget Report. It goes on to explain in more detail the approach used to cyclically adjust key fiscal balances. The following section considers some of the indicators used in analysing the longer term fiscal position, including issues of long-term fiscal sustainability and inter-generational fairness. Finally, the paper considers how the various indicators are used in formulating the Government's fiscal strategy.

2. Main fiscal indicators currently used in the UK

7. Section 1 outlined the UK's fiscal policy framework established over 1997 and 1998. In "Analysing UK Fiscal Policy" it was noted that "high quality external scrutiny of the conduct of fiscal policy plays a key role in ensuring that the benefits of the new framework are delivered fully". In order to facilitate such scrutiny, the key fiscal indicators were grouped under five headings relating to the Government's domestic fiscal policy objectives and its European commitments. Since the

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[3] Financial statements must include: current spending, current receipts, the surplus on the current budget, public sector net borrowing, public sector net cash requirement, general government financial deficit, general government gross debt, public sector net debt and a measure of net worth. They should also include a statement of cash flows and, upon implementation of Resource Accounting and Budgeting, an operating statement, reflecting the Government's projected current revenue and current expenses for each financial year.

[4] HM Treasury (1999), *Analysing UK Fiscal Policy*.

Table 1

Summary of Public Sector Finances
(percent of GDP)

	Outturns		Estimates		Projections			
	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Fairness and Prudence								
Surplus on current budget	–1.9	–1.6	–0.9	–0.6	0.1	0.5	0.7	0.8
Average surplus since 1997-1998	0.5	0.2	0.1	0.0	0.0	0.1	0.1	0.2
Cyclically-adjusted surplus on current budget	–1.4	–1.3	–0.3	0.4	0.7	0.7	0.7	0.8
Long-term Sustainability								
Public sector net debt[1]	33.2	35.0	36.4	37.5	38.1	38.3	38.4	38.4
Core debt[1]	32.8	34.3	35.2	35.4	35.5	35.7	35.9	36.0
Net worth[2]	28.5	29.0	26.0	24.8	23.3	22.9	22.9	22.8
Primary balance	–1.6	–1.7	–1.3	–1.1	–0.5	–0.1	0.1	0.1
Economic Impact								
Net investment	1.3	1.8	2.1	2.2	2.3	2.3	2.3	2.3
Public sector net borrowing (PSNB)	3.2	3.4	3.0	2.8	2.2	1.7	1.6	1.5
Cyclically-adjusted PSNB	2.7	3.0	2.4	1.9	1.6	1.6	1.6	1.5
Financing								
Central government net cash requirement	3.5	3.3	3.2	3.2	2.6	2.1	2.1	1.8
Public sector net cash requirement	3.5	3.3	3.0	2.9	2.4	1.8	1.8	1.5
European Commitments								
Treaty deficit[3]	3.1	3.3	3.2	3.0	2.4	1.9	1.7	1.6
Cyclically-adjusted Treaty deficit[3]	2.6	2.9	2.5	2.0	1.8	1.7	1.7	1.7
Treaty debt ratio[4]	39.5	40.8	42.6	43.9	44.5	44.5	44.5	44.5
Memo: Output gap	–0.6	–0.4	–1.2	–1.4	–0.7	–0.1	0.0	0.0

(1) Debt at end March; GDP centred on end March.
(2) Estimate at end December; GDP centred on end December.
(3) General government net borrowing on a Maastricht basis.
(4) General government gross debt measures on a Maastricht basis.

publication of "Analysing UK Fiscal Policy", new indicators have been added to enhance scrutiny, but reporting under the five groupings has remained constant. Table 1 is drawn from Budget 2006,[5] which was published on the 22nd March 2006.

8. The following subsections will briefly discuss the key indicators used under each heading. With the exception of the central government net cash requirement and the Maastricht Treaty indicators, all of the Government's key fiscal indicators cover the entire public sector. This is because the liabilities of public corporations could fall ultimately on the taxpayer and, to exclude a portion of public sector activity from binding rules could create incentives to reclassify activity in order to meet the rules.

2.1 Fairness and prudence

9. The indicators grouped under "fairness and prudence" are those that inform the Government's golden rule, which states that over the course of the economic cycle it will only borrow to invest and not to fund current expenditures. The key aggregate is the *surplus on the current budget*, which is defined as current receipts less current expenditure including depreciation. The golden rule is met when the average current budget (as a percent of GDP) over the economic cycle is in balance or surplus. This avoids pro-cyclical fiscal policies, which would run counter to the short-term fiscal policy objective of supporting monetary policy and allowing the automatic stabilisers to operate fully. For monitoring purposes, every Budget and Pre-Budget Report sets out the average surplus since the start of the current economic cycle.

10. Finally, while the average surplus over the cycle should not be overly influenced by cyclical factors,[6] as an indicator of whether the Government is meeting the golden rule it is not very timely. The duration of the average post-war economic cycle in the UK is eight years. As such, it is important to have an indicator for the current budget surplus that abstracts from the influence of cyclical factors: the *cyclically-adjusted surplus on the current budget*. The method of cyclical adjustment used by HM Treasury is covered in Section 3.

2.2 Long-term sustainability

11. While the golden rule goes a long way to meeting the Government's short- and medium-term fiscal policy objectives, by excluding public sector net investment, it does not place a limit on overall public sector borrowing. The golden rule is therefore augmented by the sustainable investment rule in order to ensure

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5 Chapter 2, p. 33.

6 It is not, however, completely unaffected. Given the way that HM Treasury estimates the output gap (explained briefly in Section 3), it is not necessarily the case that the extent of the up- and down-phase of any cycle will be perfectly balanced.

sound public finances are maintained. The "long-term sustainability" indicators are key to monitoring performance against the sustainable investment rule, which states that over the course of the cycle, *public sector net debt* will be held at a stable and prudent level. Other things equal, it will be held at 40 per cent of GDP. Public sector net debt is defined as public sector gross debt less liquid financial assets.[7] The Government chose to define the sustainable investment rule in terms of net, rather than gross, debt because net debt provides a better reflection of a government's immediate solvency.

12. The primary role of the sustainable investment rule is to ensure sound public finances are maintained, but in doing so it also plays an important role in maintaining inter-generational fairness by ensuring that current taxpayers are not able to borrow to invest excessively in assets that are likely to be subject to diminishing social, as well as financial, returns.[8]

13. As with the various flow indicators, it is useful to be able to abstract from the impact of the cycle on public sector net debt. The Treasury has developed a measure of *core debt*[9] that shows the evolution of net debt as determined by the structural fiscal balance. Taking as its starting point the level of public sector net debt in 1986-87, the start of the previous economic cycle, the cyclical component of net debt is calculated as the cumulative sum of cyclical borrowing. The estimate of core debt is equal to total public sector net debt less the cyclical component of net debt.

14. Figure 1 shows how the path of public sector net debt has been affected by cyclical factors since 1986-87. It can be seen that in the late 1980s, when the economy moved significantly above trend, a substantial gap opened between the estimate of core debt and actual net debt. This closed in the down-phase of the cycle so that at the start of the next cycle, estimated to be in 1997H1, core and actual net debt were almost the same again. With the economy judged to have been below trend since end 2001, the cumulative effect of cyclical borrowing on public sector net debt – *i.e.* the difference between net debt and core debt – is judged to be around 2 per cent of GDP.

15. The more familiar fiscal indicators of net borrowing and net debt are complimented with a measure of *net worth*, which is defined as net financial assets plus non-financial assets. The golden rule is closely aligned with net worth; if a government borrows only to finance investment, then any new debt will be matched by an increase in assets, leaving net worth broadly unchanged. Net worth has not yet played a significant role as a fiscal indicator in the UK's fiscal framework, mainly

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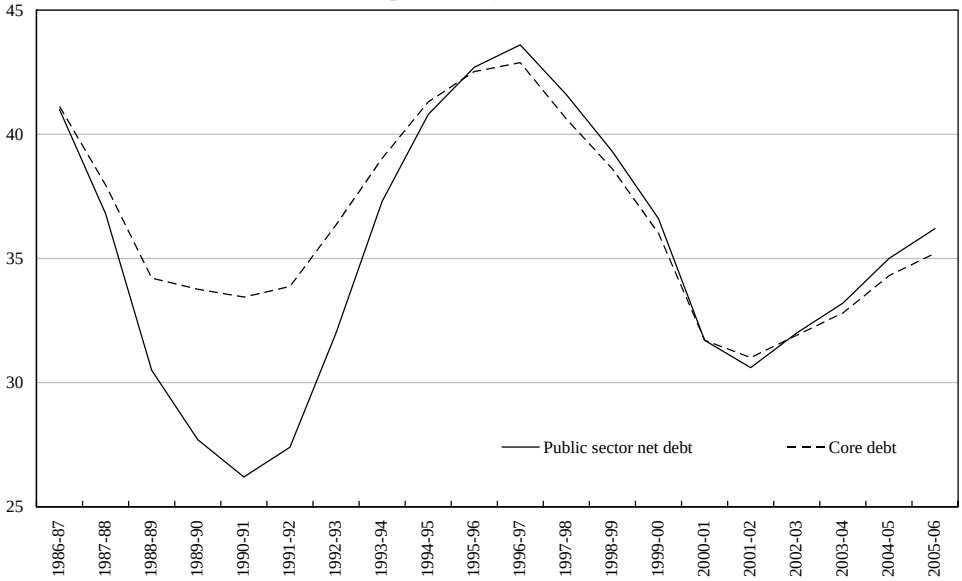
7 Given the level of public sector liquid financial assets in the UK, the 40 per cent public sector net debt ceiling complements the Government's European commitments (see the subsection on "European commitments"), which are defined in terms of general government gross debt.

