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NATIONAL AUDIT OFFICE

Audit of Assumptions for the Pre-Budget 2000 Report

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
HC 959 Session 1999-2000: 8 November 2000

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Report

Report by the Comptroller and Auditor General to the House of Commons

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Statement of Responsibilities

1 Sections 156 and 157 of the Finance Act 1998 provide for me to examine and report on such of the conventions and assumptions underlying the Treasury's fiscal projections as are submitted to me by the Treasury for examination.

2 The Chancellor of the Exchequer has indicated that there are no new assumptions that he wishes me to examine. I understand that none of the assumptions I have examined in previous Reports[1] are to be changed. As before, the Treasury remains responsible for making projections of future public expenditure and revenue on the basis of these assumptions.

3 At the time of the March 2000 Budget, the Chancellor requested that I conduct a three year rolling review of the assumptions I have audited previously. This is to provide a check both that the assumptions remain reasonable and cautious, and to see whether they have indeed resulted in reasonable and cautious projections in the period since they were first audited. The remit is as follows:

- To ensure that the key audited assumptions underpinning projections of the public finances remain valid, the Comptroller and Auditor General shall examine each audited assumption three years after its most recent audit:

  (a) to review whether the assumption has resulted in reasonable and cautious projections of the elements of the public finances projections it relates to since it was first audited; and

  (b) to check that it remains a reasonable and cautious assumption to use in future projections of the public finances.

4 For the purposes of this Report, this entails an audit of assumptions concerning equity prices; VAT receipt assumptions; and the consistency of price indices used to project government revenues and expenditure with the retail prices index excluding mortgage payments. These assumptions were first reviewed in my November 1997 Pre-Budget Report. At that time I also examined a convention governing projections of future oil prices, but as I re-examined this assumption for the November 1999 Pre-Budget Report, it is not included in the rolling review for this report.

5 Assumptions related to the direct effects of Spend to Save programmes of a number of Government Departments were due for inclusion in the rolling review for the March 2000 Budget. I said in my report then that the assumptions could not be reviewed until audited outturn figures for the programmes were available. The required information is now on the whole available, though as programmes with a completed three year life, my report here on this element of the rolling review is retrospective only.

[1] *(Cm 3693; HC 361, Session 1997-98; HC 616, Session 1997-98; HC 294, Session 1998-99; HC 873, Session 1998-99; and HC 348, Session 1999-00)*

6 I note two developments in respect of other assumptions that I have not audited as part of the rolling review for this report. The first concerns revised definitions of recent levels of unemployment used in connection with the assumption for future unemployment. These changes are currently not likely to affect the fiscal projections in a material way. Details are given in Annex 1.

7 The second development concerns the statistical methods underlying the assumption about the profile of future interest rates. This profile continues to be derived from expectations in financial markets, as reported in my Audit of Assumptions for the July 1997 Budget. Interest rates then were derived from a Bank of England model. However, the Treasury believes that an alternative method is currently a more transparent and cautious one. It implies higher interest rates than those predicted by the Bank, and consequently a higher debt burden to be financed. Details are again given in Annex 1.

Basis of Report

8 As in my previous reports on assumptions underlying the fiscal projections, I have considered the available evidence in undertaking the rolling review. Evidence was obtained from relevant papers and discussions with officials as appropriate in the Treasury, HM Customs and Excise, Department of Social Security, Inland Revenue, Foreign and Commonwealth Office, Driver and Vehicle Licensing Agency, Legal Services Commission, the Home Office and the Northern Ireland Office.

9 The results of my audit follow.

Report

Equity prices

10 Equity prices directly affect the public finances through their impact on receipts of capital gains tax, stamp duty and inheritance tax. They are a significant though not the only determinant of these revenues.

