



National Audit Office

# Audit of Assumptions for Budget 2006

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL | HC 937 Session 2005-2006 | 22 March 2006

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# Audit of Assumptions for Budget 2006

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**Comptroller and Auditor General**  
**National Audit Office**

**17 March 2006**

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# AUDIT OF ASSUMPTIONS FOR BUDGET 2006

## Statement of Responsibilities

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

**2** The Treasury has advised me that there are no new assumptions to examine and that none of the other assumptions examined in previous Reports has been changed since its most recent audit. As before, the Treasury remains responsible for making projections of future public expenditure and revenue on the basis of the audited and other assumptions.

**3** The Chancellor has requested that I conduct a three year Rolling Review of the assumptions I have audited previously. These arrangements were introduced at the time of the March 2000 Budget, to provide a check both that the audited assumptions remain reasonable and cautious, and to see whether they were reasonable and cautious projections in the period since they were last audited. The remit is:

- 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** The Rolling Review for this Report includes the assumption for the underlying trend growth rate of the economy used in making the fiscal projections. This assumption was audited previously in 2002<sup>1</sup> and therefore fell due to be examined as part of the three year Rolling Review at the time of Budget 2005. The Treasury expected at that time, however, that the economic cycle would be completed towards the end of 2005, providing useful information about growth over the period of the most recent economic cycle. Accordingly, I was asked to postpone my audit slightly. In view of the updated assessment the Chancellor made for the 2005 Pre-Budget Report, that the economy was expected to return to trend in 2008-09, the Treasury has now asked me to carry out the audit of the trend growth rate, rather than wait<sup>2</sup>.

**5** The Rolling Review also includes a convention for assumed privatisation receipts and the methodology used for obtaining projections of interest rates, both of which I examined first in 1997<sup>3</sup> and then in 2000 and 2003<sup>4</sup>. Also covered on this occasion is the then Inland Revenue (now HM Revenue and Customs) spend to raise compliance package for direct tax and national insurance contributions. I reviewed this on its introduction at the time of Budget 2003.

**6** I also reviewed a revised assumption for tobacco duty revenues, relating to the underlying market share of smuggled cigarettes, at the time of Budget 2003<sup>5</sup>, and this assumption would have fallen due for examination under the Rolling Review for Budget 2006. Firm data to make an assessment of the smuggled market share are available, however, for only the first year of the three year Rolling Review period, 2003-04. I have therefore been asked to examine the available evidence for 2003-04, the issues that have arisen in producing an estimate for 2004-05 and the steps being taken to resolve these, with a view to carrying out a full Rolling Review of the assumption for Budget 2007.

<sup>1</sup> *Audit of Assumptions for the 2002 Budget*, HC 760, Session 2001-02.

<sup>2</sup> Paragraph 2.32, *Pre-Budget Report*, HM Treasury, 5 December 2005.

<sup>3</sup> *Audit of Assumptions for the July 1997 Budget Projections*, Cm 3693.

<sup>4</sup> *Audit of Assumptions for the March 2000 Budget*, HC 348, Session 1999-2000 and *Audit of Assumptions for Budget 2003*, HC 627, Session 2002-03.

<sup>5</sup> *Audit of Assumptions for Budget 2003*, HC 627, Session 2002-03.

## Basis of Report

7 I have considered the available evidence gathered for this audit from relevant papers and discussions with officials as appropriate in the Treasury, the Bank of England and HM Revenue and Customs. I have consulted the International Monetary Fund, Morgan Stanley, the National Institute of Economic and Social Research and Oxford Economic Forecasting Ltd, and used information from other external forecasting organisations.

## Report

### The underlying trend growth rate of output

#### Background

8 The trend rate of output growth is the rate at which the output of the economy can grow, on a sustained basis without putting upward or downward pressure on inflation. The evolution of the economy can be predicted in the short term, based on contemporary economic developments, but not in the longer term. The Treasury therefore estimates when the economy is likely to return to trend and then adopts the assumption that the economy will grow at the underlying rate. The Treasury defines the trend rate of growth on the basis of UK non-oil Gross Value Added (GVA).

9 The Treasury increased its estimate of the underlying trend rate of growth in Budget 2002 from 2½ per cent to 2¾ per cent per year, which I audited<sup>6</sup>. This increase was partly because higher estimates of net inward migration by the Office for National Statistics led to an increase in the Government Actuary's Department projection of net migration going forward, leading to faster workforce growth, and hence greater potential output growth<sup>7</sup>. It was expected at the time that population growth would decrease later in the decade, due to post-War baby boom women reaching retirement age, which reduces growth in the working-age population<sup>8</sup>, and as reflected in the Government Actuary's Department's 2004-based

population projections<sup>9</sup>. The assumption for underlying growth beyond the end of 2006 was presented for the first time in the 2002 Pre-Budget Report. In light of the projected slow down in the growth of population of working age discussed above, the Treasury's neutral assumption was for trend growth to be 2½ per cent per year from 2007 onwards<sup>10</sup>.

10 On the grounds of caution, the rate of growth used in making the fiscal projections is a ¼ percentage point lower than the Treasury's neutral estimate of the underlying growth rate and increased from 2¼ to 2½ per cent for the period 2002 to 2006, reducing to 2¼ per cent per year for 2007 and beyond, **Figure 1**.

11 The assumption for underlying growth used for the fiscal projections was due for re-examination under the three-year Rolling Review at the time of Budget 2005. The Chancellor asked me to postpone this work pending the completion of the current economic cycle, then forecast for end 2005, on the grounds that I would then have had another on-trend point to inform my work<sup>11</sup>. By the time of the 2005 Pre-Budget Report the Treasury's forecast was, however, that the economic cycle would end in 2008-09, rather than 2005-06. The Budget 2006 forecast also shows the current cycle ending in 2008-09. I have therefore been asked to carry out the audit now.

**1** Treasury estimates of the underlying growth rate of the economy and the rate assumed for the purposes of making the fiscal projections, UK non-oil Gross Value Added, per cent per year

	Underlying growth rate	Rate used for the fiscal projections
2001Q4 – 2006Q4	2¾	2½
2007Q1 onwards	2½	2¼

Source: HM Treasury

6 HC 760, Session 2001-02.

7 HC 760, Session 2001-02, paragraph 20. Further details are set out in *Trend Growth: Recent Developments and Prospects*, HM Treasury, 2002 at <http://www.hm-treasury.gov.uk/media/D6678/ACF521.pdf>.

