Trend growth: new evidence and prospects

December 2006

HM TREASURY

HM TREASURY

Trend growth: new evidence and prospects

December 2006

HMSO
Licensing Division
St Clements House
2-16 Colegate
Norwich
NR3 1BQ

Fax: 01603 723000

E-mail: hmsolicensing@cabinet-office.x.gsi.gov.uk

HM Treasury contacts

This document can be found on the Treasury website at:

hm-treasury.gov.uk

For general enquiries about HM Treasury and its work, contact:

Correspondence and Enquiry Unit
HM Treasury
1 Horse Guards Road
London
SW1A 2HQ

Tel: 020 7270 4558
Fax: 020 7270 4861
E-mail: public.enquiries@hm-treasury.gov.uk

ISBN-10: 1-84532-224-X
ISBN-13: 978-1-84532-224-3

Printed by The Stationery Office 12/06 349606

Printed on at least 75% recycled paper.
When you have finished with it please recycle it again.

PU087

Contents

SUMMARY

1.1 The economy's trend (or potential) level of output is the level that puts no upward or downward pressure on inflation, and the economy's trend rate of growth is the rate at which output can grow, on a sustained basis, without exerting any inflationary pressures. The observed level of output comprises both cyclical and trend components. Temporary cyclical factors influence deviations of the economy from trend, whereas only more permanent factors affect trend output.

1.2 There are a range of approaches to estimating and projecting trend growth. The Treasury's approach is to project the economy's overall trend rate of growth by projecting forward the underlying components. Trend output growth is composed of two key variables – growth in output per hour (productivity) and growth in the number of hours worked. In turn, growth in the number of hours worked can be decomposed into: growth in population of working age; growth in the employment rate; and growth in the average number of hours worked per person in employment. This means trend output growth is determined by four variables which can be analysed separately:

- productivity;
- average hours;
- employment rate; and
- working-age population.

1.3 The Treasury's neutral projection for the economy's trend rate of growth between 2001Q3 and 2006Q4 was set at 2¾ per cent in Budget 2002, and has since been maintained, although some small offsetting changes have been made to its components. The rationale for this 2¾ per cent projection was set out in detail in a Treasury paper published alongside Budget 2002.[1] From 2006Q4 onwards the effect of post-war baby-boom women reaching State Pension age was expected to cause a drop in working-age population growth of ¼ percentage point. As a result, the neutral rate of trend output growth was expected to slow to 2½ per cent a year in the post-2006 period.

1.4 This paper sets out the Treasury's revised assessment of trend output growth post-2006, following a number of significant new data releases. Recent new data on output, productivity and employment reinforce confidence in the Treasury's post-2001 projections for the components of trend output growth. In particular, data for actual growth in productivity have been revised up to an average of 2.4 per cent a year between the 2001 on-trend point and 2006Q3, clearly above its trend projection of 2.15 per cent. However, because actual productivity growth is influenced by cyclical factors, the Treasury's approach is to wait until a distinct phase of the cycle has come to an end before fully reassessing the trend rate of productivity growth. So while this evidence adds to the confidence in the trend growth assumption, it is not enough to lead to an upward revision at this point.

1.5 There has also been significant new evidence published since Budget 2006 on migration flows and population trends. This evidence is strong enough to lead the Treasury to revise the current working-age population projection for the post-2006 period. Analysis of these new data support a higher contribution of net inward migration to growth in working-age population post-2006, leading to an upward revision to working-age population growth

[1] *Trend Growth: Recent Developments and Prospects*, HM Treasury, April 2002, sets out the approach to estimating and projecting trend growth. See http://www.hm-treasury.gov.uk/media/D6678/ACF521.pdf.

post-2006 from 0.4 per cent to 0.6 per cent a year. This upward revision offsets the downward effect of post-war baby-boom women retiring that was previously driving the fall in the trend output growth assumption post-2006. Therefore, the upward revision to working-age population growth implies an increase in the post-2006 *neutral* estimate of trend output growth from 2½ per cent to 2¾ per cent a year.

Comparison with external estimates

I.6 This conclusion brings the Treasury's estimate of trend output growth into line with a number of external independent forecasters, including the OECD and NIESR, that have recently revised up their estimates of trend output growth post-2006. The Treasury's revised neutral estimate of trend output growth of 2¾ per cent a year for the post-2006 period is within the 2.6 per cent to 2.9 per cent range of external estimates cited in Table 1 (and discussed in Section 5).

Table 1: Estimates of UK trend output growth over the medium term (per cent, per annum)[1]

Organisation	Estimated trend rate of growth	Period
HM Treasury (neutral)	2¾	2007–2011
OECD	2.7	2006–2008
EU Economic Policy Committee	2.8	2004–2011
European Commission	2.7	2006–2007
IMF	2.6	2006–2011
Oxford Economics	2.7	2006–2010
NIESR	2.6	2006–2014
Goldman Sachs	2.9	2005–2010

[1] For source and methods see Table 4.

I.7 Moreover, external estimates of trend output growth cited in this paper are typically defined in terms of whole economy GDP, whereas the Treasury defines trend output growth in terms of non-oil gross value added (GVA). The difference between the trend rate of growth of whole economy GDP and non-oil GVA is essentially accounted for by North Sea output (oil and gas production). The Treasury is currently projecting an average rate of decline in North Sea output of about 3 per cent a year between 2006 and 2011, reflecting a stronger underlying downward trend for existing fields partly offset by the contribution from new fields coming on stream over the next two years. This implies the Treasury's post-2006 neutral estimate of trend output growth would be slightly below 2¾ per cent on a whole economy GDP basis.

Trend growth and the public finances

I.8 The Government's well established practice is to base the public finance projections on a *cautious* trend rate of growth, which is ¼ percentage point below the neutral estimate. The upward revision to the neutral estimate implies an equal upward revision to the cautious estimate from 2¼ to 2½ per cent a year in the post-2006 projection period. The revised cautious assumption of 2½ per cent would be 2.4 per cent if translated on to a whole economy GDP basis, so materially below the range of external estimates, which reinforces the caution in the assumption when compared with external estimates.