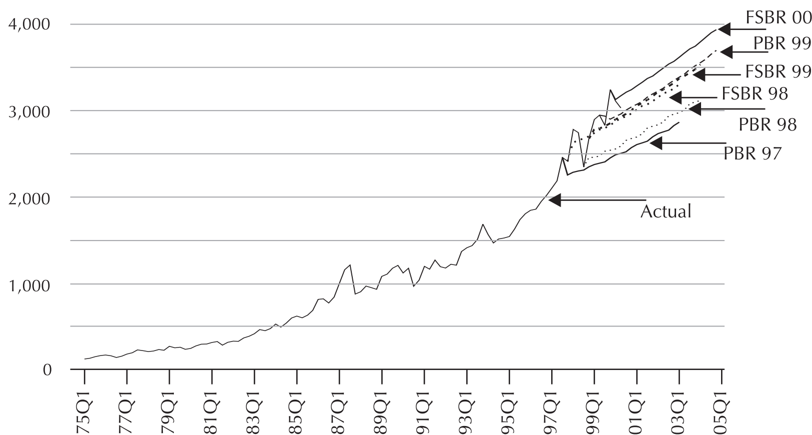
11 While there is a great deal of information on companies and markets that could provide a basis for forecasting equity prices, this information is available to participants in the equity market, and because of the efficiency of such markets, these views ought to be reflected in existing market prices. Short term changes in equity prices will therefore depend on unforeseen events, which by their nature cannot be forecast. In the long term, it is reasonable to expect that equity prices will reflect the profitability of businesses and grow in line with this. The share of profits in gross domestic product (GDP) has tended to be stable, and this implies that profits grow at the same rate as GDP[2]. As a result, Treasury assumes that equity prices (represented by the FTSE all-share index) will grow at the same rate as gross domestic product in money terms.

12 **Figure 1** shows the actual path of the FTSE all-share index and the six Treasury forecasts made over the past three year rolling review period.

13 Treasury's forecasts have tended to underestimate future equity prices, with the FTSE all-share index rising markedly faster than money GDP over the last few years. The average one year ahead forecast error for the forecasts made for the 1997 Pre-Budget Report and since has been 6.4 per cent. All else equal, (including exactly correct forecasts of equity turnover and realisation rates), underestimating equity prices would result in underestimating government revenues. To this extent, the forecasts can be regarded as having been cautious over the rolling review period.

[2] *I reviewed this assumption in my Audit of Assumptions for the March 1998 Budget.*

1 FTSE all-share index against forecast values



FSBR is the Financial Statement & Budget Report, and PBR the Pre-Budget Report

Source: HM Treasury

14 There is no guarantee that these trends will continue in the future, although stock market growth has exceeded money GDP growth by around five per cent per year over the last 25 years. This may in part be attributable to the size of structural changes arising from financial deregulation in the 1980s, which would be expected to increase equity prices by more than money GDP. Nevertheless, I note that underestimating stock market growth has had a relatively minor effect on Treasury forecasts of the public finances, since they are updated twice a year for the Budget and Pre-Budget Report.

15 I commented on alternative methods for forecasting future equity prices in my November 1997 Report and concluded that these offered limited predictive power. On the basis of past data, I concluded that while the Treasury assumption of linking equity prices to money GDP growth was by no means exact, it nevertheless had broad validity. The assumption is consistent with economic theory, and similar approaches are used by the Congressional Budget Office in the United States and elsewhere overseas.

16 I remain of the view that the relationship between equity prices and money GDP is likely to be imprecise and at times significantly so. But there are reasonable grounds to support the continued use of the assumption as a sensible rule of thumb for forecasting purposes.

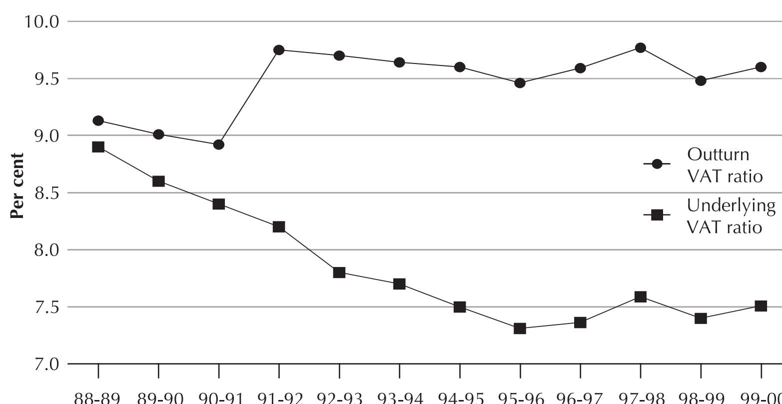
The underlying ratio of Value Added Tax receipts to consumers' expenditure

17 The assumption I audited in November 1997 concerning forecast VAT receipts was that, "… given current uncertainties about the prospects for VAT receipts, explored in the recent report by the Working Group on VAT Receipts, there will be a slight fall in the underlying ratio of VAT receipts to consumers' expenditure". The underlying ratio allows for changes in VAT coverage, in other words as if under a constant tax regime.