8 As discussed in the Treasury's 2004 Pre-Budget Report paragraph A36, Budget 2005 paragraph B36, and the 2005 Pre-Budget Report, paragraph A39.

9 Details of the Government Actuary's Department's methodology are available at <http://www.gad.gov.uk/Population/2004/methodology/pensionage.htm>. The effect on working age population of increasing numbers of women coming up to retirement age is only partly offset by the raising of the state retirement age for women, in 2010, which is then phased in up to 2020.

10 *Audit of Assumptions for the 2002 Pre-Budget Report*, HC 109, Session 2002-03, paragraph 4. The change in the projected growth rate of the working age population after 2006 was first noted in *Trend Growth: Recent Developments and Prospects*, HM Treasury, April 2002, Chapter 3.

11 *Audit of Assumptions for the 2005 Budget*, HC 452, Session 2004-05, paragraph 5.

## Trend growth between 2002 and 2005

**12** The period of the Rolling Review covers the four years since Budget 2002, from 2002 to 2005. The trend growth assumption used for fiscal projections over that period was 2½ per cent. One test of the caution of the assumption is how it compares to outturn growth rates. The assumption is the basis for projecting the fiscal position and the outturn determines it in practice.

**13** The actual average annual growth rate of non-oil GVA from 2002Q1 to 2005Q4 was 2.5 per cent, based on the latest Office for National Statistics data. It would be misleading, however, to compare this outturn growth rate with the assumption for the underlying rate, unless the output gap was the same at the start and end of the Rolling Review period.

**14** To take account of this issue, a better test of caution of the Treasury's trend growth rate assumption is a comparison with external estimates of underlying, rather than actual, growth rates. **Figure 2** shows estimates of the underlying growth rate made by various forecasting bodies.

**15** Figure 2 indicates that the Treasury's assumption of 2½ per cent per year over the period to end 2006 is equal to the average estimate made by external forecasters of 2.5 per cent, lower or equal to four of the estimates in Figure 2, and higher than one. On this basis, the assumption was reasonable and cautious, though other assumptions could have been adopted which would have introduced a greater degree of caution.

## Trend rate of output growth from 2006 onwards

**16** **Figure 3 overleaf** brings together current estimates of the underlying growth rate of the UK economy made by external organisations. The methods used to produce the estimates vary and each has a balance of advantages, as set out in my audit of the date of the end of the previous economic cycle for the 2005 Pre-Budget Report<sup>12</sup>.

## 2 External estimates of UK trend growth rate 2002 to 2005, per cent per year

	2002	2003	2004	2005	2002-2005
OECD <sup>1</sup>	2.6	2.5	2.6	2.6	2.6
EC <sup>2</sup>	2.7	2.6	2.7	2.8	2.7
OEF <sup>3</sup>	2.5	2.5	2.5	2.5	2.5
IMF <sup>4</sup>	2.8	2.6	2.5	2.6	2.6
NIESR <sup>5, 6</sup>	2.2	2.5	2.2	2.3	2.3
<b>Highest</b>	2.8	2.8	2.7	2.8	2.7
<b>Lowest</b>	2.2	2.5	2.2	2.3	2.3
<b>Average</b>	2.6	2.5	2.5	2.6	2.5

### NOTES

1 OECD Economic Outlook No: 78, December 2005.

2 EC Autumn Forecast 2005.

3 OEF Economic Outlook, January 2006.

4 IMF, Article IV database, March 2006, supplied by IMF.

5 NIESR Economic Review No: 195, January 2006.

6 The numbers in the table are approximations for the trend growth rate implied by output gap estimates made by the organisation and output growth.

**17** The Treasury's assumed underlying rate of growth for the fiscal projections of 2½ per cent up to 2006Q4 is equal to the 2.5 per cent average of estimates between 2002 and 2005, Figure 2, and lower than the average estimate of 2.6 per cent for 2006, Figure 3. The lower rate of 2¼ per cent for the underlying growth rate assumed for 2007 and beyond is below the lowest external estimate, of 2.4 per cent, for 2006-11 and is therefore cautious on this basis of comparison.

**18** Forecasts for future actual output growth also provide information about the validity of the assumed underlying growth rate. Most economic models constrain GDP growth to return to its trend or equilibrium growth rate in the medium term, and as a result, medium term projections can be used as one indicator of the underlying growth rate.

<sup>12</sup> *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraphs 28-31.

### 3 External estimates of the UK trend rate of growth (per cent, per annum) beyond 2005

Organisation	Estimated trend rate of growth	Period	Estimation methodology
OECD <sup>1</sup>	2.5	2006-2010	Production function
Economic Policy Committee <sup>2</sup>	2.8	2004-2010	Production function
EC <sup>3</sup>	2.7	2006-2007	Production function
IMF <sup>4</sup>	<b>2.6</b>	2006-2011	Production function
OEF <sup>5</sup>	2.5	2006-2009	Production function
NIESR <sup>6</sup>	<b>2.4</b>	2005-2013	Band-pass filter
Goldman Sachs <sup>7</sup>	<b>2.7</b>	2004-2014	On-trend extrapolation
PriceWaterhouseCoopers <sup>8</sup>	<b>2.5</b>	2004/5 – 2010/11	Model based
<b>Highest<sup>9</sup></b>	2.7	2006-2011	
<b>Lowest<sup>9</sup></b>	2.4	2006-2011	
<b>Average<sup>9</sup></b>	2.6	2006-2011	
<b>Average<sup>10</sup></b>	2.6	2006	

#### NOTES

1 An average of an estimate of trend growth rate of 2.6 per cent for 2006, Economic Outlook 78, and 2.5 per cent per year over 2007-2010, Economic Outlook 77 (Appendix I.1).

2 The Economic Policy Committee, Special Report No: 1/2006 (produced jointly by the EPC (ECOFIN) and EC).

3 EC Autumn forecast 2005.

4 Article IV Staff Report on the UK, Medium-term scenario, (trend growth rate as implied by output growth and the output gap forecasts over the period).

5 Economic Outlook, January 2006.

6 National Institute Economic Review No: 194, October 2005 and No: 195, January 2006, (trend growth rate as implied by output growth and the output gap forecasts over the period).

7 European Weekly Analyst, January 2006.

8 Economic Outlook, November 2005.

9 For the calculation of the minimum, maximum and average over the 2006-11 period only the estimates in bold have been taken into account due to data availability.