I.9 As required by the Code for Fiscal Stability, this 2½ per cent a year post-2006 trend output growth assumption has been audited by the National Audit Office (NAO). The NAO concludes that: *"The Treasury's revised underlying growth rate assumption adopted for the fiscal projections, ¼ percentage points below the Treasury's neutral estimate, is below the range* *of external forecasts of the long-term growth rate. It is also at or below the average of external forecasters' medium term growth projections. On this basis the revised assumption is reasonable and cautious".*[2]

Structure of the paper

1.10 This paper updates the analysis in the 2002 paper and sets out the rationale and reviews the evidence for revising up the working-age population projection, and thus the Treasury's neutral estimate of trend output growth from 2006Q4 onwards. The focus of the analysis is mainly on the neutral projection, rather than the cautious assumption used for projecting the public finances and subject to NAO audit.

The paper is set out as follows:

- **Section 2** summarises the Treasury's approach to estimating and projecting trend output growth.
- **Section 3** reports on the main new evidence, including National Accounts revisions and migration data, published since Budget 2006, and reconsiders the projections of the components of trend growth – labour productivity, average hours, the employment rate and working-age population.
- **Section 4** draws together the implications for trend output growth based on the analysis of the recent evidence.
- **Section 5** compares the Treasury's new projection of trend output growth with estimates produced by external organisations.

[2] *Audit of Assumptions for the 2006 Pre-Budget Report*, NAO, 6 December 2006.

2 TREASURY APPROACH TO ESTIMATING AND PROJECTING TREND GROWTH

2.1 The rate of trend (or potential) output growth is the rate at which the economy can grow on a sustained basis without putting upward or downward pressure on inflation. Many factors influence the observed rate of economic growth. Some, such as changes in confidence, demand conditions in the UK's trading partners, and the stance of monetary and fiscal policy, have temporary effects on economic growth. Other factors, such as the fundamental drivers of productivity growth, and the rate of growth and structure of the population, have permanent effects.

Methodology

2.2 The Treasury assesses trend growth in the economy on the basis of non-oil GVA. The Treasury's trend output growth projections would currently be slightly lower if, like most external institutions, they were defined in terms of GDP rather than non-oil GVA, as discussed in detail in Section 5.

2.3 There are a number of approaches to estimating and projecting trend growth. The method employed by the Treasury in projecting the economy's trend rate of growth is a 'bottom up' approach based on building up the forward projection for trend output growth beyond a previous on-trend point by using forward projections of the underlying determinants. The underlying components that influence trend economic growth can be grouped under those that determine output per hour and those that determine employment:

- trend labour productivity measured in terms of output per hour worked;
- trend average hours worked per worker;
- the trend proportion of the working-age population in employment (the employment rate); and
- the working-age population.

2.4 The projections for the components from a previous on-trend point are informed by recent evidence, internal and external analysis, and, in the case of the working-age population projection, by external Government Actuary's Department (GAD) assumptions.[1] The Treasury also maintains the practice of not assuming gains from future policies before they are realised, by basing projections on past performance.

Practice

2.5 The Treasury's practice has been to review the overall trend growth projection fully after making a judgement that a distinct phase of the cycle has come to an end, in order to abstract from cyclical influences on the data. The Treasury last undertook a full assessment of trend output growth at Budget 2002[2] when the up-phase of the current economic cycle, which commenced in the first half of 1997,[3] was judged to have reached an end in 2001Q3.

2.6 In Budget 2002 the Treasury's neutral estimate of the economy's trend rate of output growth between 2001Q3 and 2006Q4 was set at 2¾ per cent a year, and this projection has since been maintained. Beyond 2006 trend output growth was projected to slow to a rate of

[1] Though responsibility for official population projections has recently been transferred from GAD to the Office for National Statistics (ONS).

[2] *Trend Growth: Recent Developments and Prospects,* HM Treasury, April 2002. See http://www.hm-treasury.gov.uk/media/D6678/ACF521.pdf

[3] Following significant revisions to non-oil GVA data released by the ONS in June 2005, the Treasury revised its provisional judgement that the current economic cycle began in the first half of 1997, rather than in 1999. This assessment was set out in *Evidence on the UK economic cycle*, HM Treasury, July 2005. See http://www.hm-treasury.gov.uk/media/2E6/A5/economic-cycles 190705.pdf.

2½ per cent a year due to the demographic effects of post-war baby boom women reaching State Pension age and depressing the growth in working-age population by a ¼ percentage point. This is a demographic effect which is not driven by cyclical factors.

2.7 Since then the Treasury has made small offsetting adjustments to the underlying components of trend growth, within an unchanged overall trend output growth projection (see Table 2), as new information has emerged. Up until Budget 2006 the evidence was not sufficiently compelling to support any revision to the overall trend output growth projection within the cycle.

2.8 Since Budget 2006 there have been significant new data releases on migration flows and population trends. These affect the post-2006 trend growth assumption and are demographic rather than cyclical effects, so can be properly reassessed before the end of the cycle. Therefore, the Treasury is now reviewing the change in the post-2006 trend growth projection to ensure it is based on the latest available data and analysis. The subsequent sections of this paper discuss the Treasury's revised trend output growth projection for the post-2006 period.

Judgement

2.9 The Treasury exercises a degree of judgement when projecting the components because:

- recent trend estimates are not necessarily indicative of future trends: for instance, trend estimates might be biased by the length of the period over which they are calculated;
- there is no uniquely correct method of estimating trends (trend estimation is inevitably judgemental), and different approaches to decomposing trend output growth may yield different estimates of trend components over the recent past; and
- data used to inform Treasury projections might not be up-to-date.

2.10 The following instances illustrate the Treasury's use of judgement:

- since the 2003 Pre-Budget Report (PBR), the Treasury has not mechanically knocked forward pre-2001 gains in productivity growth because this would have implied an implausibly high post-2001 estimate of trend output growth (see Table 2);
- in the 2002 trend growth paper,[4] the Treasury assumed net migration would be half way between GAD's principal and high variant projections, because GAD's principal projection was viewed as being excessively cautious. This has subsequently been borne out by developments; and
- at the time of PBR 2005,[5] the working-age population growth projection for the period 2001Q3 to 2006Q4 was revised up by 0.1 percentage points a year to reflect upward revisions to Office of National Statistics (ONS) population estimates and GAD projections. However, the Treasury's neutral trend output growth projection of 2¾ per cent a year for the same period was left unchanged, as there was no firm evidence at that stage of the cycle to change

[4] *Trend Growth: Recent Developments and Prospects.* HM Treasury, April 2002. See http://www.hm-treasury.gov.uk/media/D6678/ACF521.pdf.
[5] *Pre-Budget Report 2005*, page 187, paragraph A.42. See http://www.hm-treasury.gov.uk/media/FA6/50/pbr05—annexA—293.pdf

the overall projection. Hence, for the sake of arithmetical consistency, and in the interest of caution, a small offsetting adjustment was made to the output per worker component.