18 HM Customs and Excise have applied the assumption to the forecasts of VAT revenues they make, adjusting these as necessary so that the implied forecast ratio of VAT receipts to consumers' expenditure in the next financial year is 0.05 percentage points less than the estimated ratio for the current year. HM Customs and Excise adopted a figure of 0.05 percentage points as a reasonable extrapolation of the recent trend in the ratio.

19 **Figure 2** shows the path of the actual and underlying VAT ratios.

2 **Outturn actual and underlying VAT ratios**[1]



Notes: 1. The underlying VAT ratio is the VAT ratio adjusted for changes in VAT coverage, i.e. outturn based on a constant tax regime.

Source: HM Customs and Excise

20 In the ten years preceding adoption of the assumption, the underlying VAT ratio had declined from 8.9 per cent (1988-89), to 7.6 per cent (1997-98). In the light of this evidence, I concluded for my November 1997 Report that some allowance for the possibility of further decline was reasonable. In the two years after the adoption of the assumption, the outturn underlying VAT ratio was 7.4 per cent (1998-99) and 7.5 per cent (1999-2000). All else equal, an assumption of a gradual fall in the underlying VAT ratio would therefore have produced slightly cautious estimates of forecast VAT revenues in comparison with outturns.

21 While recent outturns indicate that the underlying VAT ratio may be levelling out, it is too soon to be sure if this trend will continue. I also note that HM Customs and Excise now has a target to improve compliance year on year which, if achieved, would tend to increase the ratio over time. In the meantime, given a further slight decline in the ratio since 1997, I remain of the view that the existing assumption is a cautious and reasonable one.

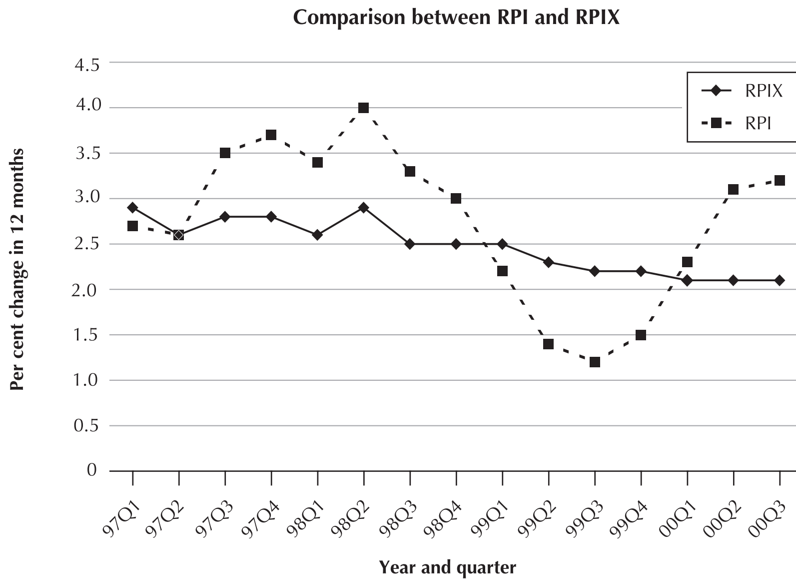
The consistency of price indices used in forecasting public finances and the retail prices index excluding mortgage payments