8 See Toigo and Woods (2005).

9 For a full discussion of core debt, see: HM Treasury (2002).

Figure 1

Comparison of Core Debt and Net Debt
(percent of GDP)



because of measurement difficulties surrounding the valuation of government assets, many of which have no market prices. However, with more reliable data becoming available through the Whole of Government Accounts (WGA) programme, it may be possible to place greater weight on such a measure (see Section 4.2).

16. Finally, the main flow indicator used when considering long-term debt sustainability is the *primary balance*, defined as public sector net borrowing less net interest payments. This definition is in line with that recommended by the IMF[10] and used by the OECD,[11] but contrasts with that used by Eurostat and the European Commission[12] where the headline balance is adjusted for gross, rather than net, interest payments. In the UK's fiscal framework the target debt ratio is expressed in net terms so there is a clear rationale for defining the primary balance in terms of net interest payments.[13]

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[10] IMF (2001), p. 46.

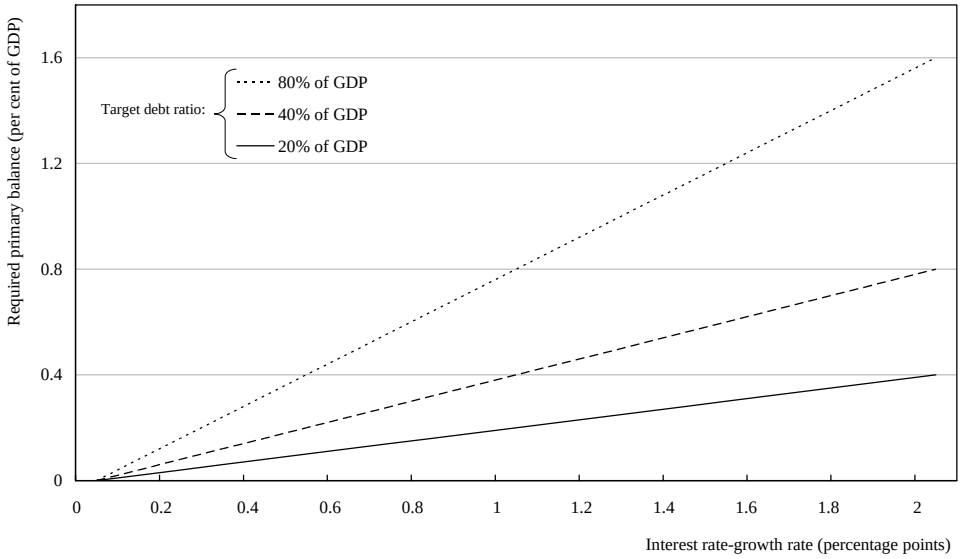
[11] OECD (2005).

[12] European Commission (2005).

[13] Conversely, when, as under the Stability and Growth Pact, the target debt ratio is expressed in gross terms, the same rationale points to defining the primary balance adjusted for gross interest payments. If the interest rate is equal to the growth rate, the primary balance required to stabilise the gross debt ratio is zero defined in terms of gross interest payments. Similarly, the primary balance required to stabilise the net debt ratio is zero defined in terms of net interest payments.

Figure 2

Debt-stabilising Primary Balance under Different Scenarios



17. The standard debt sustainability equation,[14] which relates the required primary balance ratio to the difference between the prevailing interest rate and prevailing growth rate, means that when the interest rate is higher than the growth rate, a primary surplus is required in order to stabilise the debt ratio. Figure 2 illustrates the primary balance required to stabilise the debt ratio at various levels given different wedges between the interest rate and growth rate.

18. A full assessment of long-term fiscal sustainability requires a consideration both of stocks (of net liabilities) and also projected future revenue and spending flows. For this reason, since 2002, HM Treasury has published a detailed *Long-term Public Finance Report*. Indicators of long-term fiscal sustainability used in the report are discussed in Section 4.

2.3 Economic impact

19. The indicators grouped under the first two headings inform progress against the Government's fiscal rules. The main role of these indicators therefore concerns

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[14] The primary balance PB to GDP Y ratio required to stabilise debt at the target ratio D^*/Y is given by the difference between the real interest rate r and the real growth rate g, times the target debt ratio, *i.e.*:

$$\frac{PB}{Y} = (r - g)x\left(\frac{D*}{Y}\right)$$

the Government's medium-term fiscal objectives. However, fiscal policy can also play a short-term role in supporting monetary policy, which is why the fiscal rules are defined over the full economic cycle, allowing borrowing to fluctuate between years. The indicators reported under the "economic impact" category allow for scrutiny of the short-term fiscal impact on the economy.

20. *Public sector net investment* is the Government's preferred measure of investment since conceptually it measures the increase in the public capital stock and therefore the amount of public expenditure that the principle of fairness dictates can be financed through borrowing. If, by contrast, the fiscal rules were set up to allow gross investment to be financed through borrowing it would imply the current generation of taxpayers passing on the cost of wear and tear on the public capital stock to the next generation of taxpayers.

21. As a first approximation, ignoring the potential economic impact of changes in the composition of spending and taxation over time, the key indicator for assessing the overall "fiscal impact" is the change in *public sector net borrowing*. When borrowing rises, fiscal policy has been loosened and the fiscal impact is positive. When borrowing falls, fiscal policy has been tightened and the fiscal impact is negative. However, not all of the fiscal impact will result from the conscious decisions of policymakers. In part, changes in borrowing will reflect changes in the position of the economy relative to trend via changes in the automatic stabilisers. The impact of fiscal policy over and above the automatic stabilisers is described as the "fiscal stance" and is measured by the change in the cyclically-adjusted public sector net borrowing. The overall fiscal impact is therefore made up of changes in the automatic stabilisers and the fiscal stance, which in turn can be split between discretionary policy measures and non-discretionary, non-cyclical factors, as set out in Box 1.

22. The impact of discretionary measures on the fiscal stance is estimated through the Budget scoring process. This involves estimating the direct cost or yield of a particular measure[15] relative to a baseline in which the measure was not taken. Non-discretionary, non-cyclical factors are less obvious. They include, for example, the impact on tax receipts of a change in the workforce composition. For example over 2005-06 income tax receipts held up better than might have been expected given the slowdown in UK growth because earnings growth was higher in the financial sector, which has a relatively larger proportion of taxpayers who pay tax at the higher rate.

23. This framework for analysing the short-term economic impact of fiscal policy can be used to unpack the fiscal impact into either *absolute* or *relative* terms. The absolute fiscal impact compares the fiscal aggregates in one year with the previous year – if borrowing increases from the previous year then the fiscal impact in absolute terms is positive. It is useful in considering the contribution of fiscal policy to the increase or decrease in growth from on year to the next. The relative

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[15] This is, it excludes any second round effects, e.g. from the effect on output or inflation.

Box 1
Key elements in determining the overall fiscal impact

Discretionary Budget measures to change the fiscal stance

+

effects of all *non-discretionary*, *non-cyclical factors* which have, or which are expected to, alter the fiscal stance

=

the change in the *fiscal stance* (measured by the change in the *cyclically-adjusted public sector net borrowing*)

+

the effect of the *automatic stabilisers* stemming from the cyclical position of the economy relative to trend

=

the change in the overall *fiscal impact* (measured by the total change in *public sector net borrowing*)

fiscal impact compares the fiscal aggregates for a given year in the current Budget with projections made in the previous Budget (or pre-Budget) – if borrowing is revised higher for a given year, the relative fiscal impact is positive. This measure is of more interest in considering the "news" in the fiscal statement.

2.4 Financing

24. The flow indicators under headings (a) to (c) are all accruals-based National Accounts concepts, which best reflect the sustainability or economic impact of fiscal policy. However, the accruals adjustments, which match the timing of activities with their financial impact, rather than payments, mean that these measures are not suitable for calculating the Government's debt issuance, which must necessarily match cash flows.

25. The *central government net cash requirement* represents the level of central government net cash financing and is the key indicator of the Government's debt issuance, which is carried out by the Debt Management Office, an independent agency of Government.

26. The *public sector net cash requirement* is the cash equivalent of public sector net borrowing and was, for many years through the 1980s and early 1990s, the main target for fiscal policy.[16] Since public sector net debt is a cash concept, annual changes in net debt are related to the public sector net cash requirement.

2.5 European commitments

27. The Stability and Growth Pact sets out the Maastricht criteria for EU Member States' deficit and debt ratios. Unlike the indicators pertinent to the UK's fiscal rules, the Stability and Growth Pact indicators are defined at the general government level, excluding public corporations. The Pact sets reference levels of 3 per cent of GDP for general government net borrowing, the *Treaty deficit*, and 60 per cent of GDP for general government gross debt, the *Treaty debt ratio*. In the case of the UK, the Treaty reference values are not binding, rather the UK must endeavour to maintain a Treaty deficit and Treaty debt ratio below the reference values.

28. In addition to the Treaty reference values, the UK Government's prudent interpretation of the Pact emphasises the importance of taking account of: the cycle, the level of public net investment, and the sustainability of the public finances over the longer term and including debt sustainability.[17] In line with informing the Government's prudent interpretation of the Pact, the Government also presents the *cyclically-adjusted Treaty deficit* (measures of public net investment and net debt are also presented as discussed above).