Estimates of trend output growth and its components

2.11 Table 2 presents historical estimates and previous forward projections of trend output growth and its underlying components.

Table 2: Contributions to trend output growth[1]

	Estimated trend rates of growth, per cent per annum					
	Trend output per hour worked[2, 3]		Trend average hours worked[3]	Trend employment rate[3]	Population of working age[4]	**Trend output**
	Underlying (1)	Unadjusted (2)	(3)	(4)	(5)	(6)
1986Q2 to 1997H1						
Budget 2006	2.22	2.04	−0.11	0.36	0.24	**2.55**
Latest data	2.10	1.92	−0.11	0.36	0.24	**2.43**
Over the recent past						
1997H1 to 2001Q3						
Budget 2002	2.14	1.96	−0.37	0.36	0.66	**2.63**
PBR 2002 and Budget 2003	2.35	2.14	−0.47	0.43	0.50	**2.61**
PBR 2003 and Budget 2004	2.65	2.44	−0.47	0.42	0.54	**2.94**
PBR 2004 and Budget 2005	2.70	2.50	−0.43	0.41	0.58	**3.06**
PBR 2005 and Budget 2006	2.79	2.59	−0.44	0.42	0.58	**3.15**
Latest data	2.81	2.60	−0.44	0.42	0.58	**3.16**
Projection						
2001Q3 to 2006Q4						
Budget 2002	2.10	2.00	−0.1	0.2	0.6	**2¾**
PBR 2002, Budget/PBR 2003, Budget/PBR 2004 and Budget 2005	2.35	2.25	−0.1	0.2	0.5	**2¾**
PBR 2005 and Budget 2006	2.25	2.15	−0.2	0.2	0.6	**2¾**
2006Q4 onwards						
PBR 2004 and Budget 2005	2.35	2.25	−0.1	0.2	0.3	**2½**
PBR 2005 and Budget 2006	2.25	2.15	−0.2	0.2	0.4	**2½**

[1] Treasury analysis based on judgement that 1986Q2, 1997H1 and 2001Q3 were on-trend points of the output cycle. Figures independently rounded. Trend output growth is estimated as growth of non-oil gross value added between on-trend points for the past, and by projecting components going forward.
Columns (2) + (3) + (4) + (5) = (6).
Full data definitions and sources are set out in Annex A.

[2] The underlying trend rate is the unadjusted trend rate adjusted for changes in the employment rate, i.e. assuming the employment rate had remained constant. Column (1) = Column (2) + (1-a).Column (4), where 'a' is the ratio of new to average worker productivity levels. The figuring is consistent with this ratio being of the order of 50 per cent, informed by econometric evidence and LFS data on relative entry wages.

[3] The decomposition makes allowances for employment and hours worked lagging output. Employment is assumed to lag output by around three quarters, so that on-trend points for employment come three quarters after on-trend points for output, an assumption which can be supported by econometric evidence. Hours are easier to adjust than employment, and the decomposition assumes that hours lag output by just one quarter, though this lag is hard to support by econometric evidence. Hours worked and the employment rate are measured on a working-age basis.

[4] UK resident household basis.

3 New evidence since Budget 2006

3.1 Latest National Accounts data, including revisions, and other data releases since Budget 2006 support the Treasury's 2¾ per cent projection of trend output growth for the period 2001Q3 to 2006Q4. New evidence on population growth and migration published since Budget 2006, however, has significant implications for the working-age population growth assumption, and in turn the trend output growth projection, for the post-2006 period. The new evidence since Budget 2006 is considered in detail below.

National Accounts data

3.2 The ONS 2006 Blue Book dataset,[1] released in June 2006, and subsequent releases contained sizeable revisions to National Accounts data. In particular, between early 2002 and end-2005 growth in non-oil GVA, the measure the Treasury uses to estimate trend output growth, was revised up by a cumulative 0.7 percentage points.

3.3 In addition to upward revisions to past data, non-oil GVA growth so far in 2006 has been stronger than expected, with growth of 0.7 per cent in the first quarter and 0.8 per cent in both the second and third quarters, compared with the Budget forecast of 0.6 per cent in each of the three quarters. This implies that output on a non-oil GVA basis is estimated to have grown at an average rate of 2.7 per cent between the on-trend point in 2001Q3 and 2006Q3, which is close to the Treasury's projection of trend growth of 2¾ per cent between 2001Q3 to 2006Q4. Indeed, with evidence of a degree of slack in the economy (i.e. a small negative output gap), based on the current trend growth assumption of 2¾ per cent between 2001Q3 and 2006Q4, the trend rate of output growth since 2001Q3 can be expected to exceed 2.7 per cent.

3.4 Moreover, since the start of the current economic cycle, which commenced in the first half of 1997,[2] non-oil GVA growth has averaged 2.9 per cent, which is above the Treasury's trend growth estimate of 2¾ per cent between 2001Q3 to 2006Q4. Over this period, average GDP growth in the UK has exceeded that of the G7 as a whole - in contrast to the previous economic cycle in which UK growth lagged behind the G7 average by over a ¼ percentage point. Indeed, among the major economies, only the US and Canada have seen higher average growth rates than the UK over the past nine years.

3.5 On an unchanged 2¾ per cent trend growth assumption, the latest National Accounts data imply the output gap is currently around -¼ per cent, compared with the Budget 2006 estimate of around -1¼ per cent. At the time of Budget 2006,[3] the Treasury drew attention to the tension between National Accounts data and other economic indicators. However, the subsequent revisions bring National Accounts data much more into line with these other indicators, and thus support the assessment of a currently small negative output gap which is well within the range of estimates made by external organisations. Nevertheless, considerable uncertainty still surrounds the current output gap estimate, not least reflecting the possibility that labour supply may be understated as a result of migration and population measurement difficulties.