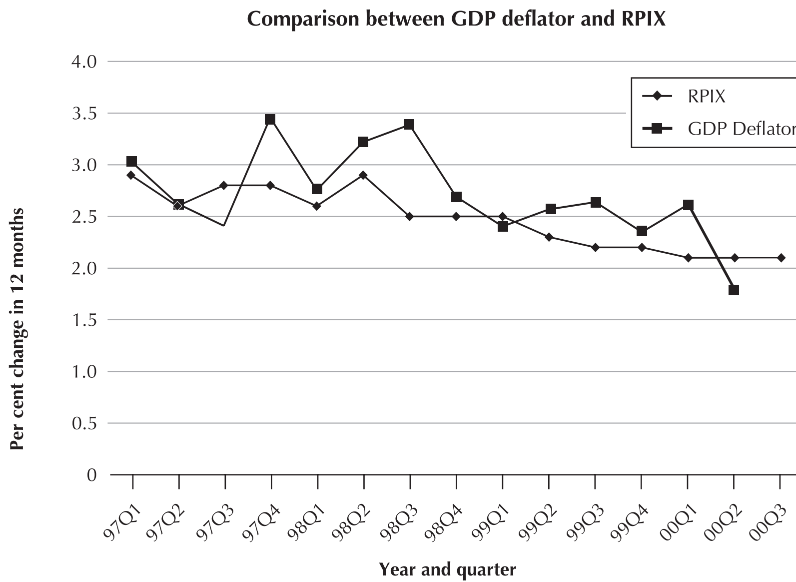
22 The indices used to forecast significant elements of government revenue and expenditure are the Retail Prices Index, (RPI), the Rossi Index used to uprate income support and other income related benefits, and the price deflator of Gross Domestic Product, (GDP deflator). My November 1997 Report set out the definitions of these price indices and they continue to apply.

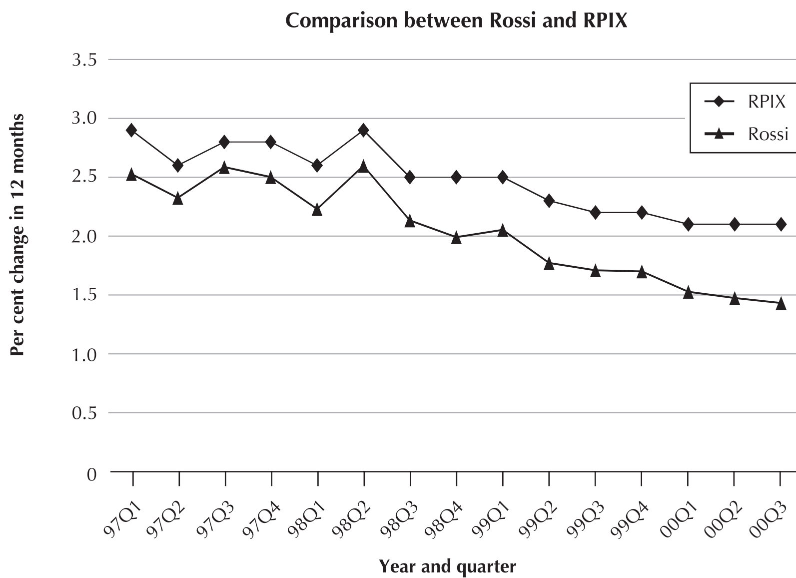
23 The Government's target for inflation is defined using the retail prices index excluding mortgage interest payments, (RPIX), and remains at 2.5 per cent per year. **Figure 3** shows the path for inflation on the RPIX and the other three price indices over the rolling review period.

24 RPI inflation showed greater fluctuation over the period than RPIX inflation. This reflects changes in mortgage interest payments over the period, due to mortgage rate changes and MIRAS reductions. I have confirmed that the MIRAS reduction from 15 per cent to 10 per cent in April 1998, and its abolition in April 2000, were included in the Treasury's forecasts of RPI during the rolling review period.

3 Annual RPI, Rossi, GDP deflator and RPIX inflation







Source: HM Treasury

25 The Rossi index excludes council tax, rent and housing depreciation costs, all of which rose by more than RPIX inflation over the period. The depreciation element rose particularly strongly, fuelled by rising house prices. As a result, Rossi inflation was consistently lower than RPIX inflation over the last three years, although it followed a similar path.

26 The GDP deflator is a much broader price index than the RPI and its derivatives that relate just to consumers' expenditure. Inflation as measured by the GDP deflator has generally been a little above RPIX inflation over the last three years. The GDP deflator is designed to reflect the prices of all domestically produced goods and services and thus excludes the prices of UK imports. The improvement in the terms of trade from a steeper decline in import prices than in export prices in response to the appreciation of sterling thus increased the GDP deflator relative to RPIX.

27 **Figure 4** shows the forecasts of the four price indices underlying the Pre-Budget Report.