3. Approach to cyclical adjustment

29. Identifying the cyclical part of the change in the budget balance is important for the management of public finances and for the conduct of macroeconomic policy more generally. The method used by HM Treasury, which is common to all the international organisations, consists of evaluating the cyclical component of the government balance on the basis of measurement of the economy's position in the cycle (captured by the output gap). The Cyclically Adjusted Balance (CAB) is then obtained by removing this cyclical component from the observed balance. More precisely, spending and revenues expressed as ratios of GDP over the past 30 years are regressed against contemporaneous and lagged estimates of the output gap.

30. Before discussing how the budgetary elasticities are estimated, it is worth briefly reviewing the approach used to estimate the output gap by HM Treasury.[18] The approach involves reviewing a wide range of indicators to form a judgement

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[16] The public sector net cash requirement was previously known as the public sector borrowing requirement.

[17] For further information see HM Treasury (2004) and Woods (2005).

[18] See HM Treasury (2002, 2005a) for further information.

Box 2

Presenting uncertainty

Fiscal policy decisions should also be taken with due regard for the degree of uncertainty in making fiscal projections. There are several different aspects that reflect this in the UK framework:

(i) The fiscal projections are made on the basis of assumptions that are intended to be deliberately cautious. A key assumption is that for trend growth which is assumed to be ¼ point below the Government's neutral estimate for the purpose of making the fiscal projections;

(ii) The projections are presented along with a stress test in which the level of trend output is 1 per cent lower than in the main projection. This allows for mis-judgements in the degree of spare capacity; and

(iii) The fiscal projections include sensitivity analysis on particular variables on occasion, e.g. trend growth, interest rates, equity prices. (The *Long-term Public Finance Report* also conducts some sensitivity analysis, including, for example, with respect to alternative demographic assumptions.)

Since 2002 the HM Treasury has also published a detailed analysis of fiscal forecast errors.[(a)] For example the *End of Year Fiscal Report (2005)* indicated the average absolute forecast error for public sector net borrowing a year ahead over 1997-2004 was 1.1 per cent of GDP with an average error of –0.4 per cent of GDP (indicating that the projections were cautious on average). The report also breaks down the detailed reasons for forecast errors on each main area of receipts and spending. For example, it indicates that in 2004-05 the Budget 2004 forecast for corporation tax at the start of the year was £0.6bn too high. This was the result of offsetting effects: "economic determinants" (in this case weaker than expected profits growth) meant receipts were £2.9bn lower than forecast; this was offset by the "NAO-audited assumptions" and "fiscal forecasting differences" which pushed up receipts by £1.1bn and £1.2bn respectively more than expected (the former effect largely related to oil prices, an audited assumption, and the latter to receipts from life assurance companies which increased by more than expected).

[(a)] *End of Year Fiscal Report* (annual publication since 2002).

about when the economy is on trend (for example, survey evidence on capacity constraints, skill shortages, vacancies, earnings growth etc).[19] Once the on-trend points have been chosen the cycles are dated according to whether the economy decisively passes through trend and a linear trend is assumed between the on-trend points defining the up-phase and down-phase of the cycle. From the last on-trend point trend output growth has to be projected. This is done by projecting forward the actual trend productivity growth over the most recent cycle, and then combining that with projections for average hours, employment and the population of working age.[20]

31. Given the estimate of the output gap, the next step is to estimate the budgetary elasticities, *i.e.* how sensitive are the public finances to changes in the output gap. In common with other organisations, the revenue and expenditure sides are taken separately. *On the revenue side*, both components of revenue (income taxes, corporate taxes, VAT and excise duties) and aggregate revenues are regressed against the output gap and trend GDP. Movements in tax receipts over time will be influenced by a number of factors, including discretionary tax measures, fiscal drag as well as purely cyclical effects. It is therefore necessary to adjust the data for the first two influences in order to identify the genuine effects of the cycle. Discretionary measures are accounted for by estimating a constant tax regime using Budget costings, with 1989-90 as a base.[21] Fiscal drag has been accounted for by the inclusion of the trend GDP variable, which plays the role of a time trend. The detailed results were published in HM Treasury (2003).[22]

32. In total, the estimated aggregate equation for public sector current receipts (PSCR) has a lagged output gap coefficient of 0.2. However, to allow for the impact of the corporation tax reforms, a contemporaneous term has been introduced.[23]

$$\textit{Cyclically-adjusted PSCR/GDP} = \textit{PSCR/GDP} - 0.1\ \textit{Output Gap} - 0.1\ \textit{Output Gap}(-1)$$

The equation for cyclically-adjusted receipts means that revenues increase slightly *as a share of GDP* when output is above trend (so the elasticity of receipts to GDP will be slightly greater than 1). A term in the trend level of GDP (not shown above) implies an estimate of real fiscal drag of 0.2 per cent of GDP a year.

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[19] See HM Treasury (2005b) and the NAO (2005) report which audited the dating of the cycle.

[20] One advantage of this approach is that the indicators used to date the on-trend points are generally not revised. Compared with other approaches (e.g. a statistical filter like the Hodrick-Prescott filter), this helps to confer some stability to the output gap estimates in the face of significant revisions to national accounts data on output.

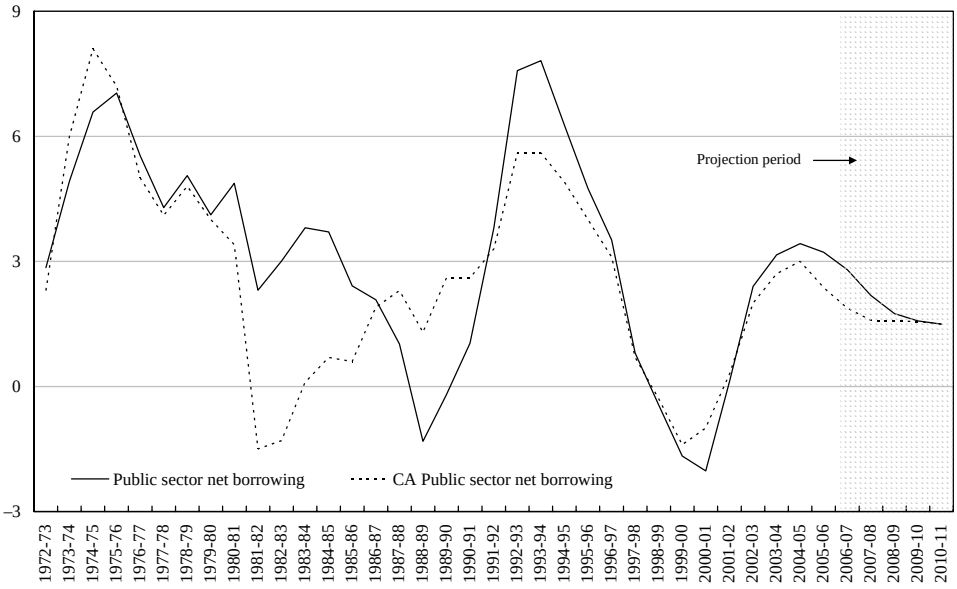
[21] Costings for policy changes in national insurance contributions, local authority taxes and other non-tax receipts are not available on a consistent basis. Therefore, the cyclicality of these components is not estimated, because they could be seriously distorted by the effect of policy changes.

[22] See the *End of Year Fiscal Report* (2003), Annex A.

[23] There have been significant reforms to corporation tax since 1999 which have affected the timing of corporation tax relative to output fluctuations. The abolition of payable tax credits on dividends and advance corporation tax, and the introduction of quarterly instalment corporation tax payments for large companies have increased the contemporaneous elasticity of corporate taxes. The full effects of these changes would only be felt from 2003 on and would not be captured in the estimated elasticities.

Figure 3

Actual vs Cyclically-adjusted Net Borrowing
(percent of GDP)



33. As *public expenditure* is not very sensitive to the cycle, the Total Managed Expenditure (TME) ratio to GDP is sensitive to the cycle principally through a "denominator effect". That is, the ratio of spending to GDP would be expected to fall when output is above trend principally because of the rise in GDP. Hence, the TME elasticity to the output gap should be expected to be close to the ratio of TME to GDP, which is around 40 per cent. This reasoning is supported by the regression results.[24]

$$\textit{Cyclically-adjusted TME/GDP} = \textit{TME/GDP} + 0.4\ \textit{Output Gap} + 0.1\ \textit{Output Gap}\ (-1)$$

34. In total, the sensitivity of the public finances to short-term economic fluctuations can be summarised as:[25]

$$\textit{Cyclically-adjusted PSNB} = \textit{PSNB} + 0.5\ \textit{Output Gap} + 0.2\ \textit{Output Gap}\ (-1)$$

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[24] See the *End of Year Fiscal Report* (2003), Annex A, for details. Among the spending items, cyclical social security (CSS) (including spending on Jobseeker's Allowance and Income Support for non-pensioners) is likely to display a high sensitivity to the cycle. Econometric analysis shows that CSS is sensitive to the lagged output gap.

[25] Even after making the adjustment for the corporation tax changes, these estimates could be biased because social security contributions are not taken into account. This is because the information to construct constant tax regimes are not available for this item.

Estimated cyclically-adjusted net borrowing is plotted against actual net borrowing in Figure 3.