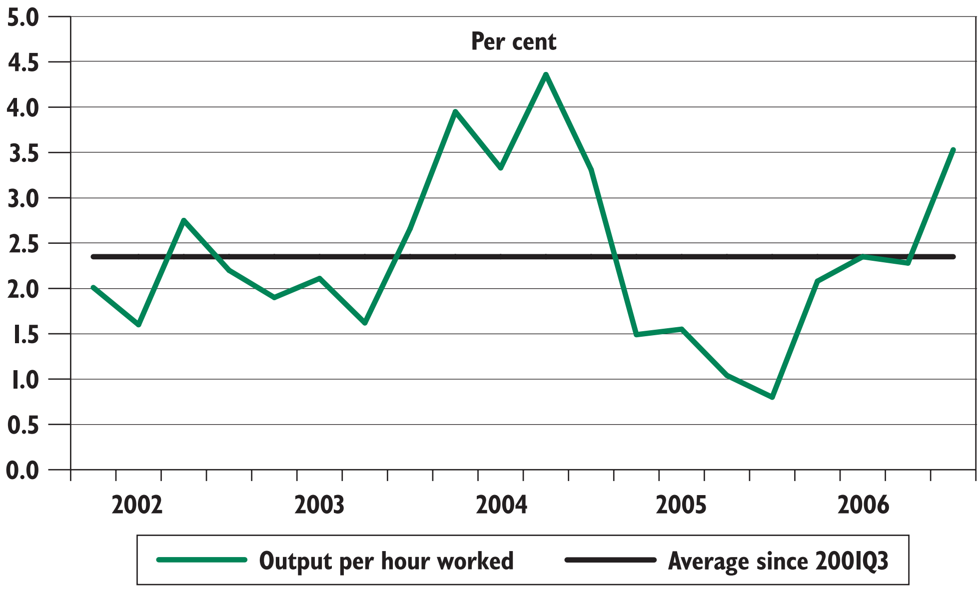
[1] *Blue Book 2006*, ONS. See http://www.statistics.gov.nis/downloads/theme_economy/BlueBook2006.pdf
[2] Following significant revisions to non-oil GVA data released by the ONS in June 2005, the Treasury revised its provisional judgement that the current economic cycle began in the first half of 1997, rather than in 1999. This assessment was set out in *Evidence on the UK economic cycle*, HM Treasury, July 2005.
[3] *Budget 2006*, pages 230–231, paragraphs B46–B51. See http://www.hm.treasury.gov.uk/media/20F/36/bud06_chb_248.pdf

Trend growth components: recent evidence and projections

Growth in labour productivity

3.6 At the time of Budget 2006, the Treasury highlighted uncertainties surrounding estimates of productivity growth, on the grounds that it was difficult to reconcile labour market and output data. However, National Accounts revisions and outturns since Budget 2006 imply that productivity growth since 2001 has been more consistent with its trend projection. Data at the time of Budget 2006 showed actual productivity growth (on the core measure of output per hour worked) averaging 2.2 per cent a year between the 2001Q3 on-trend point and 2005Q4. Outturn data now available show actual productivity growth (see Chart 3.1) has averaged 2.4 per cent a year between 2001Q3 and 2006Q3, clearly above its trend projection of 2.15 per cent. Moreover, trend productivity growth was 2.6 per cent in the first half of the current cycle compared to 1.9 per cent in the previous cycle (1986Q2–1997HI).

Chart 3.1: Annual growth in output per hour worked



Source: Calculated from ONS data.

3.7 The revisions to actual data and more recent outturns significantly increase confidence in the post-2001 projection for the trend rate of growth of output per hour. However, since actual productivity growth is influenced by cyclical factors, the Treasury's approach, as for the average hours and employment rate components of trend output growth, is only to reassess the trend rate of productivity growth once a distinct phase of the cycle has come to an end, unless there is sufficiently compelling evidence to support a change within cycle. In other words, a proper assessment of whether the economy's trend rate of productivity growth has increased, given recent outturns for actual productivity growth, can only be made over an economic cycle or between on-trend points. So the Treasury will reconsider the trend productivity growth projection once the current economic cycle reaches an end. The inclusion of own account software investment in the National Accounts in 2007 could also lead to a revised productivity assessment at some point in the future.

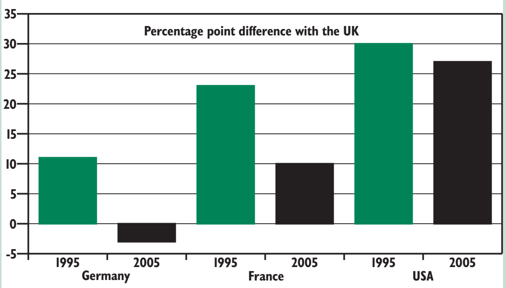
Box 3.1: UK productivity performance

Productivity and employment growth are key determinants of higher standards of living and enhanced quality of life. The Government's approach to improving the UK's long-term productivity performance has two broad strands: maintaining macroeconomic stability to help firms and individuals in planning for the future, and implementing microeconomic reforms to remove the barriers which prevent markets from functioning efficiently. These microeconomic reforms address historic weaknesses in five areas that affect the rate of productivity growth:

- **improving competition, to enable the adoption of innovative business practices and increased business efficiency;**
- **promoting enterprise, to support entrepreneurship and the strengthening of the UK's enterprise culture;**
- **supporting science and innovation, to ensure that the UK capitalises on the creation of new knowledge and its translation into new goods and services;**
- **raising skills levels, to support the development of a more flexible, responsive and productive workforce; and**
- **encouraging investment, to enhance the stock of physical capital and ensure its efficient utilisation.**

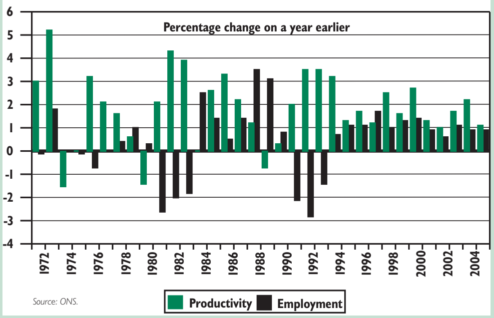
As discussed in *Productivity in the UK 6: Progress and new evidence,* **published alongside Budget 2006, historically, UK productivity has lagged behind that of other major industrialised countries. However, latest statistics show that the UK is making real progress towards closing the productivity gap with its main competitors. The UK has significantly improved its position since 1995 on both key measures of productivity: output per worker and output per hour. Chart (a) shows the reduction in UK's output per worker gap with France, Germany and US. The UK is now experiencing its longest period of combined productivity and employment growth since the 1950s. This achievement is significant, as strong employment growth is usually associated with lower productivity growth, because new workers are initially less productive while they learn job-specific skills. Chart (b) shows the UK's enhancement of both its productivity and employment performance.**

Chart (a): UK output per worker gap



Source: ONS.