4 **Treasury forecasts of percentage changes in RPI[1], RPIX, ROSSI and the GDP deflator on the year earlier**

	RPI	RPIX	ROSSI		GDP deflator
2000 September	3.3	2.2	1.6	2000-01	2
2001 September	2½	2½	2¼	2001-02	2½
2002 September	2¾	2½	2¼	2002-03	2½
2003 September	2½	2½	2¼	2003-04	2½
2004 September	2½	2½	2¼	2004-05	2½
2005 September	2½	2½	2¼	2005-06	2½

1. RPI projections incorporate the profile of market expectations of interest rates.

Source: HM Treasury

28 Treasury forecast that RPIX inflation will be at its target level of 2½ per cent by the middle of 2001. The gap between the RPIX and RPI inflation is projected to narrow. For the next year, this arises because market expectations of interest rates remain broadly unchanged, while the impact from earlier rate rises and the abolition of MIRAS will drop out of the annual comparisons. The path for GDP deflator inflation is forecast to be very similar to that of RPIX inflation, in the absence of the previous upward contribution from the terms of trade. The expected narrowing in the differential between RPIX and Rossi inflation arises from an assumed slow down in the growth of house prices and associated housing depreciation costs. However, the gap between Rossi and RPIX inflation is not forecast to close completely.

29 While there are differences between the paths of the four price indices over the rolling review period, these reflect the different definitions and the fact that excluded or included components have changed at a different rate to RPIX. For the future, I have not reviewed how accurate Treasury's price forecasts are likely to be, but there are reasons to explain the different forecast paths assumed for RPI, Rossi and the GDP deflator, and the series therefore have a consistency with each other and with the RPIX based series used to monitor achievement of the inflation target.

Spend to Save

30 Spend to Save programmes were designed to reduce fraud and raise tax yields. Over the three years 1997-98 to 1999-00, savings were projected to be some £6.7 billion, mainly by the Inland Revenue, HM Customs and Excise, and the Department of Social Security. For the purposes of making cautious fiscal projections, the savings figure has been restricted to only the direct effects of the measures, forecast to be around £5 billion over the three years.

Inland Revenue

31 In 1997, at the time of my original audit of Spend to Save assumptions, the Inland Revenue expected to secure £1,774 million in direct savings over three years, as a result of extra tax compliance work costing £187 million. This savings forecast was amended over the next two years to £1,686 million, as a result of adjustments to small projects within the initiative, and to take account of rule changes announced in the 1998 Budget reducing the expected savings from the Construction Industry Scheme.

32 The Inland Revenue has monitored the Spend to Save Programme throughout, ensuring that all allocated expenditure was used to fund only Spend to Save posts. It has also estimated that direct savings attributable to these extra resources amounted to £1,868 million over the three years, £182 million higher than the target.

33 The components of this estimate have been reviewed by Inland Revenue's Internal Audit Office. I have carried out my own checks and I conclude that the monitoring and control systems were sound, and that the savings estimate is reported on a prudent basis. In view of the fact that the savings target was more than met by a small margin, the original assumption was reasonable and cautious.

HM Customs and Excise

34 The direct savings I audited in 1997 covered four initiatives expected to save £669 million. Three, relating to VAT assurance, involved extension of existing activities, and the Departmental performance target for each activity was increased in line with assumptions made for Spend to Save.

35 The fourth initiative, creating 130 posts to counter excise fraud, was largely new. A target was set for it to generate £60 million revenue a year over the three year life of the programme. However, the Department's experience in the first year, confirmed in the second year, suggested that although the initiative was producing worthwhile indirect benefits, no direct effects were achieved. The target was therefore transfered to the VAT assurance targets.

36 On the basis of monitoring, HM Customs and Excise state that the existing and new activities together at least met their Departmental performance targets. They believe that on the basis of this achievement they also met their specific targets for the Spend to Save package as a whole. HM Customs and Excise believe that it would not be possible to evaluate the impact of just the additional Spend to Save measures separately from their assurance activities in their entirety.

37 One way to assess this is to calculate the proportion of revenue raised under each initiative that was due to the provision of extra staff, assuming they were equally productive as staff already in post. The results of this analysis are at **Figure 5**.

5 **My estimates of direct additional revenue deriving from the HM Customs and Excise Spend to Save programme (£ million)**

Initiative	1997-98	1998-99	1999-00	Total
Retain 1,100 VAT assurance staff years due to be lost in 1998-99 as a result of the Fundamental Expenditure Review	N/A[1]	210	322	532
Increase staff allocated to control of large traders by eight staff years	13.5	8.5	14.2	36
Increase "Shadow Economy teams" by 85 staff years	17	32	77	127
130 new full time equivalent posts for three years to counter excise fraud[2]	0	0	0	0
Total	**31**	**251**	**413**	**695**

Note: 1. Not applicable.
2. Excludes indirect effects which were achieved.