4. Long-term fiscal sustainability and generational fairness

35. As explained in Section 2.2 above, the UK uses projections of public sector net debt as its main summary indicator for assessing whether the Government's fiscal policy is sustainable in the long run. In the case of the UK, the sustainable investment rule requires that public sector net debt be held at a stable and prudent level over the course of the cycle. In addition, however, the Government publishes a number of long-term sustainability indicators based on comprehensive spending and revenue projections. The Government is also in the process of compiling consolidated Whole of Government Accounts (WGA) under a UK Generally Accepted Accounting Practice basis.

4.1 Indicators based on comprehensive projections

36. Indicators based on comprehensive projections will generally take account of existing liabilities (for example debt) but also include information about future spending and revenue streams. As such they can provide an answer to the question of whether the government will be able to meet its obligations if and when they arise in the future. The main limitation is that projecting far into the future is inevitably subject to a high degree of uncertainty, making sensitivity analysis important.

37. The UK Government publishes a range of sustainability indicators in its annual *Long-term Public Finance Report*,[26] which aims, *inter alia*, to provide a comprehensive picture of the sustainability of the public finances over the long term based on a range of plausible assumptions. The indicators are based on projections of the individual spending and revenue items, and of GDP, over a 50-100 year time horizon.

38. To produce projections of real GDP growth the model combines economic assumptions about productivity growth with long-term employment projections (generated using Government Actuary's Department (GAD) population projections[27] and the "cohort" employment model).[28] Up to the end of the medium term (5 years ahead), the taxation and revenue projections are based on the Government's

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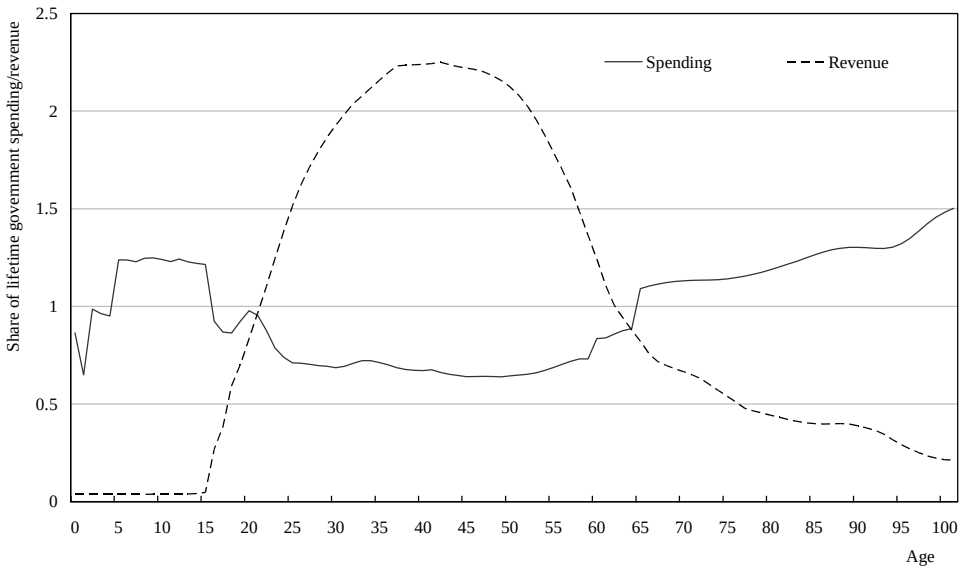
[26] See, for example, HM Treasury (2005).

[27] See, for example, Government Actuary's Department 2004-based population projections available at: http://www.gad.gov.uk/Population/index.asp

[28] The "cohort" model projects future employment trends by using historical participation rates to calculate the probability that a male or female will enter or leave the labour market at a specific age. These probabilities can then be applied to existing and future participants in the labour market to build up a projected lifetime participation profile for each cohort. By applying these projections of participation rates to the latest population projections, a long-term projection of total employment is obtained.

Figure 4

Aggregate Government Spending and Revenue Attributable to an Individual Over Their Lifetime
(percent)



medium-term fiscal forecasts. Policy settings at the end of the medium term are then assumed to remain unchanged throughout the rest of the projection period.

39. The spending and revenue projections use individual spending and revenue profiles derived from household or individual micro data. The profiles represent normalised per capita spending and revenue over different ages, and vary according to sex. The aggregate profiles in Figure 4 are generated by combining the profiles for the individual spending and revenue items holding the spending and revenue profiles constant over the person's lifetime.[29] As might be expected, the bulk of revenue is raised during the individual's working years, while government spending is mainly received during old age and, to a lesser extent, when young. Government spending rises as the individual approaches the end of their life, primarily reflecting the fact that a large share of total spending on health care during a person's life tends to be concentrated in the final years of life. But Figure 4 also demonstrates that tax

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[29] In practice, in generating the projections the health and long-term care, the profiles shift during the projection period to implement the assumption used in the modelling regarding future trends in morbidity, namely that that the proportion of life spent in ill health remains constant as life expectancy increases. The profiles are therefore shifted progressively to the right, so that increases in expenditure associated with old age are effectively delayed. The pension profile also shifts between 2010 and 2020 to reflect the fact that the female state pension age rises gradually over this period.

revenue does not fall to zero beyond the state pension age.[30] This will reflect a combination of factors including: people paying income tax on income from working beyond the retirement age, pension and investment income, expenditure taxes and inheritance tax.

40. Using the spending and revenue profiles, information on the number of males and females at each age, and information on total spending and revenue from HM Treasury's medium-term forecast, the projection model calculates the per capita allocation or contribution as a share of total spending or total revenue on the different spending and revenue items. Where appropriate, the projection model raises the per capita allocations and contributions in line with productivity gains over the projection horizon. These per capita terms are combined with detailed population projections to generate long-term spending and revenue projections. The projections are then used to calculate the following familiar indicators of long-term fiscal sustainability:

- *Intertemporal budget constraint/gap*: A government's obligations over time can be represented through the intertemporal budget constraint (IBC), which states that the present discounted value (PDV) of all future revenues (that is, over an infinite time horizon) should be equal to the PDV of all future spending (excluding interest payments) and today's outstanding debt burden. If the PDV of future primary balances is not sufficient to cover the current debt burden then the extent of the imbalance is called the intertemporal budget gap (IBG). As presented in the Treasury's Long-term Report, the IBG measures the constant increase (reduction) in tax revenue as a share of GDP needed for the Government to meet the IBC. Annex A provides more information on the derivation of the IBC.
- *Fiscal gap*: One of the problems with the IBG is that, as long as the IBC is satisfied (which requires, broadly, that debt cannot, on average, grow at too fast a rate, given the levels of interest rates and economic growth rates), there are no further constraints on the evolution of the debt to GDP ratio over time; it can take any value, provided sufficient fiscal surpluses are projected at some time in the future to allow the debt to be repaid. This potentially raises compatibility issues with existing debt targets such as the UK's sustainable investment rule or the 60 per cent gross debt to GDP criterion in the EU's Stability and Growth Pact. The fiscal gap approach, by contrast, uses the IBC to calculate the immediate and permanent change in the primary balance needed to achieve a certain, pre-determined debt target at a specific date in the future.[31] The required change in the primary balance to GDP ratio depends on the initial and desired target ratios, the time horizon and the projected primary balance. One problem with the fiscal gap is that (unlike the IBG) any information on the future evolution of the primary balance beyond the target year is ignored in the calculations. In practice,

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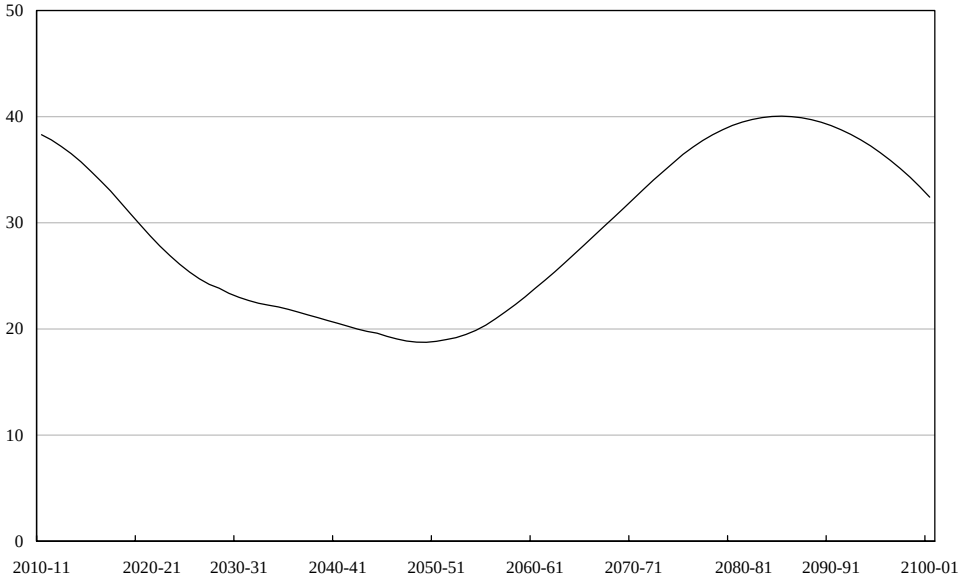
[30] Currently, and as shown in Figure 4, the state pension age is 60 for women and 65 for men.

[31] This definition follows Auerbach (1994).

Figure 5

Alternative Fiscal Gap Indicator: Projected Net Debt*
(percent of GDP)



* With primary balance tightened by 3/4 per cent of GDP after the medium term.

Source: HM Treasury.

therefore, the *Long-term Public Finance Report* presents fiscal gaps over a range of horizons.