Chart b: Employment and productivity growth

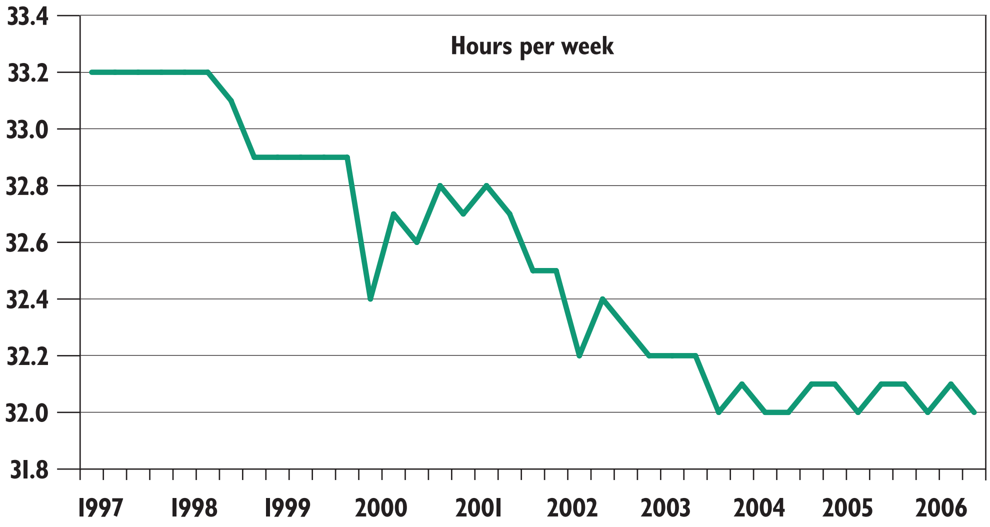


Source: ONS.

Growth in average hours worked

3.8 As the economy moved below trend in 2002 and 2003, average hours worked per week fell to 32 from 32½ in early 2002 (see Chart 3.2). Since late 2003, average hours worked have remained broadly flat. While there remain uncertainties with respect to the assumed trend decline in average hours, recent movements in average hours show reversion towards their projected downward trend of 0.2 per cent a year. Currently average hours are estimated to be only slightly below trend, and so appear consistent with the trend assumption, given the assessment that the overall output gap is currently small.

Chart 3.2: Average hours worked

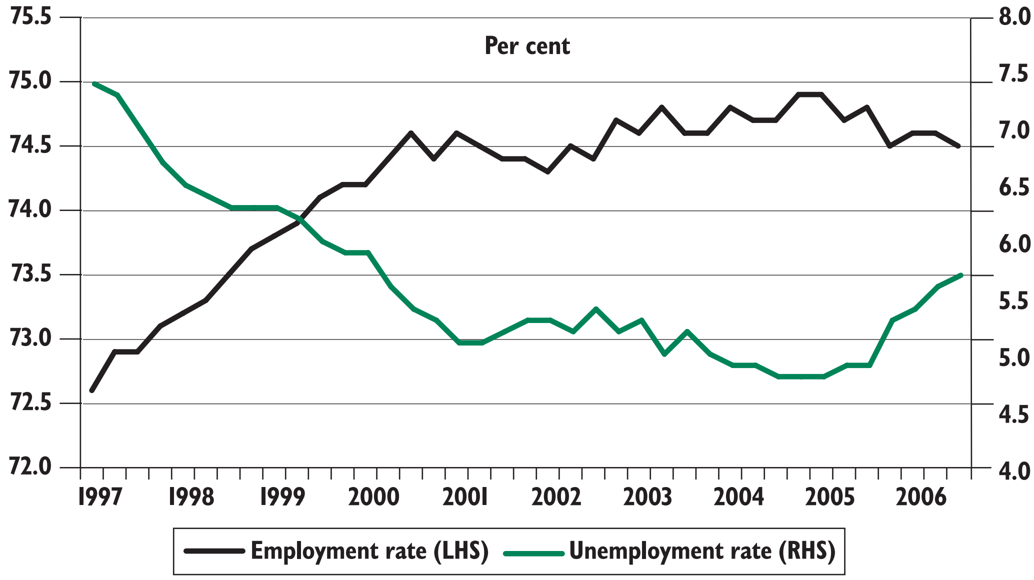


Source: ONS.

Growth in the employment rate

3.9 Over the past year or so the employment rate (see Chart 3.3) has remained relatively steady in the face of strong growth in the population of working age. The labour supply has also been boosted by a sharp fall in inactivity adding to the ongoing positive contribution from continued strong growth in the population of working age. It is not clear whether the sharp fall in working-age inactivity over the past year, which has added over 110,000 people to the workforce since 2005Q4, is indicative of a more structural change, and so there inevitably remain some uncertainties around the current trend estimate. Nevertheless, with some slack in the labour market, developments since 2001Q3 can be seen as broadly consistent with the Treasury's trend employment rate projection of a rise of 0.2 per cent a year after 2001Q3, which is based on a projected decline in the inactivity rate of 0.1 per cent a year and a modest fall in the sustainable rate of unemployment (or NAIRU) of 0.05 per cent a year. At this stage there is no strong case to change the employment rate projection. However, as a matter of course the Treasury monitors developments in the labour market and will conduct a full assessment of the employment rate projection once the cycle has reached an end.

Chart 3.3: Employment and unemployment rates



Source: ONS.

Box 3.2: Government policies to raise the employment rate

The UK employment rate has risen from 72.7 per cent in 1997 to 74.5 per cent in 2006. In 2006, employment reached a record high of just over 29 million. Macroeconomic stability has provided the basis for this success. Microeconomic reforms have also been important and the Government has introduced a number of policies which are aimed at moving people from welfare to work and making work pay. There are now over 1 million fewer people of working age who are out of work and claiming benefits than in 1997.