10 The average is for all eight estimates shown.

**19** Figure 4 presents the latest published independent forecasts to 2009 and 2010.

**20** Taking 2009 and 2010 together, by when the economic models are most likely to be converging on a trend rate, the median external forecast is for a growth rate of 2.6 per cent, which is higher than the Treasury's trend growth assumption of 2¼ per cent used when projecting the public finances. For 2009/10, only one estimate is lower than the Treasury's assumption; some three quarters of the estimates lie between 2.4 and 2.7 per cent. For earlier years, comparing the median forecast growth rate against the assumed rate of 2¼ per cent, expected growth is again higher, except in 2006 which is estimated by the Treasury

to be a below trend year. The Treasury's assumption of 2¼ per cent per year is therefore at the cautious end of the range of external forecasts.

**21** A measure of the effect of over-estimating the underlying growth rate for the purposes of the fiscal projections is given by a sensitivity calculation for the public finances. The Treasury estimates that raising the underlying growth rate by a ¼ percentage point a year would lead to higher tax revenues of about £1 billion in the first full year. This is equivalent to about a ¼ of one per cent of total public sector receipts.

#### 4 Medium-term forecasts of GDP growth (per cent, year-on-year) by independent forecasters

	2006	2007	2008	2009	2010	2009/2010 <sup>1</sup>
Williams de Broe	2.8	2.9	2.2	2.0	1.8	1.9
CitiGroup	2.1	2.4	2.5	2.3	–	2.3 <sup>2</sup>
Hermes	2.0	1.8	2.3	2.3	2.3	2.3
ING	1.9	2.3	2.8	2.5	2.5	2.5
HSBC	1.7	2.7	2.5	2.5	–	2.5 <sup>2</sup>
NIESR	2.3	2.7	2.6	2.5	–	2.5 <sup>2</sup>
ITEM Club	2.3	2.9	3.0	2.6	2.5	2.55
Moody's Economy.com	2.2	2.5	3.1	3.0	2.1	2.55
Cambridge Econometrics	2.0	2.8	3.1	2.7	2.5	2.6
Goldman Sachs	2.4	2.4	2.4	2.6	–	2.6 <sup>2</sup>
Bank of America	2.0	2.2	2.3	2.6	2.7	2.65
CEBR	2.5	2.1	2.5	2.8	2.5	2.65
Experian	2.3	2.5	2.5	2.6	2.7	2.65
OEF	2.1	2.8	3.2	2.8	2.5	2.65
Daiwa	2.2	2.8	3.2	2.8	2.6	2.7
Macroecon.com	2.6	2.7	2.7	2.7	–	2.7 <sup>2</sup>
Capital Economics	2.0	2.5	2.7	2.7	–	2.7 <sup>2</sup>
Global Insight	2.2	2.6	2.9	2.9	2.6	2.75
<b>Highest</b>	2.8	2.9	3.2	3.0	2.7	2.75
<b>Lowest</b>	1.7	1.8	2.2	2.0	1.8	1.9
<b>Median</b>	2.2	2.6	2.7	2.6	2.5	2.6

Source: HM Treasury, *A comparison of independent forecasts, February 2006*

#### NOTES

- 1 Calculated average for 2009 and 2010 where data available
- 2 Estimates are for calendar year 2009

## Privatisation Proceeds

**22** The convention adopted for the July 1997 Budget projections, reviewed for Budget 2000 and 2003<sup>13</sup>, was that for the purposes of projecting the public finances, only the proceeds of those sales that have already been announced will be included in the projections. "Privatisation proceeds" are for these purposes defined as sales by central government of businesses, either by flotation (including subsequent equity and debt sales) or trade sale.

**23** Over the Rolling Review period, there was only one announced sale included in the Treasury's fiscal projections. The proceeds of that sale were related to the repayment by QinetiQ of a loan note secured on the sale of specific properties<sup>14</sup>. I have confirmed that only proceeds relating to this sale were included in the fiscal projections over the Rolling Review period.

<sup>13</sup> HC 348, Session 1999-00 paragraphs 21-23; and HC 627, paragraphs 9-13.

<sup>14</sup> Relating to the £50 million of receipts described in *Audit of Assumptions for Budget 2003*, HC 627, Session 2002-03, paragraph 13.

**24** Figure 5 sets out the estimated profile of repayments included in successive fiscal projections over the Rolling Review period, and the profile as currently estimated. It shows that in the 2005 Pre-Budget Report, no proceeds were included for 2004-05 or the first half of 2005-06. That was because the repayments initially expected to occur during this period had been delayed. However, the Treasury did not adjust the expected profile of repayments in later years of the projection to reflect that delay.

**25** Figure 6 sets out the differences between actual (or latest estimated) outturn and projected privatisation proceeds, related to the one sale included in the fiscal projections within the three year Rolling Review period. A positive number in a given financial year means that the outturn was greater than projected. For example, Figure 6 shows that outturn receipts in 2005-06 were £30 million greater than expected when the projection was made at the time of Budget 2005.

**26** Figure 6 shows that there were differences in both directions between outturn and projection, indicating that the projections were not systematically over or under optimistic. The differences between outturn and projection are also very small in relation to total government revenues in excess of £1,350 billion over the years 2003-04 to 2005-06.

**27** The differences between forecast and outturn (or latest estimate) over the Rolling Review period are explained by differences in the profile of the repayment of the loan note, rather than by differences in the total amount to be repaid. For example, for Budget 2004, the £28 million shortfall in 2004-05 is offset by a combination of the £4 million greater than projected receipts in 2003-04 and part of the £31 million expected excess over projection in 2005-06. The differences were not, however, offsetting in the 2005 Pre-Budget Report projection, where outturns were on average higher than projected. While the projection was in this respect cautious, the Treasury should have revisited the estimated profile of repayments when the receipt that was expected to occur in 2004-05 was delayed.