- *Alternative fiscal gap indicator*: As noted, the fiscal gap does not provide any information about the extent of fiscal pressure that might arise at different times during the projection period.[32] Indeed, changing the fiscal stance as required by the fiscal gap indicator does not preclude the possibility that the debt to GDP ratio might exceed the desired target value at some point during the projection period. This is particularly true for a distant target year and is likely to happen if spending and/or revenue develop in a non-linear way, for example due to demographic effects like the retirement of the baby boom generation. The alternative fiscal gap indicator provides one way of addressing this problem. It calculates the immediate and permanent change in the primary balance necessary so that the debt to GDP ratio *never* exceeds a certain limit. Figure 5 shows the alternative fiscal gap for the UK presented in the 2005 *Long-term Public Finance*

[32] This is, of course, also true of the intertemporal budget gap.

Report where the limit is the 40 per cent net debt-to-GDP ratio used in the sustainable investment rule.

- *Spending and revenue projections*: In order to get a complete picture of the timing and extent of future fiscal pressure, as well as the causes of that pressure, it is necessary to look at the spending and revenue projections on which the indicators are based. The *Long-term Public Finance Report* therefore also presents detailed projections for the age-related spending items over a 50-year time horizon, as well as projections for other spending and revenues.

4.2 GAAP-based accounts

41. A number of countries have recently moved towards producing government financial accounts on a GAAP-based accruals basis.[33] The UK already publishes GAAP-based accounts for individual departments, and has announced that it will publish consolidated accounts for the public sector (Whole of Government Accounts or WGA) for the 2006-07 financial year onwards, once the methodological issues that have been raised by the development work are resolved in the dry-run processes. This section discusses the new information that will become available through the WGA programme, and how it can be used to improve overall fiscal transparency and accountability.

4.2.1 Comparing SNA and GAAP

42. Both the System of National Accounts (SNA) and GAAP are accrual accounting systems; that is, they seek to record transactions/events when they occur rather than when cash payments are made. However, SNA is designed to record the economic activity of different sectors within the economy; while GAAP has been developed to reflect the financial performance of individual organisations. In addition, some differences reflect methodological differences and past practice, where in theory the two systems should concur. This is reflected in several key differences between the two systems:

- There are small but significant boundary differences between the two systems. For example, under GAAP, the Queen and Parliament are excluded from the public sector (because they are not seen to be under the government's control), while under SNA they are included.
- There are some differences in terms of how *assets* are treated. The most important of these is the purchase of military weapon systems (single-use military equipment). While GAAP treats these as capital assets (and records depreciation for them) SNA treats these as current expenditure. It is now proposed that the next revision of SNA will also treat expenditure on military weapons as gross fixed capital.

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[33] Generally Accepted Accounting Practice. Countries which produce consolidated (whole of Government) financial statements on a GAAP basis include Canada, Australia and New Zealand.

Table 1

Defining Creditors, Provisions and Contingent Liabilities

Concept	Level of certainty	Example
Creditor	Certain transfer	Government debt
Provision	Certain or probable transfer, but uncertainty over timing	Nuclear decommissioning liability
Contingent liability	Possible transfer, uncertainty over existence of past event	Guarantees on private sector borrowing
Remote contingent liability	Possible transfer, but unlikely to occur	Notes and coins in circulation

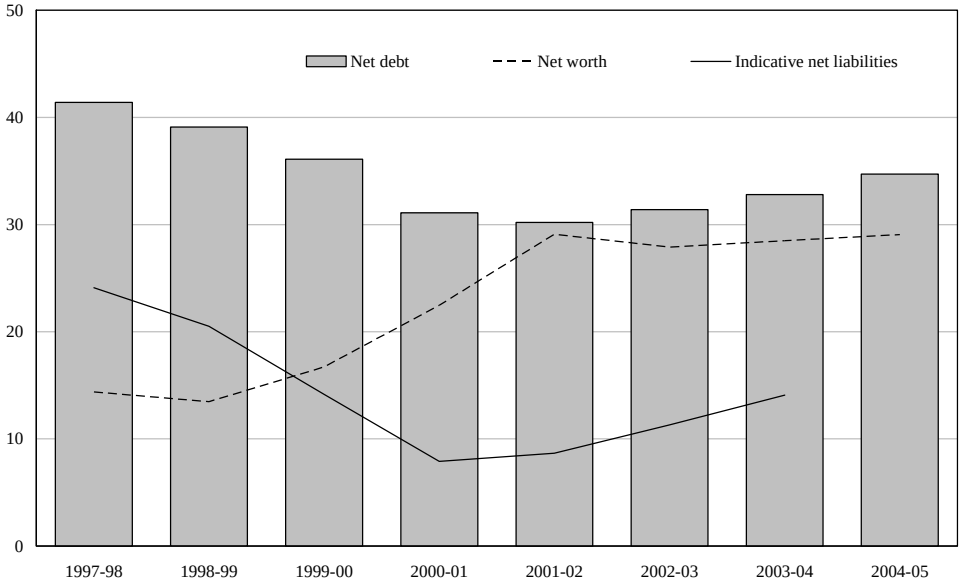
- There are also important differences in how *liabilities* are recorded. Both SNA and GAAP record liabilities where both the obligation to pay and the amount are certain. But GAAP also includes provisions, where the obligation to pay is certain but the amount or timing is not. GAAP also records in a note to the accounts contingent liabilities, where the liability itself is contingent on some uncertain event.
- One of the most significant differences is the treatment of public service pension liabilities. Under SNA, current transactions in relation to public service pension schemes are included, such as cash flows in from current employees (employee contributions) and cash flows out to current pensioners (total pension payments). However GAAP recognises the value of pension entitlements as a liability at the time when they are earned (which may be 40 years or more before payments commence).

43. In addition, given the links between the two systems, there is considerable potential to improve overall data quality for the public sector through the WGA programme. For example, GAAP builds estimates of the capital stock and other liabilities from the "bottom up"; this has helped the Office for National Statistics in its ongoing efforts to improve estimates of public sector capital assets and depreciation.

44. Figure 6 compares the key SNA indicators public sector net debt and net worth with an indicative estimate of net liabilities on a GAAP basis. In particular, it can be seen that while (SNA-based) net worth is positive (financial and non-financial assets are higher than liabilities), indicative net liabilities on a GAAP basis are also positive (in 2003-04 they were estimated to be just under 15 per cent of GDP). This largely reflects the inclusion of the public service pensions liability.

Figure 6

Public Sector Net Debt, Net Worth and Indicative Net Liabilities on a GAAP basis
(percent of GDP)



Net debt and indicative net liabilities as at end-March, GDP centred on end-March. Net worth as at end-December, GDP centred on end-December.
Data for indicative net liabilities are not yet available for 2004-05. The exact figures for the indicative net liabilities are 24.1, 20.5, 14.2, 7.9, 8.7, 11.3, and 14.8 per cent of GDP respectively.

Source: HM Treasury.

45. This new information on assets and liabilities helps to increase fiscal transparency and accountability. However, it needs to be interpreted carefully. Information on new liabilities, for example, may suggest that the government's financial position is worse than previously thought. However governments rely primarily on future flows of revenue to fund both existing and future commitments and these are not included in the balance sheet. In this sense the GAAP-based balance sheet can only be a partial assessment.[34]

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[34] An interesting illustration of this is given by considering the effect of a change in the assumed discount rate. A reduction in the discount rate increases net liabilities through the effect of increasing the estimated public service pension liability. However, in the UK case, the sensitivity analysis in successive versions of the *Long-term Public Finance Report* illustrate that, taking all the revenue and expenditure flows into account, a lower discount rate actually leads to an improvement in the inter-temporal budget gap.

46. A full assessment of fiscal sustainability requires information both on existing and future spending commitments along with expected future revenue flows. Buiter[35] has suggested a comprehensive balance sheet that would include such flows. In theory, it would be possible to put together such a balance sheet from the projections in the UK Treasury's *Long-term Public Finance Report*. Such an exercise would show that the size of the public service pensions liability was small relative to the net present value of future tax receipts (as can be deduced from their respective flows as a share of GDP presented in the long-term report). Such a presentation would also underline that, other commitments, such as the net present value of future health spending, would be much more significant than public service pensions.

4.3 Inter-generational fairness

47. As explained in the introduction, the Government's fiscal policy objectives include inter-generational fairness. This is enshrined in the Government's fiscal framework through the golden rule and the sustainable investment rule. This section looks at generational fairness and the fiscal framework in more detail and describes the generational accounts' inter-generational balance gap (IGG), which is an indicator of generational fairness published by the UK Government. It also discusses some of the limitations of this approach to generational fairness.

4.3.1 The benefit principle

48. There is no single definition of generational fairness, but it is often expressed in terms of the "benefit principle": each generation of taxpayers should, as a group, contribute to public expenditures in accordance with their share of the benefits derived from those expenditures.[36]

49. In order to assess whether, and to what extent, a particular policy change would be justified on generational equity grounds it is necessary to have detailed information on the likely lifetime net tax positions of current and future generations and the contribution of health spending to these positions. Moreover, in considering the generational equity implications of a policy change, a government should be aware about the high degree of uncertainty surrounding the projections. So while the benefit principle appears *prima facie* to provide a clear principle for governments to follow, in practice, given the uncertainties, it is extremely complex to assess the impact of policy changes on generational equity.