- **Welfare to work: New Deal programmes offer intensive support to help people move into employment. Over 694,000 young people and 272,000 adults have found work with the help of the New Deal since it was introduced in 1998. Independent evaluators have concluded that the New Deal has increased youth unemployment by 30-40,000, with a positive impact on the economy of up to £500 million. The Government has also encouraged people to move from inactivity into the labour market, by ensuring that Incapacity Benefit and Income Support claimants have access to early and ongoing jobsearch advice. The lone parent employment rate is now 56.6 per cent, the highest rate on record and an increase of over 11 percentage points since 1997. Government policies account for about half of this rise, principally through tax credits and the New Deal for Lone Parents. The New Deal for Disabled People has helped over 116,000 Incapacity Benefit claimants move into work, and the Welfare Reform Bill, currently before Parliament, will go further to reform the system of incapacity benefits by introducing a clearer balance of rights and responsibilities for most people.**
- **Making Work Pay: The Government has boosted in-work incomes and improved financial incentives to work through the National Minimum Wage, which rose to £5.35 in October 2006. Moreover, 2.2 million working families and 320,000 low-income working households without children are now benefiting from the introduction of the Working Tax Credit. Together these have significantly improved incentives to move into work and progress in the labour market.**

Growth in the population of working age

3.10 Recent developments and new data releases since Budget 2006 relating to the working-age population and inward migration to the UK provide clear grounds to support projections of continued strong growth in the population of working age. In the 2005 PBR, following upward revisions to ONS population estimates and in GAD population projections published in October 2005, the Treasury raised the working-age population projection from 0.5 per cent to 0.6 per cent a year for the period 2001Q3 to 2006Q4. The data released since Budget 2006 show that the working-age population continues to grow strongly, with growth averaging around 0.7 per cent a year since the last on-trend point in 2001Q3 (see Chart 4). So the Treasury's working-age population growth projection for the 2001Q3 to 2006Q4 period has had to be revised up to 0.7 per cent a year (see Table 3 in Section 4).

3.11 In addition to a higher overall working-age population growth rate apparent in the data, new releases also show strong net migration into the UK:

- Official mid-year population estimates released by the ONS in August 2006 showed the high levels of net inward migration in 2004 continued into 2005. Full-year estimates published in November 2006[4] showed net inward migration to the UK was 223,000 in 2004 and 185,000 in 2005, having averaged around 160,000 over the previous five years following a strong rise in the late 1990s. The data are based on the UN definition of migrants being individuals who change their country of usual residence for a period of at least a year.

- The ONS data disaggregated by country and region of citizenship show an average net inflow of migrants from New Commonwealth[5] countries of 110,000 a year in 2004 and 2005. This is the largest source of inward migrants and continues an upward trend of over 10 per cent a year over the past decade.

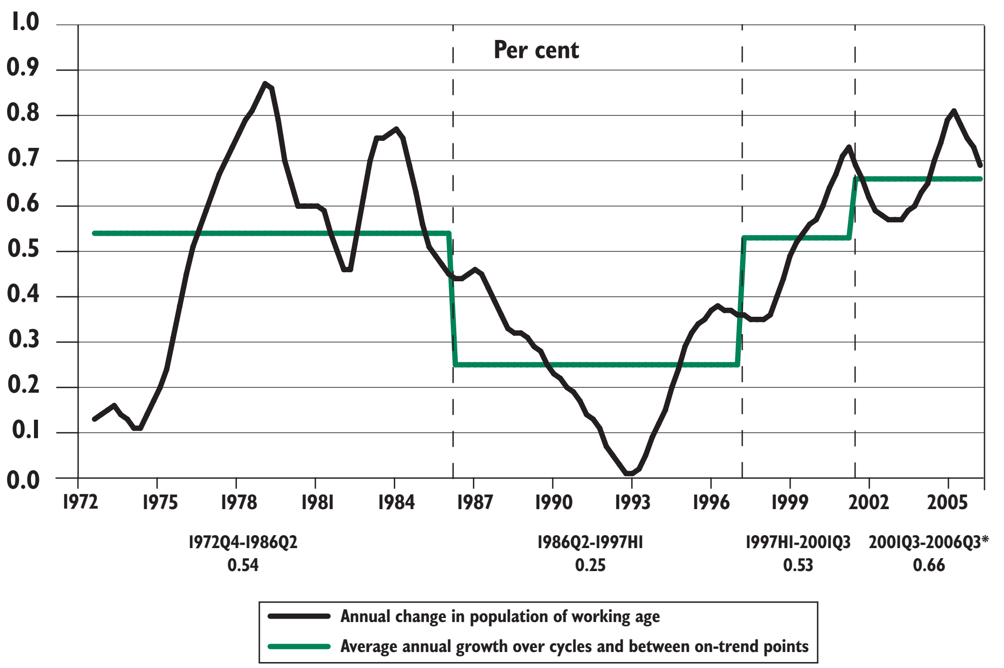
- The ONS data show a net inflow of 64,000 A8[6] migrants in 2005. Visits to the UK by A8 nationals are now running at around 2.7 million a year compared with around 2.0 million a year ago[7] and around 680,000 pre-accession. The number of National Insurance numbers issued to Accession country migrants increased from 110,000 in 2004-05 to 270,000 in 2005-06,[8] with continued strength in the second and third quarters of 2006.

- In 2005-06, some 217,000 A8 nationals registered to work for an employer under the Worker Registration Scheme (WRS).[9] The coverage of this scheme excludes A8 migrants who are self-employed or students and those who do not register. In the year to the third quarter of 2006, the number registering under the WRS rose by a further 6 per cent on a year earlier.

[4] *Over 500 a day gained through migration to the UK*, ONS News Release, 2 November 2006.
[5] New Commonwealth excludes Canada, Australia, New Zealand, South Africa and, from 2004, Cyprus and Malta.
[6] In May 2004 eight Central and Eastern European accession countries joined the European Union. The eight accession (A8) countries are: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia.
[7] *Visits to the UK from the enlarged EU*, ONS, 8 November 2006. See http://www.statistics.gov.uk/downloads/theme_transport/Visits_to_UK_Sep06.pdf
[8] *National Insurance number allocations to overseas nationals entering the UK–2006*, Department of Work and Pensions, 21 July 2006. See http://www.dwp.gov.uk/asd/asdi/niall/niall_first_release.pdf.
[9] *Accession Monitoring Report May 2004–September 2006*, Home Office *et al*, 21 November 2006

3.12 These new data provide evidence to support an upward revision of the assumed working-age population growth rate post-2006. Growth in the population of working age comprises natural population growth, typically contributing around 40 per cent to total working-age population growth in recent years, and net migration, which has typically contributed around 60 per cent to working-age population growth.