Source: National Audit Office

38 This analysis suggests that savings of £695 million were made, £26 million greater than the target of £669 million. As a result, the original assumption was likely to have been reasonable, and within the margins of error, not incautious.

Department of Social Security

39 The Department of Social Security's original Spend to Save assumption was that it would cost £469 million and lead to savings of £2,145 million over the period 1997-98 to 1999-00. In the event, the Spend to Save initiative ended after two years, when the Security and Control Programme, of which it was a part, was replaced by a new counter fraud strategy and a new method of measuring its effect. This focuses on measuring changes in the overall level of fraud, rather than on the weekly benefit savings anticipated from action to stop fraudulent payments.

40 For the two years it ran, the Spend to Save initiative cost £244 million and was expected to save £921 million in this period. The Department has not evaluated the effects of the Spend to Save initiative separately, but considers it reasonable to estimate them as a proportion of the savings achieved by the wider Security and Control Programme. The Programme is estimated to have saved £2,354 million over the two years of the Spend to Save initiative. This estimate was examined as part of an extensive internal validation programme by the Department, as noted in my Report on the Department's 1998-99 Appropriation Accounts[3].

41 Taking Spend to Save costs as a proportion of the costs of the Security and Control Programme as a whole, the Department estimates savings of £1,854 million from Spend to Save, compared to the target of £921 million. This savings estimate amounts to 86 per cent of the original three year Spend to Save savings target, while the actual costs of the initiative over this period were only about half those projected for the three years.

[3] *Appropriation Accounts 1998-99 Volume 12: Class XII Department of Social Security, HC 11-XII, Session 1999-00, paragraphs 3.4 - 3.6*

42 I do not necessarily challenge the Department's estimates on these grounds, but an alternative method would be to base the savings estimate on the original two year savings target for Spend to Save as a proportion of that for the Programme as a whole. Savings would then be estimated at £716 million, in comparison to the £921 million target. The Department notes that this alternative apportionment relies on a forecast of planned savings, rather than on actual costs, but even so, shows a positive return on the investment of £244 million.

43 While the Department's preferred methodology implies that the original Spend to Save assumption was reasonable and cautious, I noted in my July 1997 Report that, because the assumptions made at the time were based on consequential savings from spend to save action, they may not have been the most restrictive ones that could have been supported. This remains the case in the light of using a less optimistic method of apportionment, but in view of the uncertainties, the original savings assumption may not have been unduly over-optimistic.

Other Departments

44 The Spend to Save programme included initiatives launched by a number of other Government departments. **Figure 6** shows Departmental estimates of savings made where available.

6 **Comparison of estimated direct savings for the period 1997-98 to 1999-2000 against the 1997 forecast of direct effects[1]**

Department	Cost £ million		Savings £ million[2]	
	Planned	Actual	Planned	Actual
Foreign and Commonwealth Office	5	4	54	45
Driver and Vehicle Licensing Agency	15	15	47	34
Legal Services Commission (formerly Legal Aid Board)	6	7	92[3]	64

Notes:
1. At current prices for the period 1997-98 to 1999-2000
2. Separately identifiable figures were not available for Home Office Spend to Save activities, and following devolved government in Northern Ireland, no figures are available. My July 1997 Audit identified some £60 million expected Spend to Save savings from each of these two Departments.
3. Revised estimate of forecast savings, compared to the figure of £116 million reviewed in July 1997.

Source: Audit of Assumptions for the July 1997 Budget, Cm 3693, Table 3 and Departments

45 Departments derived the estimates in a variety of ways including the recording of savings on a case by case basis and statistical modelling. It has sometimes been difficult for Departments to isolate savings attributable to Spend to Save, and the outturn figures are not always comparable with the original targets, as some activities were either deferred or went ahead in a different form. I am, however, broadly satisfied in the light of supporting evidence I have reviewed that the original savings assumptions were reasonable. In view of the lack of information about savings in some Departments and the apparent shortfalls against targets, (some of which may be due to changes in the activities undertaken), I am unable to comment on how cautious the original assumptions were in practice.