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[35] See Buiter, W.H. (1999), "Notes on 'A Code for Fiscal Stability'". Buiter has explored the idea of a comprehensive balance sheet in a number of different papers, including Buiter (2002), "Measurement of the Public Sector Deficit and its Implications for Policy Evaluation and Design", IMF, Staff Papers, Vol. 30, pp. 306-49.

[36] Coombs, G. and B. Dollery (2002), "An Analysis of the Debate on Generational Equity and Fiscal Sustainability in Australia", *Australian Journal of Social Issues*, Vol. 37, No. 4, November.

4.3.2 Generational fairness and the fiscal framework

50. The benefit principle is reflected in the UK Government's fiscal objective that spending and taxation impact fairly both within and between generations. As Balls and O'Donnell (2002) explain, in practice this objective requires that:

"…those generations who benefit from public spending also meet, as far as possible, the costs of the services they consume".[37]

51. The Government's generational fairness objective is supported by the golden rule, which states that over the economic cycle the Government can only borrow to invest and not to fund current spending. This rule is partly motivated by inter-generational equity considerations:

"…current spending, which mainly provides benefits to existing taxpayers, should be paid for by the current generation of taxpayers. Similarly, because capital spending produces a stream of services over time, it is fair that this form of spending is financed initially through borrowing".[38]

52. So the golden rule aims to ensure that, as far as practicable, each generation (as a group) pays for the benefits of the public services it consumes.[39] The sustainable investment rule supports the golden rule in achieving inter-generational fairness by ensuring that current taxpayers are not able to borrow excessively for the purposes of investment. The upper limit on net debt minimises the risk that the burden of paying for this investment is shifted to future generations that do not benefit from the returns to this investment.

4.3.3 Generational accounting and the inter-generational balance gap

53. Indicators of fiscal sustainability, such as the inter-temporal budget gap, provide limited information about the effect of fiscal policy on intergenerational fairness. For example, the fact that a government is projected to satisfy its IBC (which is calculated as a stock indicator) does not necessarily mean that it can meet its future obligations *if and when they arise*, nor does it reveal when pressure on the government finances might be greatest in the future. Meeting its obligations in the future could require the Government to effect substantial inter-generational transfers, as future generations might have to pay off debts built up by earlier generations.

54. One approach to measuring the generational fairness of a government's fiscal stance, developed by Auerbach, Gokhale and Kotlikoff,[40] is to use generational

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[37] Balls and O'Donnell (2002), page 134.

[38] Balls and O'Donnell (2002), page 162.

[39] The golden rule requires that current generations ensure that existing financial liabilities are held constant in nominal terms. Buiter and Grafe have suggested an alternative inflation and growth-adjusted golden rule, pursuant to which the government would ensure that its (net) financial liabilities were held constant as a share of GDP. See Buiter and Grafe (2004).

[40] Auerbach, Gokhale and Kotlikoff (1992).

accounting. Generational accounting compares the projected lifetime net tax payments faced by newborns born in different years (net tax payments are the difference between taxes paid to the government and transfers received from the government, growth adjusted). If the present value (discounted to year of birth) of average lifetime net tax payments as a share of lifetime earnings (*i.e.* adjusted for growth) is the same for these different groups, then the government's fiscal stance is considered generationally fair.

55. The inter-generational balance gap (IGG) gives the amount by which current taxes have to rise (or fall), or spending has to fall (or rise), so as to achieve generational balance.[41] Specifically, the IGG shows the tax change required so that each successive future cohort pays the same share of its lifetime labour income in net taxes, while at the same time satisfying the IBC. The IGG focuses on current newborns, rather than existing generations, since the current government can only partially affect the lifetime tax burden of existing generations. More information on generational accounting and the derivation of the IGG indicator can be found in Annex A.[42]

56. The IGG therefore provides an indication of how far the Government is achieving its fiscal objective of ensuring that taxes and spending impact fairly between generations. For example, if current policy means that present revenue levels are insufficient to cover present spending, taxes will have to be raised in the future, disadvantaging future generations and favouring current generations.

57. However, the standard IGG indicator does not distinguish between current consumption and investment. Other things equal, an inter-generational imbalance that favours current generations will overstate the degree of imbalance since (as is reflected in the golden rule) current consumption only benefits the current generation whereas investment benefits both current and future generations. To obtain a better assessment of the degree of generational fairness of current policy, the generational accounts therefore need to treat current consumption and investment differently.

58. The measure of the IGG used in the UK Treasury's *Long-term Public Finance Report* addresses this issue by converting the future investment flow into a future flow of services (FOS) derived from the resulting capital stock. The future FOS accruing to society depends on the physical benefit (measured by depreciation) and on the monetary benefit of not having to rent the capital stock to be able to generate those physical benefits (similar to an imputed rent on the capital stock).[43]

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41 See also, for example, Cardarelli, Sefton and Kotlikoff (2000).

42 Gokhale and Smetters (2003) propose a closely related indicator of generational fairness, the generational imbalance.

43 The capital stock in any given year depends on the capital stock in the previous year, investment and depreciation. The capital stock K in year t is given by equation (1):

$$K_t = K_{t-1} + iY_t - \delta K_{t-1} \quad (1)$$

(continues)

4.3.4 Problems with the generational accounting approach

59. Generational accounting and the IGG suffer from a number of limitations. For this reason, the IGG measure plays only a very limited role as a fiscal indicator in the UK. The IGG is an imperfect measure of the extent to which current fiscal policy is fair on existing and future generations. Since it summarises in one figure the policy change required to achieve generational equity, it does not provide more detailed information about the timing and extent of generational inequity in the future. The IGG does not, therefore show the extent to which specific future generations will be net beneficiaries or net losers under current policy.

60. Perhaps more importantly, the IGG is a forward-looking indicator and does not look at the fairness of policy changes to existing generations. It is therefore of rather limited use for carrying out generational fairness assessments of alternative policy proposals. Although this approach is rationalised on the grounds that governments cannot affect the historical net tax position of existing generations, it is nonetheless a significant limitation. It is at least arguable that a proposed change in fiscal stance should also consider the effect on the lifetime net taxation position of existing generations, particularly since the change in revenue from existing generations as a result of any hypothetical tax change required to ensure generational fairness is included in the calculation of the IGG. Moreover, given the high degree of uncertainty associated with very long-term projections, the IGG can in practice only assess generational fairness in relation to a few generations, while at the same time it discards historical information, which is known with certainty.

61. In addition, it can be seen that generational accounting is not equivalent to the benefit principle. It looks at matching taxation and expenditure, not taxation and the benefits from expenditure.[44] The cost value of government purchases will not necessarily equal the social value. For example, generational accounting would not measure a return to investment in social capital through spending on urban green spaces or improved social housing. Nor does the generational accounting approach take into account the broader costs to future generations of current government policies, for example environmental costs. That said, it is the financial return that matters from the point of view of fiscal sustainability. Attempting to incorporate social returns into a measure of generational fairness could therefore result in a measure that does not guarantee fiscal sustainability (unlike the IGG, which is a hypothetical tax change which, *inter alia*, satisfies the IBC).

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where K_{t-1} is the capital stock in the previous year $t-1$, i the gross investment, Y_t is GDP in year t and δ the depreciation rate.

The flow of services FOS in year t is then given by equation (2):

$$FOS_t = \left(\delta K_t + rK_t\right) \tag{2}$$

and is the sum of the physical benefit (depreciation) δK_t in year t derived from the existing capital stock, and the monetary benefit (imputed rent) from the capital stock $r K_t$, where r is the real interest rate.

[44] Coombs and Dollery (2002).

62. Buiter (1997) identifies several other weaknesses of generational accounts. The usefulness of generational accounting relies on the validity of the life cycle model which requires, *inter alia*, that there exists no operational Ricardian intergenerational gift motive (that might offset, at least in part, intergenerational transfers through the government budget) and that markets are sufficiently complete that the timing of government taxes and transfers over the life cycle does not matter, only their present value (discounted at the government rate of interest). Buiter argues that:

"…generational accounts are uninformative as to the budget's impact on intergenerational distribution and saving behaviour when consumers' decision horizons are longer than those characteristic of the life-cycle model (e.g. when there is an operative Ricardian bequest motive), or when decision horizons are shorter than those postulated by the life-cycle model, because of the appropriate kind of capital market imperfections".[45]

In order to address the first part of this criticism, some economists have suggested incorporating bequests into the generational accounts.[46] The impact of this could be quite substantial, for example Congdon (2005) estimated that in the UK bequests, including gifts inter vivos, could be of the order of 5 per cent of GDP a year.

63. Buiter also notes that generational accounts are not calculated within the framework of a general equilibrium model of the economy, and therefore do not take into consideration the effects of changes in budgetary policy on pre-tax, pre-transfer and pre-subsidy factor incomes and rates of return.

64. It is also very difficult to identify the appropriate discount rate for the purposes of calculating generational accounts. The discount rate should arguably include a premium to reflect the cost of uncertainty associated with future fiscal policy, but assigning a value to this premium is problematic, not least because different generations may attach different premiums for risk to prospective payments or receipts of each tax or transfer.[47]

65. Annex B briefly discusses some other approaches to inter-generational fairness in the literature.

5. Role of fiscal indicators in setting fiscal policy in the UK

66. Fiscal indicators play a central role in guiding fiscal policy decisions and in ensuring a high level scrutiny over the conduct of fiscal policy in the UK. The

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[45] Buiter (1997), page 606.

[46] See de Neubourg, C. and A. Sebald (2003), *Intergenerational Fairness in Old-Age Provision: Who cures? Who cares?*, International Social Security Association, which describes generational accounts with bequests.