Chart 4: Annual growth rates in population of working-age



*Average annual growth since the last on-trend point in 2001 Q3.
Source: ONS.

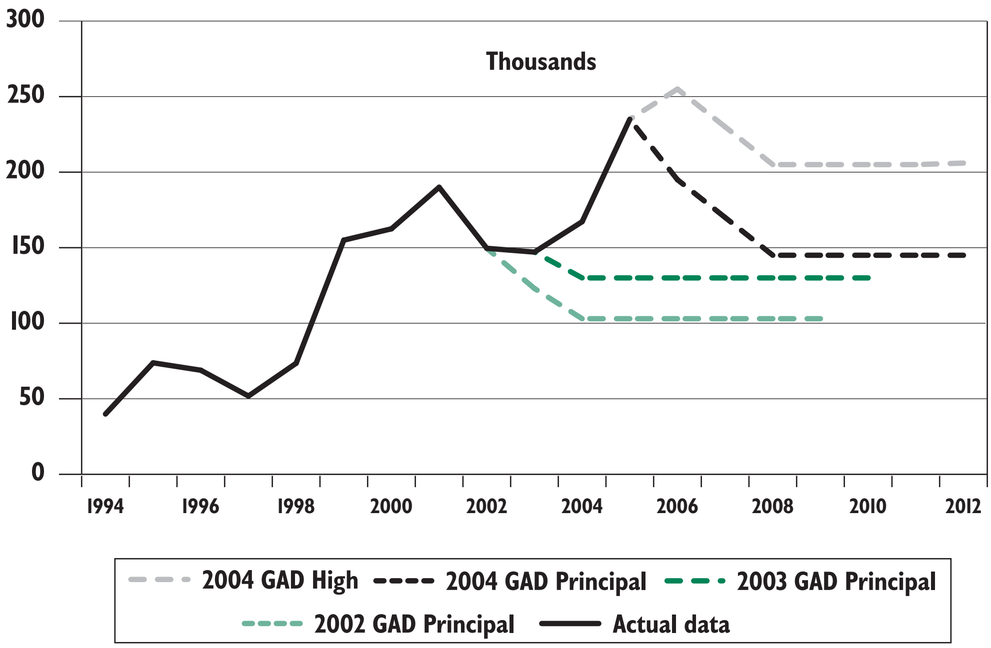
3.13 Natural growth in the population of working age is generally estimated relatively accurately as it is largely predictable. The number of teenagers entering the workforce and the number of workers retiring can be accurately predicted over the next 10 years from present demographic data. Deaths can also be accurately predicted, as mortality rates tend closely to follow well-established trends. In Budget 2006 the Treasury assumed that natural population growth would slow after 2006, due to the impact of post-war baby-boom women reaching State Pension age, causing working-age population growth to slow to 0.4 per cent a year. The latest evidence on natural growth in population remain consistent with the assumption for the period up to 2010.

3.14 Projections of net migration are subject to greater uncertainty. The last GAD principal projection, published in October 2005, assumed that net migration would fall to 145,000 a year after mid-2007, with a low and high variant range of 85,000 to 205,000 a year. Since GAD made these projections, the ONS has released the net migration data set out above of 223,000 for 2004 and 185,000 for 2005. Official migration statistics show these net inflows have been driven by a steady rise in non-EU immigration into the UK and by inflows of A8 migrants.

3.15 On the basis of these latest data and following analysis of trends in migration, the Treasury's revised post-2006 projection is that net migration will be maintained well below the 2004 peak and broadly in line with the outturn for 2005, at a level between the GAD principal and high variant projections. This is similar to the approach taken in Budget 2002 when the Treasury also adopted a net migration projection that was between the GAD's latest principal and high migration variants at the time; a decision that has been justified by migration outturns since 2002 (see Chart 5). This change to the net migration assumption implies working-age population growth of 0.6 per cent a year after 2006, rather than falling to 0.4 per cent.

3.16 The new post-2006 working-age population growth projection does not take into account any increase in post accession migration, and makes no allowance for possible additional migration from Bulgaria and Romania (A2) after their accession to the EU in 2007. The possibility of additional A2 migration and continued net inflows of A8 migrants therefore adds to the degree of leeway in the projection.

Chart 5: Net migration outturns and GAD projections



Source: ONS and GAD.

4 IMPLICATIONS FOR TREND GROWTH PROJECTION

4.1 The Treasury's practice is fully to review the overall trend output growth projection after making a judgement that a distinct phase of the economic cycle has come to an end, on the grounds that assessment of trends needs to abstract from cyclical developments and thus be made over the cycle. In accordance with this practice, the Treasury last undertook a full assessment of trend growth and its underlying components at Budget 2002. At that time, the projection for the neutral rate of trend output growth between 2001 and 2006 was set at 2¾ per cent a year. Beyond the horizon of this projection period it was stated that "*GAD projections imply a slowdown in the rate of growth of the population of working age for several years…related to the particular demographics affecting this period rather than assumptions about net migration*".[1] Consequently, as the projection window moved forward to include years beyond 2006, a neutral rate of trend output growth of 2½ per cent a year was projected for the post-2006 period. This ¼ percentage point slowdown reflected the effect of post-war baby-boom women reaching State Pension age.

4.2 Since Budget 2002, small offsetting changes have been made to trend growth components within the unchanged overall trend output growth projection of 2¾ per cent for the 2001 to 2006 period; and the ¼ percentage point drop for the post-2006 period, with the incidence on the population of working age component, was maintained through to Budget 2006. As a result, working-age population growth post-2006 was projected at 0.4 per cent a year at Budget 2006.