## 5 Profile of privatisation proceeds included in fiscal projections, related to QinetiQ loan note repayment, £millions

	Budget 2003	PBR 2003	Budget 2004	PBR 2004	Budget 2005	PBR 2005	Latest <sup>1</sup>
2003-04	0	0	0	0	0	0	4
2004-05	28	28	28	28	28	0	0
2005-06	15	15	15	15	16	8	46
2006-07	7	7	7	0	7	7	0

Source: HM Treasury

### NOTE

1 Latest profile for repayment of the loan note by QinetiQ.

## 6 Differences between projected proceeds and outturn/latest estimates, £millions

	Projection in					
	Budget 2003	PBR 2003	Budget 2004	PBR 2004	Budget 2005	PBR 2005
<b>Outturn less projection for</b>						
2003-04	4	4	4	4	4	4
2004-05	-28	-28	-28	-28	-28	0
2005-06	31	31	31	31	30	38
2006-07	-7	-7	-7	0	-7	-7

Source: HM Treasury

### NOTES

1 Positive numbers show outturn/estimated outturns higher than forecasts, ie cautious forecasts.

2 The outturns for financial year 2005-06 are in part, and for 2006-07 entirely, projected.

**28** For the period ahead, the fiscal projections for Budget 2006 include proceeds of £393 million in 2005-06. These are the remaining repayments (£46 million) on the QinetiQ loan note arising from the sale of a minority stake in QinetiQ announced in December 2002 and £347 million of proceeds from the sale of QinetiQ shares announced in January 2006. The sale by BNFL of its Westinghouse subsidiary, worth \$5.4 billion, announced by the company in February 2006, is not a sale by central government and so does not fall within the definition of privatisation proceeds for the purposes of this audit. In terms of the Budget 2006 fiscal projections, the Westinghouse sale will be accounted for in the public corporations sector.

## Interest rates

**29** Assumptions for future interest rates are needed by the Treasury for projecting the cost of paying interest on central government debt, as well as for certain other elements of the fiscal projections, including some tax receipts. An increase in interest rates leads to higher central government net debt interest payments and to lower corporation tax receipts due to an increase in tax deductible interest payments made by corporations. This impact is offset by factors such as an increase in the taxable interest income earned by households and corporations.

**30** The Treasury estimates that the net impact of a one percentage point increase in short-term interest rates would be a deterioration in the public finances of about £200 million in the first full year. Over subsequent years, the positive impact from higher taxable interest income is estimated to rise, so that over the five-year projection period it would roughly offset the negative impact of higher debt interest payments and tax deductible interest payments by corporations. The Treasury notes, however, that these medium-term estimates do not take account of second round effects from higher interest rates via lower economic growth. The Treasury's view is therefore that the overall impact of higher interest rates on the public finances is negative.

**31** The convention is that for the purposes of projecting the public finances, three month forward interest rates will be based on market expectations, as calculated by Bloomberg. Bloomberg is a major commercial company, based in the United States and operating globally, which specialises in the provision of market data, news and analytical tools and whose services are widely used in financial circles. Specifically, the Treasury uses the implied forward interest rates derived by Bloomberg on the basis of the yield on interest rate swaps at different maturities<sup>15</sup>. The yields on interest rate swaps are compiled by Bloomberg from data supplied by a wide variety of market participants.

**32** The information on commercial forward interest rates from Bloomberg builds in an element of caution: the 'risk premium'<sup>16</sup> incorporated in these rates will be higher than that applied to government borrowing. Bloomberg data are also transparent, available to the public by subscription and regularly updated.

**33** **Figure 7 overleaf** shows the differences between projections for three month forward interest rates and outturns over the Rolling Review period since Budget 2003. The projection errors are generally small, and usually below 50 basis points, though they increase the further forward a projection is taken. More projections were above outturns than below. On the basis that higher interest rates are adverse for the public finances most clearly in the short term, the convention was cautious in this sense more often than not over the Rolling Review period. The largest error, for the Budget 2003 projection for 2004-05, resulted from a projection lower than outturn, however.

**34** Although the Bloomberg information is based on commercial interest rates, which incorporate a margin reflecting the risk of non-governmental borrowing, additional caution could be introduced by increasing this margin. Such an approach would however require a view to be taken of the extent of an additional premium and this would be a matter of judgement.

<sup>15</sup> The implied forward rates are calculated by comparison of two swap yields at different maturities, calculating the implied yield on a security that bridges the gap between them. So, the implied three month yield two years ahead is calculated on the basis of the actual yield on a swap with 24 months to maturity and one with 27 months to maturity.

<sup>16</sup> The risk premium is the compensation for holding a risky investment rather than a risk free one. Market instruments tend to be considered 'riskier' investments than government debt and thus carry a higher rate of interest to compensate the purchaser for the increased risk.

**7** Difference between Treasury assumption and outturn for three month interest rates, percentage points<sup>1</sup>

**Difference between projections and outturn in**

	2002-03	2003-04	2004-05	2005-06 <sup>2</sup>
Projections made for				
Budget 2003	0.02	-0.16	-0.81	-0.16
PBR 2003		0.02	0.09	0.71
Budget 2004		0.00	-0.13	0.41
PBR 2004			0.03	0.25
Budget 2005			0.03	0.49
PBR 2005				0.00

Source: HM Treasury, Office for National Statistics and Bloomberg

**NOTES**

- 1 A positive number indicates that projections were higher than outturn.
- 2 Differences for 2005-06 are based on an outturn calculated as the average of daily rates for the 2005-06 financial year up to 13 March 2006.

**35** I consulted a number of external organisations to compare the methods they use for projecting interest rates with the Treasury's. The Bank of England, the National Institute of Economic and Social Research, Oxford Economic Forecasting Ltd, and Morgan Stanley, which collaborates with the Institute of Fiscal Studies in the preparation of the latter's Green Budget, all confirmed that a yield curve approach is a reasonable one. The method does rely, however, on the hypothesis that implied market forward interest rates closely correspond to the expectations of future policy rates held by market participants, and that financial markets are efficient in incorporating the available information into the forward prices of financial instruments. The Bank of England estimates yield curves using its own methodology<sup>17</sup>, and its projections are very similar to those used by the Treasury.

**36** Some organisations use other methods for projecting interest rates, for example, based on the size of the output gap, forecast inflation and other economic variables<sup>18</sup>. Simple versions of such approaches for projecting interest rates include rules which describe how interest rates have been adjusted in the past by the authorities in respect of factors, such as the difference between actual inflation

and the target. These methods are based on partial data, compared to the yield curve method, which in principle takes in all available information. As in my audits for the July 1997 Budget Projections and for Budget 2000 and 2003, I have no reason to believe that alternative methods offer superior results to those resulting from the adopted yield curve methodology.