[47] Congressional Budget Office (1995).

credibility and legitimacy of the overall framework depends on a high level of openness, transparency and accountability. While forward-looking projections of the key fiscal indicators can inform the fiscal strategy over the medium (and longer) term, the fiscal indicators also provide a backward-looking measure of how successful the Government has been in meeting its objectives.

67. Fiscal policy needs to be set in a forward-looking way. Given the difficulty in changing fiscal policy it is desirable to set fiscal policy decisions in a medium-term context and to minimise the need for sudden lurches in policy. The policymaker's problem is to consider, given that we are where we are, where do we want to be and how should we get there? In the UK Treasury, as in most other policymaking institutions, the fiscal projections are made on the basis of underlying economic assumptions in which the economy comes back to the trend/potential level of output and then grows at the trend growth rate over the remainder of the forecast horizon. In the UK, the medium-term budget projections are made over five years, which means that generally the fiscal position that is projected three-to-five years ahead represents the desired fiscal position in "normal" times when output is on trend and any cyclical or otherwise temporary effects on the public finances have unwound.

68. In the UK in recent years, the interaction between the Government's fiscal rules and the plans to raise public sector net investment to 2¼ per cent of GDP has led to fiscal policy being set to generate a current budget surplus of around ¾ per cent of GDP and thus public sector net borrowing of around 1½ per cent of GDP in the medium term. On plausible assumptions of the long-term nominal growth rate, this fiscal policy setting is consistent with stabilising public sector net debt below 40 per cent of GDP, thus also meeting the sustainable investment rule.

5.1 The fiscal indicators and the fiscal objectives

69. As noted Section 2, the fiscal rules focus attention on two key indicators, the *current budget balance* and *public sector net debt*. These two indicators reflect the government's focus on the medium-term fiscal objectives of intergenerational fairness and fiscal sustainability over the cycle, and the fiscal rules are designed to ensure fiscal policy remains consistent with these objectives.

70. The Government also has a short-term economic objective of supporting monetary policy. As noted above, the key indicators of the short-term economic impact of fiscal policy are *public sector net borrowing* and *cyclically-adjusted public sector net borrowing*.

71. The *long-term indicators* in Section 4 do not directly factor into Budget policy decisions. The main concern surrounding these as indicators to direct policy decisions, rather than informing them and facilitating scrutiny, is that they are extremely uncertain and very sensitive to the assumptions underpinning them. In addition, when considering the longer-term fiscal imbalances that such indicators

might reveal, the appropriate policy response may often be for structural reforms rather than fiscal measures.[48]

5.2 Backward-looking performance appraisal

72. To complement the forward-looking policymaking process, the Government's fiscal rules also provide hard *ex post* measures of the performance of fiscal policy. The ability to assess, in simple terms, whether fiscal policy has been operated in line with the fiscal rules plays an important role in facilitating external scrutiny and holding the government to account. One of the common failings of previous fiscal frameworks in the UK was that policy goals were set and frequently revised, but without a concrete, backward-looking measure of performance, governments were not held to account for these changes. As such, policy goals lacked consistency over time and governments were unable to build confidence that policy goals would be achieved.

73. Box 3, taken from HM Treasury Budget 2006,[49] illustrates how the fiscal indicators have been used to provide a narrative of the Government's performance against its fiscal rules and objectives ex post in the Budget documents in addition to the commentary around the fiscal projections discussed in Section 2.

6. Conclusions

74. In the UK a wide range of fiscal indicators are presented and used to underpin fiscal decisions. The need for a range of indicators reflects the complexity of fiscal policy. The indicators both guide the Government in setting its fiscal policy and provide the evidence base to hold the Government to account. Several aspects of the way the indicators are used by the UK Government are worthy of note:

- The central role of the fiscal rules means that the evolution of the current budget and net debt over the 5 year fiscal projection horizon are very prominent. Net borrowing is mostly of interest in terms of its short-term impact on demand (though clearly net borrowing is also anchored by the net debt target in the medium and longer term);
- The framework is set up on the understanding that fiscal policy should 'see through' the short-term effects of the economic cycle, and hence indicators are presented in cyclically-adjusted terms and as averages over the cycle. Policy is also directed at the fiscal position in 3-5 years time when the economy is assumed to be on trend;

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[48] For example, raising pension ages in the future rather than raising tax rates to reduce debt in the short term to pay for increased pension costs later on. Moreover, for permanent demographic changes, a fiscal response of this sort would clearly be unsustainable in the very long term.

[49] Chapter 2, page 32. The references to figures in the box refer to the Budget 2006 document and are not included in this paper.

Box 3

Key successes of the UK fiscal framework

The UK fiscal framework was designed to address a number of challenges, discussed below. On each challenge clear progress has been made.

The first challenge was to ensure sound public finances and fairness within and between generations. Over the cycle from 1986-87 to 1997-98 the current budget was in deficit by an average of 1.9 per cent of GDP, peaking at over 6 per cent in 1993-94. While the current cycle has not been completed, the Budget projections show that by 2008-09 the average surplus will be 0.1 per cent of GDP. The largest deficit in any one year of this cycle, at 1.9 per cent of GDP, is equal to the average of the deficit over the previous economic cycle. Net debt as a percentage of GDP was 43.6 per cent in March 1997 compared with a projected 38.3 per cent at the end of the current cycle.

Current Budget Surplus
(percent of GDP)

Year of Cycle	1	2	3	4	5	6	7	8	9	10	11	12	Average
1986-87 to 1997-98 cycle	–1.4	–0.3	1.7	1.4	0.4	–2.0	–5.6	–6.2	–4.8	–3.4	–2.8	–0.2	–1.9
1997-98 to 2008-09 cycle	–0.2	1.2	2.2	2.2	1.0	–1.2	–1.9	–1.7	–0.9[1]	–0.3[2]	0.0[2]	0.5[2]	0.1

[1] Estimate.
[2] Projections for 2006-07 to 2008-09.

Second, fiscal policy has supported monetary policy over the cycle. One way of demonstrating this is to compare the change in cyclically-adjusted net borrowing (the fiscal stance) with the evolution of the output gap. The economy moved above trend in the first half of 1997, and between 1996-97 and 2000-01 the fiscal stance was tightened by 4 percentage points of GDP. As the economy moved below trend in late 2001, the fiscal stance was relaxed by just under 3 percentage points of GDP between 2001-02 and 2004-05.

The third challenge in 1997 was to rebuild the public capital stock. The fiscal rules provided the framework within which an increase in public investment could take place while maintaining sound public finances. Since 1997-98 public sector net investment has increased from 0.6 per cent of GDP to an estimated 2.1 per cent in 2005-06. For the remainder of the cycle, public net investment is projected to remain at 2¼ per cent of GDP, the longest period of sustained high public investment for 26 years.

Source: Taken from UK Budget 2006, Box 2.4.

- Indicators of the uncertainty of the fiscal projections are important and the fiscal framework deliberately aims to be on the side of caution so as to avoid the need for policy reversals. In recent years, the Government has also presented more information on the reasons for differences between fiscal forecasts and outturns;
- There has also been an increasing emphasis on long-term indicators of fiscal sustainability although they do not have a direct impact on the setting of fiscal policy. An important reason for this is that in many cases structural reform, rather than fiscal measures, may be the better option; and
- The UK Government has an objective for inter-generational fairness - indeed it is part of the basis for the golden rule. Estimates of the inter-generational gap have also been presented in the *Long-term Public Finance Reports*, however, this is an area where there remains further work to be done if such indicators are to be useful in a policy context, in particular to take account of the position of existing generations and not just newborn generations.

APPENDIX 1
INTER-TEMPORAL BUDGET CONSTRAINT AND GENERATIONAL ACCOUNTING

The inter-temporal budget constraint

The intertemporal budget constraint (IBC) is given by:

$$IBC: \sum_{s=t}^{\infty} R_s (1+r)^{-s+t} = \sum_{s=t}^{\infty} S_s (1+r)^{-s+t} + D \tag{1}$$

where R_s is revenue in year s, S_s is spending in year s, r he discount rate, and D the initial stock of net debt.

We can also define the level of primary balance PB_s to equal $R_s - S_s$ so that the IBC can be rewritten as:

$$D - \sum_{s=t}^{\infty} PB_s (1+r)^{-s+t} = 0 \tag{2}$$

By substituting into the left hand side the current level of debt, and current and (discounted) projected primary surpluses, the sum is equal to zero if the IBC is satisfied.

The IBC, in a variety of forms, has been used widely in the analysis of the sustainability of fiscal policy. For example, it is possible to rewrite equation (2) as ratios to GDP. This yields:

$$d - \sum_{s=t}^{\infty} pb_s \left(\frac{1+g}{1+r} \right)^{s-t} = 0 \tag{3}$$

where d is the initial debt to GDP ratio, pb_s is the primary balance as a share of GDP in year s, g is the real growth rate of GDP, and r is the discount rate. This formulation of the IBC has been used to analyse the level of primary balances needed to achieve a certain debt target in the future, such as in "fiscal gap" analysis.[50] The fiscal gap is the immediate and permanent change in the primary balance that is needed in order so that the debt to GDP ratio at time T in the future returns to the level that prevails at the current time.[51]

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[50] Auerbach, A. (1994), *The US Fiscal Problem: Where We Are, How We Got There, and Where We're Going*.