Conclusions

46 My rolling review of assumptions for equity prices, the VAT ratio and the consistency of price indices indicates that they were reasonable ones to have adopted three years ago, and were generally cautious assumptions. It is also reasonable that the assumptions continue to be used, though I note the uncertainty over the future path of the VAT ratio. Taking account of the information available on Spend to Save measures, I conclude that figures for direct savings assumed by most Departments were on the whole reasonable and cautious, though I do not have sufficient evidence to conclude that all were.

Annex 1

Adjustments to the future unemployment and interest rate assumption methodologies used by Treasury for making fiscal projections

Unemployment assumption

1 The unemployment assumption hitherto made by the Treasury rests on a comparison between

- the most recent quarterly figure for claimant unemployment, as published in *Economic Trends*, and
- the average predicted level of unemployment in the fourth quarter of the following calendar year, according to a range of external independent forecasters.

2 If on average the independent forecasters predict a fall in claimant unemployment for the following year, the Treasury assumes that unemployment will remain at the most recent published level. On the other hand, if a rise were predicted, Treasury would assume a similar rise by the fourth quarter of the following year, the levels in intermediate quarters being calculated by compound interpolation.

3 In June 2000 there was a change in the presentation of the quarterly unemployment data in *Economic Trends*. The method of calculating the monthly figures remained unaltered but the published quarterly figure is now the average of the three monthly figures within the quarter, rather than the figure for the first month of each quarter.

4 In line with this change, Treasury proposes that the baseline against which forecast changes in unemployment are predicted will normally be the average of the latest three months' claimant count data. This allows the most recent information to be used, (the most recent complete quarter's data as published in *Economic Trends* may be somewhat out of date depending on the timing of the Treasury forecast). Exceptionally, Treasury may use only the latest month's claimant count figure as a base. This would be the case if, for example, in the preceding three months the series were subject to disturbance by factors such as changed eligibility conditions for unemployment related social security benefits. The principles set out in paragraph 2 will continue to apply.

5 These changes are likely to make only small differences to the assumed recent level of unemployment unless trends are steeply upward or downward. For example, on the new Treasury method, average claimant unemployment over the most recent three months of available data (July, August and September 2000) was 1,052,100, the same as for Q3 2000 on the revised *Economic Trends* definition. On the old method, using the first month of the third quarter of 2000, the figure would have been 1,069,300.

Interest rate assumption

6 Until March 1998, the Treasury used Bank of England estimates for future interest rates. These were derived until November 1999 using a technique for estimating the yield curve developed by Svensson[a]. This approach aims to fit a smooth curve to the term structure of yields on government securities. As the short term gilt market is relatively illiquid, it was not regarded as a reliable source to derive predictions of short term interest rates, and interest rate projections for up to two years ahead were made using short-sterling futures. From November 1999, the Bank has used a new yield curve estimation technique based on the prices of government bonds of different maturities and shorter term maturity general collateral gilt 'repo' rates[b].

7 The Treasury now uses interest rates provided by Bloomberg, a commercial company located in the United States specialising in market and financial information, used widely in financial circles. Bloomberg derives future interest rates from a variety of financial market data using statistical modelling.

8 The Bloomberg model offers the advantages of transparency, since their data are available to the public by subscription, and also timeliness because the estimates are regularly updated to reflect developments in the UK money market.

9 The Treasury calculates that public financing costs over the 2000-04 period would be somewhat greater using the Bloomberg predictions of future interest rates, compared to those derived from the interest rate projection method now used by the Bank of England. This is because the Bloomberg interest rate predictions are higher than the Bank's, largely on account of the additional risk, credit and term premia that are attached to forward market interest rates.

10 Over the period 1997-98 to 2003-04, gross debt servicing costs are projected to be approximately 1 per cent per annum higher than using the Bank's current methodology, with costs on average some £250 million higher each year. As a result, the Treasury believes that its method is currently more cautious than that implied by the Bank of England's estimation method.

[a] *Svensson, L (1994), 'Estimating and interpreting forward interest rates: Sweden 1992-94', IMF Working Paper, No 114*

[b] *Anderson, N and Sleath, J (1999), 'New estimates of the UK real and nominal yield curves', Bank of England Quarterly Bulletin, November*