**The direct taxation compliance package**

**37** In Budget 2003, the Inland Revenue<sup>19</sup> introduced a new spend to raise compliance and enforcement package for direct tax and national insurance contributions comprising seven specific initiatives at an estimated cost of £66 million. It provided for additional staff to be deployed in new specialist teams, backed up by new IT and the use of outside legal and other expertise, to:

- protect the Exchequer from non-payment of tax and national insurance contribution debts and from failure to file tax returns;
- tackle fraud involving concealment of undeclared income or profits offshore; and
- counter avoidance of corporation tax and of national insurance contributions and tax on earnings.

**38** The Inland Revenue expected that the package would produce additional revenue in three ways:

- direct effects in terms of revenue as a result of the extra Inland Revenue activities in relation to the tax affairs of individuals and companies, or the schemes that they use;
- preventive effects, as these individuals or businesses become more compliant in future years; and
- indirect/deterrent effects, as other individuals and companies improve their compliance as they learn of the new measures being undertaken.

**39** On the grounds of caution, given the uncertainties about the size of the deterrent effects, the Treasury included only the direct and the preventive effects of the package in the fiscal projections<sup>20</sup>. The Inland Revenue estimated at the time of Budget 2003 that these revenue impacts would be £1,370 million over the three years to 2005-06, mainly comprised of the direct impact of the measures, **Figure 8**.

17 Martin Brooke, Neil Cooper and Cedric Scholtes, *Inferring market interest rate expectations from money market rates*, Bank of England Quarterly Bulletin, November 2000, pp 392-402, available at <http://www.bankofengland.co.uk/publications/quarterlybulletin/qb000404.pdf>.

18 David Miles, Vladimir Pilonca, Melanie Baker, *What Should Equities and Bonds Be Worth in a Risky World*, Morgan Stanley Equity Research, 12 September 2005.

19 In April 2005, a new Department was created - HM Revenue and Customs (HMRC) - which brought together most of the functions of the Inland Revenue and HM Customs and Excise.

20 HC 627, Session 2002-03, paragraph 47.

**8** Treasury Budget 2003 forecasts of the direct and preventive effects of the package, £millions

	2003-04	2004-05	2005-06	Total 2003-04 to 2005-06
Direct	170	555	560	1,285
Preventive	–	15	70	85
<b>Total</b>	<b>170</b>	<b>570</b>	<b>630</b>	<b>1,370</b>

Source: HM Treasury

**40** I concluded in my review of assumptions for Budget 2003 that the projections of additional revenue in Figure 8 were reasonable and incorporated caution, but that there were uncertainties and judgements underlying the projected impact. I therefore recommended that the Inland Revenue should take account of its monitoring information on a timely basis to ensure that the projections were revised if they appeared not to be cautious in practice<sup>21</sup>.

**41** HM Revenue and Customs has collected data to monitor outturn yield. The Department has developed databases to record the yield achieved in individual cases, to assist in monitoring the performance of spend to raise initiatives. In addition it has carried out comparisons of yield before and after spend to raise activities commenced. It has also assessed the validity of key assumptions made when targets were originally set in 2003.

**42** This work showed that the projections made at the time of Budget 2003 did need to be adjusted to take account of both shortfalls and greater than expected yields in particular financial years in the rolling review period. **Figure 9** shows the differences between projected and estimated outturn yields, based on the monitoring data.

**43** Figure 9 indicates that yield in the first year was less than expected, with a shortfall of £54 million. While yields were higher than expected in later years, the shortfall in 2003-04 arose because:

- the HM Revenue and Customs processes for handling some cases of non-compliance did not initially operate as effectively as possible. The Department subsequently revised its procedures to improve the speed with which cases were handled;

**9** Projected and estimated outturn yield, direct and preventive effects of the Budget 2003 package, £millions

	2003-04	2004-05	2005-06
Additional yield in the year as projected at the time of Budget 2003	170	400	60
Estimated outturn Incremental Yield	116	432	83
(Shortfall)/Surplus of projection compared to estimated outturn	(54)	32	23

Source: HM Revenue and Customs

- HM Revenue and Customs experienced some delays in recruiting the required number of appropriately experienced and qualified staff to undertake the planned work, and there were delays before some of the initiatives were fully operational; and
- some of the original assumptions supporting the forecast of future yields were too optimistic. These assumptions surrounded the levels of non-compliance that could be tackled under these initiatives.

**44** HM Revenue and Customs' calculations of the difference between the Budget 2003 projections and estimated outturn for each year are shown in Figure 9, and each year the Treasury revised the fiscal projections for future years to reflect the estimated outturn.

**45** **Figure 10 overleaf** sets out this process. For example, HM Revenue and Customs originally projected that the package would yield £170 million in 2003-04. But the estimated outturn for 2003-04 was £116 million, and the shortfall of £54 million was reflected in the Treasury's revision of the projected yield for 2004-05. Thus the projected yield for 2004-05 was the estimated outturn for 2003-04 of £116 million, plus additional yield of £400 million, making a total of £516 million.

**46** Allowing for this continued updating of the projections to take account of estimated outturn yield in earlier years, the total projected yield of the package for the purposes of the fiscal projections was £1,294 million, see Figure 10.

21 HC 627, Session 2002-03, paragraph 56.

**10** Projections of additional yield in-year made at the time of Budget 2003; revised estimates of additional in-year yield based on estimated outturns; and total yield assumed for the fiscal projections, £millions

	2003-04	2004-05	2005-06	
Budget 2003 estimate of <b>additional</b> yield in the year	170	400	60	
Estimated outturn <b>additional</b> yield in the year	116	432	83	
Estimated (Shortfall)/Surplus	(54)	32	23	
<b>Total</b> projected yield for the year, assumed for the fiscal projections, taking account of shortfalls and surplus revenue, being the sum of:				
Contribution from 2003-04	170	116	116	
Contribution from 2004-05	0	400	432	
Contribution from 2005-06	0	0	60	
Total assumed yield for year	170	516	608	
<b>Total assumed over the rolling review</b>				<b>1,294</b>

Source: HM Revenue and Customs data

**47** HM Revenue and Customs estimates that the actual yield of the package was very close to this amount, at £1,295 million, **Figure 11**. This reflects the fact that the shortfall and surplus yields identified through the monitoring information almost exactly offset each other. The shortfall of £54 million in 2003-04 was offset by surpluses of £32 million in 2004-05 and £23 million in 2005-06, a total surplus of £55 million.