[51] The formula can be modified so that any debt to GDP ratio can be targeted at time *T*.

Generational accounting

In contrast with the fiscal gap, generational accounting looks at the absolute levels for the primary balance and debt rather than ratios, that is, equation (2) rather than equation (3). Equation (2) can also be used to calculate whether there is a "gap" in the long-term public finances. If current and future revenues are not sufficient to cover current and future spending and current debt, for a finite period the right hand side of equation (2) will not equal zero, but be a positive number. The extent of the imbalance is called the intertemporal budget gap (IBG):

$$IBG = D - \sum_{s=t}^{T} PB_s (1+r)^{-s+t} \tag{4}$$

The size of the IBG represents the immediate and permanent change in the primary balance that is needed in order that the IBG will equal zero; in other words, to ensure equation (2) is satisfied.

The inter-generational balance gap (IGG) can be used as a measure of the extent of fiscal adjustment needed to achieve generational balance. The IGG can be thought of as a stricter version of the intertemporal budget constraint, as the following section demonstrates.

Deriving the inter-generational balance gap

The following discussion (and notation) is drawn from Cardarelli *et al.* (2000). Using $PB_s = R_s - S_s$ in equation (4) and combining with equation (1) yields:

$$IBG = D - \sum_{s=t}^{\infty} R_s (1+r)^{-s+t} + \sum_{s=t}^{\infty} S_s (1+r)^{-s+t} \tag{5}$$

Look at the term $\sum_{s=t}^{\infty} R_s (1+r)^{-s+t}$ in more detail. The tax revenues to be collected by the Government can be broken down into two parts: the burden on generations that are already born, and the burden on future generations.

Tax revenues to be collected (defined as net of transfers) can be expressed as:

$$\sum_{s=0}^{D} N_{t,t-s} P_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t+s} P_{t,t+s} (1+r)^{-s} \tag{6}$$

with the first term the burden on current generations, and the second term the burden on future generations.

First, the burden on current generations.

$N_{t,t-s}$ is the present value of the average remaining lifetime net tax (taxes less transfers) payment of the person born in year $t - s$, or is aged s years old, at time t.

$P_{t,t-s}$ is the population of the generation born in year $t - s$ at time t.

Therefore, $N_{t,t-s}P_{t,t-s}$ represents the future tax burden of the generation born in year $t - s$, at time t. Summing across from $s = 0$ to D, the maximum length of life, adds together the tax burdens of different generations that have already been born.

Secondly, the burden on future generations $N_{t,t+s}$ is the present value *(to the year of birth)* of the average lifetime net tax payment of the person to be born in year $t + s$, or in s years time.

Because this is only discounted to the year of birth, this value needs to be discounted s years back to time t, hence the inclusion of $(1 + r)^{-s}$.

$P_{t,t+s}$ is the population of the generation born in year $t + s$, determined in the year of birth.

Therefore, $N_{t,t+s}P_{t,t+s}(1+r)^{-s}$ represents the tax burden of a generation to be born in s years time, at time t. Summing across from $s = 1$ to infinity adds together the tax burdens of the generations born every year from now into the infinite future.

Using equations (5) and (6), the intertemporal budget gap, as a share of GDP, can be represented by:

$$IBG = [D_t - \sum_{s=0}^{D} N_{t,t-s}P_{t,t-s} - \sum_{s=1}^{\infty} N_{t,t+s}P_{t,t+s}(1+r)^{-s} + \sum_{s=0}^{\infty} S_{t+s}(1+r)^{-s}]/GDP \quad (7)$$

where spending S now only includes government purchases (*i.e.* transfers are not included).

If the intertemporal budget gap is equal to zero, then it means that future tax collections will be sufficient to meet future spending and to pay off current debt. This does not mean, however, that the tax collections will be distributed equally across time. A country commits to raising taxes in the future to pay off past debt may still attain a IBG of zero. However, this policy makes future newborns relatively worse off than current newborns. Similarly, a country that runs large surpluses today while reducing taxes in the future may still attain an IBG of zero, but this policy could make current newborns worse off relative to future newborns.

Inter-generational fairness as defined by the IGG is achieved when current policy treats current newborns and future newborns equally on a growth adjusted basis, such that each future cohort faces the same lifetime net tax rate as current newborns. The basis for comparison for future newborns is current newborns, rather than all past newborns. This is because while the Government today can affect the

lifetime tax burden for current newborns and future newborns, it can only partially affect the lifetime tax burden for past newborns or existing generations.

If current and future newborns are to be treated the same, then the present value (discounted to their year of birth) of their average lifetime net tax payments should be the same, regardless of the year of birth. In the notation introduced above, this means that, $N_{t,t}$, the present value of the average lifetime net tax payment of the person born in year *t*, at time *t*, should equal $N_{t,t+s}$, the present value of the average remaining lifetime net tax payment of the person born s years from time *t*, for all *s*.

So in defining the IGG we are assuming that, each member of all future generations pays $N_{t,t}$ in net taxes, *i.e.*:

$$IGG = [D_t - \sum_{s=0}^{D} N_{t,t-s} P_{t,t-s} - \sum_{s=1}^{\infty} N_{t,t} P_{t,t+s} (1+r)^{-s} + \sum_{s=0}^{\infty} S_{t+s} (1+r)^{-s}] / GDP \qquad (8)$$

Thus equation (8) measures the extent of fiscal adjustment needed today, as a share of GDP, in order for future flows of spending and current debt to be financed by tax flows that do not favour one generation over the other.

The IGG is defined above in terms of the inter-generational fairness of tax flows, rather than spending flows, in that lifetime net tax payments are equalised between current newborns and future newborns. On the spending side (excluding transfers) it is already assumed that current newborns and future newborns have the same lifetime spending flow. That is, both current and future newborns are assumed to face the same (current) spending policies.

APPENDIX 2
OTHER APPROACHES TO INTER-GENERATIONAL FAIRNESS

75. The problems with the generational accounting approach were discussed in Section 4. This section briefly reviews three alternative approaches that have been suggested in the literature.

76. Hills (2004) has looked in more detail at generational accounts for the UK in order to identify "welfare generations", *i.e.* cohorts that have been or are projected to be net beneficiaries of the welfare state over their lifetimes.[52] In order to do this he looks at how education, health and social security spending have been distributed among different cohorts since 1901, using both historic and projected data. He assesses generational equity on the basis of equivalent sacrifice, i.e. that payments to government and payments received from government:

> *"…should be taken as balancing if they represent the same value – or sacrifice – in terms of contemporary living standards"*.[53]

Hills looks at cohorts born within successive 5 year periods, calculating estimates of the total education, health and social security spending received by each cohort and the total taxes paid by each cohort towards these spending items. He concludes that those born between 1901 and 1921 were, to a modest extent, a "welfare generation", but that on the whole the UK welfare system has been, and is projected to continue to be, fairly well balanced from an inter-generational equity perspective.

77. Analysis of this type is extremely data intensive. For example, Hills notes that limitations in the historical data mean:

> *"…allocating health spending even by five year age groups involves some fairly heroic assumptions"*.[54]

However, calculating a projection of the IGG is itself subject to a high degree of uncertainty, and Hills's approach does address some of the problems with the IGG identified in Section 4. It provides information about the position of particular cohorts, rather than summarising the degree of generational fairness in the economy in a single figure. And by including historical data the approach allows an assessment of the projected net lifetime tax position of current generations as well as current newborns and future generations. It therefore permits the identification of whether particular generations are projected to be net beneficiaries of the tax and benefits system, as well as an assessment of how proposed policy changes will affect current and future cohorts individually.

78. Another approach to inter-generational fairness is to take a broader view of the benefit principle, assessing policies as generationally fair if they satisfy the needs of the present without compromising the needs of the future. According to

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[52] See Hills (2004) and Falkingham and Hills (1995).

[53] Falkingham and Hills (1995), page 36.

[54] Falkingham and Hills (1995), page 37.

such an approach, the government/society is passing on a "portfolio" of assets, including, *inter alia*, public and private physical capital, human capital, a stock of technology and knowledge, and natural resources. As was explained in Section 4, generational accounts do not measure all the benefits/costs generated by some types of government spending, for example the returns to education in the form of higher growth and technological advancements, or the costs to future generations of environmental damage. Therefore the "portfolio" approach would require generational fairness to be assessed on a broader basis than generational accounts. Indicators such as the index of sustainable economic welfare (ISEW) and measures of 'living standards' incorporate some of the broader costs and benefits of government spending.[55] Another approach would be to try to capture the returns to investment in human capital formation by treating education spending as investment with a return, rather than as current consumption (although the measurement of this return would be very difficult).

79. Finally, Musgrave,[56] among others, has argued for a different notion of generational fairness, assessed in relation to the ability of different generations to pay taxes as opposed to the broader or narrower versions of the benefit principle described above. If per capita incomes rise over time then it could be argued, along similar lines to those used to justify the intra-generational distribution of income, that richer future generations should bear a higher tax burden. Moreover, to the extent that generational accounts are unable to incorporate factors such as the improvement of physical and human capital by previous generations, such an approach might accord more closely to the standard notion of generational fairness than at first appears to be the case (though less so if the environmental and other costs to future generations of current policies are taken into account). However, this is a highly problematic approach to generational equity, not least because future generations are unlikely to consider it fair. It also raises questions about what upper limit, if any, should be placed on the ever-increasing tax to GDP ratio that is implied (with implications for labour market incentives, for example).

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55 Crafts (2003).

56 Musgrave (1988).

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