**48** This offsetting indicates that the original estimates of yield made for Budget 2003 were not systematically under or over estimated. Had the estimates been systematically optimistic, for example, a cumulative shortfall would have developed. In this respect, the estimates made at the time of Budget 2003 were therefore reasonable.

**49** At the time of Budget 2003 the cumulative revenue over the rolling review period was expected to be £1,370 million, **Figure 8**. This is £75 million higher than estimated outturn taking account of monitoring information of £1,295 million shown in **Figure 11**. While this indicates that the original forecasts were not cautious, outturn being lower than the projections, the approach of updating the projections each year in the light of monitoring information was a prudent one. Had the projections not been adjusted and had they been systematically optimistic or pessimistic, greater errors would have occurred.

**11** Estimated outturn revenue impact of the 2003 package, £millions, as applicable for the fiscal projections excluding deterrent effects

	2003-04	2004-05	2005-06	Total
Direct	116	530	581	<b>1,227</b>
Preventive	-	18	50	<b>68</b>
<b>Total of which:</b>	<b>116</b>	<b>548</b>	<b>631</b>	<b>1,295</b>
Estimated outturn in 2002-03 continuing	116	116	116	348
Estimated outturn in 2004-05 continuing	0	432	432	864
Estimated outturn in 2005-06 continuing	0	0	83	83

Source: HM Revenue and Customs data

**50** The usefulness of the Treasury's updating of its projections depends on the accuracy of both HM Revenue and Customs' estimates of outturn and the assumption that yield in one year will continue at the same level in subsequent years.

**51** I have audited the methodology used by HM Revenue and Customs to estimate the yield achieved over the three years of the initiative. The work involved examining underlying records to determine whether the yield achieved in a sample of cases had been estimated accurately and that yield had not been double counted in other elements of the package. My examination involved detailed testing of the yields accruing across each of the three years of the initiative and provides assurance that the yields in Figure 11 are fairly reported. Whilst an element of judgement is necessary in coming to a conclusion, the HM Revenue and Customs methodologies were reasonable and applied soundly.

**52** The Treasury has told me that no additional revenue impact from the compliance package is assumed beyond 2005-06. The activities undertaken as part of this package will now be subsumed within the wider work that HM Revenue and Customs is undertaking to improve taxpayer compliance as part of its Public Service Agreement targets. The Treasury will therefore not estimate separately the continuing yield from the Budget 2003 initiative. I have not been asked to audit the possible future contribution of the Budget 2003 measures as part of the impact of HM Revenue and Customs compliance measures as a whole.

## Tobacco revenues

**53** The assumption I audited for Budget 2003 concerning forecasts of revenue from duty on tobacco was that:

- For the purposes of projecting the revenue from duties on tobacco, the underlying market share of smuggled cigarettes will be set at least at the latest published outturn<sup>22</sup>.

**54** The assumption replaced previous assumptions used and audited in Budget 2000 and the 2002 Pre-Budget Report<sup>23</sup>, following the introduction of a new Tobacco Strategy in November 1999. As part of the Strategy HM Customs and Excise, now HM Revenue and Customs, was set targets to slow, stabilise and then reduce the growth in tobacco smuggling, as measured by the percentage market share taken by smuggled cigarettes. The original assumption was based on estimates of the revenue effects of individual Strategy measures. The purpose of the revised

assumption introduced in 2003 was to reflect the latest available evidence on the market share taken by smuggled cigarettes (now referred to as the illicit market share)<sup>24</sup>.

**55** At Budget 2003, I concluded that the assumption was a reasonable one to adopt at that time in the light of outturn data on the smuggled market share and duty receipts, and that it was cautious to the extent that the new projections for Budget 2003 would take no account of expected further reductions in the smuggled market share<sup>25</sup>.

**56** The Budget 2003 assumption would normally fall due for a three year Rolling Review in Budget 2006 to check whether it was reasonable and cautious over that three year period and to confirm that the assumption remains reasonable and cautious going forward. HM Revenue and Customs has published an estimate of the smuggled market share for 2003-04 but has not yet published an estimate for 2004-05 because it has not been able to produce a firm estimate for that year. As firm data are only available for the first year of the three year period it is not possible to conduct a Rolling Review in the normal way. The Treasury has instead asked me to review the available evidence for 2003-04, the issues that have arisen in producing an estimate for 2004-05 and the steps being taken to resolve these, with a view to carrying out the full Rolling Review at Budget 2007.

## The evidence available on the performance of the assumption

**57** Estimates of the illicit market share are derived from:

- estimating total UK consumption of cigarettes from trends in Office for National Statistics (ONS) surveys of consumers, which are adjusted for under-reporting by survey respondents;
- deducting legitimate UK duty-paid consumption based on HM Revenue and Customs data;
- deducting estimates of legitimate cross border shopping, based on surveys of international passengers and trade data on sales of duty free goods; and
- assuming that the residual element represents the illicit market share.

22 *Audit of Assumptions for Budget 2003*, HC 627, Session 2002-03, paragraph 33.

23 *Audit of Assumptions for the March 2000 Budget*, HC 348, Session 1999-00, paragraph 4; HC 109, Session 2002-03, paragraph 30.

24 The formulation of the assumption in 2003 referred to a 'smuggled' share. HM Revenue and Customs now refers to 'illicit' share, but this does not involve a change of substance for the fiscal projections.

25 HC 627, paragraph 55.

**58** HM Revenue and Customs has published at each Pre-Budget Report, until 2005, its provisional estimate of the illicit market share for the preceding financial year. These provisional estimates have been based on cigarette consumption data derived from an ONS Omnibus Survey. The separate ONS General Household Survey produces further data the following year, and HM Revenue and Customs uses this to finalise the estimate, which is then published at the following Pre-Budget Report<sup>26</sup>. So, for example, a provisional estimate for the 2001-02 smuggled market share was published in November 2002<sup>27</sup> and this formed the basis for the Budget 2003 forecasts.

**59** Under the formulation of the assumption the Treasury would not reduce the forecast smuggled share if in-year revenue receipts indicated a smaller share than the most recently published level. If on the other hand there were indications of a growing illicit market share it would increase the forecast level<sup>28</sup>. The Treasury indicated it would not specify in advance precisely how such an increase would be reflected in the projections because that would depend on the size of the increase, the reasons and the expected trend. I concluded therefore that to ensure transparency it was important that the Treasury should set out in each Budget and Pre-Budget Report the shares that have been used in the forecast<sup>29</sup>. This has been done. The published estimates and the illicit market shares used in the forecasts are shown in **Figure 12**.

**60** At Budget 2003, the Treasury used in the forecast for 2003-04 onwards an illicit market share of 21 per cent. This matched the level calculated at that time for 2001-02, the most recent year for which ONS survey results were available. The forecast of an illicit market share of 21 per cent was a marginal increase on the 20 per cent for the previous year, provisionally indicated at that time by the level of receipts in 2002-03.

**61** With the benefit of more recent data, including data on consumption drawn from the ONS surveys, HM Revenue and Customs now assesses that the share actually rose from 15 per cent in 2002-03 to 16 per cent in 2003-04. In practice therefore the Budget 2003 audited assumption in the tobacco duty forecast for 2003-04 implied a growth of six percentage points in the illicit market share, representing the difference between the 15 per cent in 2002-03 and the 21 per cent forecast for 2003-04, **Figure 13**. The actual increase was one percentage point, rising from 15 per cent in 2002-03 to 16 per cent in 2003-04.

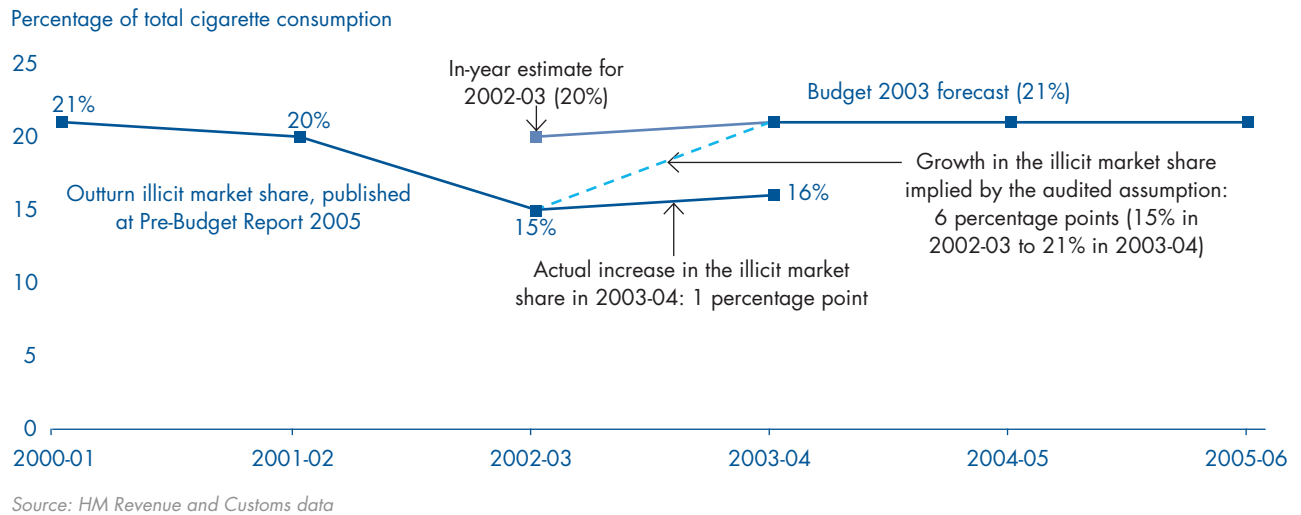
**12** The outturn estimates of illicit market share (per cent) of cigarette consumption used in subsequent Budget forecasts of Tobacco Duty revenues

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
	Outturn estimates:			Forecasts:					
As at Budget 2003 (using PBR-2002 estimate)	21	21	→	21	21	21			
As at Budget 2004 (using PBR-2003 estimate)	21	20	18	→	18	18	18		
As at Budget 2005 (using PBR-2004 estimate)	21	20	15	14.5	→	14.5	14.5	14.5	
As at Budget 2006 (using PBR-2004 estimate)	21	20	15	16	→		16	16	16

Source: HM Revenue and Customs data

26 *Measuring Indirect Tax Losses 2005*, paragraph 3.15.  
 27 *Measuring Indirect Tax Losses 2002*, paragraph 3.30.  
 28 HC 627, Session 2002-03, paragraph 37.  
 29 HC 627, Session 2002-03, paragraphs 37, 55.

**13** Outturn estimates of the cigarette illicit market share (per cent of total consumption), and the assumed illicit market share in the 2003 Budget forecast



**62** The caution in the way the assumption operated for 2003-04, with its assumed steeper rise in the illicit market share, resulted in this component of the forecast under-estimating receipts by £0.5 billion. Overall tobacco duty revenues in 2003-04 (£8.1 billion) were, however, closer to the forecast level (£8.0 billion) because the outturn of other components of the tobacco duty forecast – consumption, duty per cigarette and cross border shopping – differed from in-year estimates and the assumed growth of those components. Together they contributed a shortfall of £0.4 billion against the receipts forecast.

**The difficulties encountered in estimating the illicit market share for 2004-05**

**63** As in previous years, in late 2005 HM Revenue and Customs calculated the 2004-05 illicit market share based on the ONS Omnibus Survey data. Its analysis indicated an increase in the illicit market share which it regarded as infeasibly high, and cast doubt on its reliability as an estimate of the illicit market share. Because of this

uncertainty, it did not publish the result in the 2005 Pre-Budget Report. It acknowledges the possibility that the illicit market share may have increased in 2004-05, but some analysis also indicates that the trend is broadly flat. The anomalies identified by HM Revenue and Customs in its analysis of the 2004-05 illicit market share are:

- the apparent upward trend in the illicit market share from 2003-04 is at odds with data collected by the Tobacco Manufacturers' Association on non-duty paid consumption (both illicit activity and cross-border shopping), which indicates a flat trend, albeit at a higher level than indicated by HM Revenue and Customs' estimates;
- the methodology by which HM Revenue and Customs uses ONS Omnibus Survey data to estimate the illicit market share implied a rising prevalence in smoking, but this was unlikely because it was at variance with a longstanding declining trend shown by the surveys; and

- HM Revenue and Customs' model for estimating the illicit market share assumes no change from year to year in the number of cigarettes consumed per smoker. However, if a reducing personal consumption rate is taken into account, as indicated in the latest ONS survey data, this would suggest a flat rather than a rising trend in the illicit market share. It would also suggest much lower illicit market shares than indicated by the Department's existing methodology, and by data from the Tobacco Manufacturers' Association<sup>30</sup>. A significantly lower level of illicit market share would, however, suggest a greater level of under-reporting by ONS survey respondents about their personal cigarette consumption than previously thought, and reflected in HM Revenue and Customs' existing methodology.

### Action by HM Revenue and Customs to resolve the problems

**64** As a result of these anomalies, HM Revenue and Customs does not currently have a robust estimate of the illicit market share in 2004-05. The Department, with assistance from the ONS, is now undertaking further research to establish a better assessment of under-reporting by survey respondents and smokers' consumption levels, to produce a more robust assessment of the illicit market share of the cigarette market, with a view to publishing an estimate of the illicit market share for 2004-05 in the 2006 Pre-Budget Report. It also expects that by Budget 2007 it will have outturn data for the three years 2003-04 to 2005-06 which would permit a fuller assessment of the 2003 assumption at that stage. The Treasury has therefore indicated that it will ask me to conduct the Rolling Review audit of the 2003 assumption at Budget 2007.

**65** As a forecast is required, the Treasury is continuing with the 2003 assumption for Budget 2006 while HM Revenue and Customs completes its further work during 2006. It is forecasting an illicit market share of 16 per cent for each of the three years from 2006-07 onwards – the same figure as for 2003-04 that remains the most recently published outturn. It is doing so on the basis that the outturn results for 2003-04 indicated a broadly stable illicit market share and that some of the additional analysis carried out on the 2004-05 data also suggests a flat trend. The Treasury also considers that the additional measures that HM Revenue and Customs is taking to tackle tobacco smuggling, announced in the 2005 Pre-Budget Report, will help to reduce the level of illicit activity.

**66** There are, however, uncertainties about both the level of the illicit market share and the trend, which make it difficult to determine the most appropriate percentage market share to use in the forecasts. For Budget 2006 the Treasury is assuming that the illicit market share for 2005-06 and 2006-07 stays flat at 16 per cent. If the share actually grows over this period then, other things being equal, the Treasury's forecast of revenue for 2006-07 will have been over-estimated by £0.1 billion for every 1 percentage point by which the illicit market share grows. However, the existing assumption retains the flexibility, at each Budget and Pre-Budget Report, to increase the assumed level of the illicit market share if in-year receipts, operational data or survey results indicate this to be necessary, which would allow revisions to the forecasts for 2007-08 and beyond.

## Conclusions and recommendations

### The underlying growth rate

**67** Over the four year Rolling Review period since 2002, the rate assumed for underlying or trend growth for the purposes of making the fiscal projections was 2½ per cent per year up to end 2006. This assumption is equal to the average estimate of trend growth rates between 2002 and 2005 made by external forecasters, with more of the external estimates higher than the Treasury's than lower. On this basis, the assumption was reasonable and cautious, though other assumptions could have been adopted which would have introduced a greater degree of caution. Looking forward, the Treasury assumption of 2¼ per cent from 2007 onwards is at the bottom of the range of external estimates, for both the underlying growth rate itself and for projected actual growth in the longer term. On this basis, the Treasury assumption currently appears reasonable and cautious although estimates of the underlying trend growth rate incorporate broad margins of uncertainty and should be kept under review.

### Privatisation receipts

**68** Over the Rolling Review period actual receipts of privatisation proceeds have varied from the projections made, though not in a way that might indicate systematic over or under forecasting, as outturns were both higher and lower than expected. The sums involved were small in relation to total government revenues. There was,

30 *Measuring Indirect Tax Losses 2005*, para 3.18.

however, a concerning lack of effective monitoring of the projected proceeds over the Rolling Review period. In part this reflected the relatively small sums involved. Looking forward, the Budget 2006 projection includes substantial expected proceeds relating to QinetiQ and the sale by BNFL of its Westinghouse subsidiary and I therefore recommend that the Treasury puts in place improved monitoring arrangements to ensure that any changes to the size or profile of receipts are identified in a timely manner. The convention for the fiscal projections, that account is taken only of announced sales, remains a reasonable one based on being cautious.

### Interest rates

**69** The methodology used by the Treasury relies on market information about future interest rates, and is a reasonable approach based on economic theory, though depending on the hypothesis that financial markets are efficient. The use of information about commercial financial instruments introduces an element of caution as the risk premium on such securities is greater than that applicable to government borrowing. For the Rolling Review period since 2003, projections exceeded outturns more often than not, thereby introducing caution to this extent so long as higher interest rates have an adverse effect on the public finances as estimated by the Treasury. For the future there is no obviously better approach to making the projections of interest rates, though it will introduce some errors as in the past.

**70** The Treasury should nevertheless continue to build its technical links with the Bank of England, which is a centre of expertise on the subject, for example, on the issue of whether there are any systematic reasons why outturn interest rates have not always matched projections, including evidence on the size of any risk premium that may be incorporated in market forward interest rates.

### The Budget 2003 direct taxation compliance package

**71** The projections of yield over the Rolling Review period were reasonable and the method adopted to make adjustments to the projections in the light of outturn evidence was a helpful one to ensure caution. For the future, the activities undertaken within the Budget 2003 compliance package will be subsumed within the wider work that HM Revenue and Customs is undertaking to improve taxpayer compliance. The Treasury has therefore not separately forecast the revenue from the initiative beyond 2005-06 and I have not been asked to audit any such contribution to tax revenues.

### Tobacco revenues

**72** The revised assumption for forecasting tobacco revenues introduced at Budget 2003 added caution to the forecast for 2003-04. However, problems in obtaining a reliable estimate of the illicit market share for 2004-05, and the absence of an estimate for 2005-06, mean that it is not possible to conclude whether the assumption has proved reasonable and cautious over the three year period as a whole or whether it remains so for future forecasts. HM Revenue and Customs has work in hand to resolve anomalies identified in the data that it uses to estimate the illicit share of the cigarette market. In the light of these difficulties the Treasury has indicated that it will ask me to complete the Rolling Review audit at Budget 2007, when the results of that work should be available.

**73** I recommend that in taking forward that further analysis, HM Revenue and Customs and the Treasury:

- establish a clearer assessment of changing patterns in smokers' average consumption that underpin the estimates of cigarette consumption. This should take account of any changing propensity for survey respondents to under-report their smoking; and
- review the relative usefulness of the different data sources available and how they might each contribute to estimating the trend and level of the illicit market share, including the compatibility of the estimates using the General Household Survey with those from the Omnibus Survey.



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