Working-age population projection

4.3 Since then, the new evidence on migration and population, discussed in Section 3, supports an upward revision to the post-2006 projection for working-age population growth by ¼ percentage point a year, more or less offsetting the demographically driven downward effect in the projection. Extending the projection horizon by one year compared with Budget 2006 also tends to boost the working-age population growth projection slightly, because the phased in women's State Pension age beyond 2010 implies higher natural growth in the population of working age in the outer years. As a result, the Treasury's post-2006 working-age population projection rises to 0.6 per cent a year from 0.4 per cent projected at Budget 2006.

Productivity, average hours and employment rate projections

4.4 Recent new data from productivity, average hours and the employment rate are consistent with and reinforce confidence in the Treasury's trend assumptions. In particular, data for actual growth in productivity have been revised up to an average of 2.4 per cent a year between the 2001 on-trend point and 2006Q3, clearly above its trend projection of 2.15 per cent. However, these outturns do not at this stage provide grounds for changing their current trend projections for the post-2006 period because the data may be affected by cyclical influences. The small negative current output gap and its components implied by latest data on output, productivity, average hours and employment and their current respective trend projections appear consistent with other economic indicators and the output gap estimates produced by external organisations. This contrasts with the data at the time of Budget 2006 when there was less coherence between National Accounts output estimates and the signals from other economic indicators, and the output gap estimates of external organisations tended to be narrower than the Treasury's.

[1] *Trend Growth: Recent developments and prospects*, HM Treasury, April 2002, page 21, paragraph 3.41.

4.5 With the latest data revisions and outturns for National Accounts and trend growth components increasing confidence in the current *neutral* trend output growth projection, the degree of caution implicit in the Treasury's ¼ percentage point lower trend growth assumption used for the purposes of projecting the public finances, which is subject to NAO audit, is also increased.

4.6 Although the latest data increase confidence in the Treasury's trend projections, in particular for productivity growth, the actual data are affected by cyclical factors. In line with established practice, the Treasury will wait until the current cycle has come to an end before fully reassessing its productivity, average hours and employment rate trend projections, in order to abstract from cyclical influences.

Trend output growth projection

4.7 The rise in the working-age population projection from 0.4 per cent to 0.6 per cent a year, with no change to the productivity, average hours and employment rate projections, increases the neutral projection for the trend rate of output growth from 2½ per cent to 2¾ per cent a year for the post-2006 period (see Table 3).

Table 3: Trend growth estimates and projections

	Estimated trend rates of growth, per cent per annum					
	Trend output per hour worked		Trend average hours	Trend employment rate	Population of working-age	**Trend output**
	Underlying	Unadjusted				
Previous cycle						
1986Q2 to 1997H1	2.10	1.92	−0.11	0.36	0.24	**2.43**
First half of current cycle						
1997H1 to 2001Q3	2.81	2.60	−0.44	0.42	0.58	**3.16**
Projection[1]						
2001Q3 to 2006Q4						
Budget 2006	2.25	2.15	−0.2	0.2	0.6	**2¾**
PBR 2006[2]	2.25	2.15	−0.2	0.2	0.7	**2¾**
2006Q4 onwards						
Budget 2006	2.25	2.15	−0.2	0.2	0.4	**2½**
PBR 2006	2.25	2.15	−0.2	0.2	0.6	**2¾**

[1] Neutral case assumptions for trend.
[2] The projection of working-age population is consistent with average growth since 2001Q3. This may change as a result of population data revisions.

4.8 For the purposes of projecting the public finances, the Treasury assumes a rate of trend output growth that is ¼ percentage point lower than the neutral view. This cautious assumption is subject to audit by the NAO. A rise in the neutral estimate of trend output growth to 2¾ per cent a year for the post-2006 period implies a cautious trend growth rate of 2½ per cent for the same period. As required by the Code for Fiscal Stability, the NAO has audited this 2½ per cent assumption. The NAO concludes that: "*The Treasury's revised underlying growth rate assumption adopted for the fiscal projections, ¼ percentage points below the Treasury's neutral estimate, is below the range of external forecasts of the long-term growth rate. It is also at or below the average of external forecasters' medium term growth projections. On this basis the revised assumption is reasonable and cautious*".[2]

[2] *Audit of Assumptions for the 2006 Pre-Budget Report*, NAO, 6 December 2006.

4.9 The Treasury's trend output growth projections would be slightly lower if, like most external institutions, they were defined in terms of whole economy GDP rather than non-oil GVA, as discussed in detail in Section 5.

5 External estimates of trend growth

Comparison with external estimates

5.1 The Treasury's estimate of trend output growth can be compared with external estimates (Table 4): the Treasury's revised *neutral* estimate of trend growth of 2¾ per cent a year, based on non-oil GVA, for the period from 2006Q4 onwards is within the 2.6 per cent to 2.9 per cent range of these external estimates. The Treasury's *cautious* assumption of 2½ per cent used for the purposes of projecting the public finances is slightly below the bottom end of this range.

5.2 The Treasury uses non-oil GVA output measure to estimate the economy's trend rate of growth, which currently results in a slightly stronger estimate of trend growth than on a whole economy GDP basis, for reasons set out in detail below. When the Treasury's cautious assumption of trend output growth post-2006 is translated onto a whole economy GDP basis, it is equivalent to 2.4 per cent, which is materially below the comparable range of external estimates.

Table 4: External estimates of UK trend output growth (per cent, per annum) beyond 2006

Organisation	Estimated trend rate of growth	Period	Estimation methodology
OECD[1]	2.7	2006–2008	Production function
EU Economic Policy Committee[2]	2.8	2004–2011	Production function
European Commission[3]	2.7	2006–2007	Production function
IMF[4]	2.6	2006–2011	Production function
Oxford Economics[5]	2.7	2006–2010	Production function
NIESR[6]	2.6	2006–2014	Band-pass filter
Goldman Sachs[7]	2.9	2005–2010	On-trend extrapolation
Highest	2.9	2006–2010	
Lowest	2.6	2006–2010	
Average	2.7	2006–2010	

[1] *Economic Outlook, No. 80,* OECD, December 2006.
[2] *The 2005 projections of age-related expenditure (2004–2050) for the EU–25 Member States: underlying assumptions and projection methodologies,* Economic Policy Committee and European Commission, November 2005.
[3] *Autumn Forecast*, European Commssion, 2006.
[4] *Article IV Staff Report on the UK,* IMF 2006. The IMF estimate dates from early 2006 and therefore may not reflect recent strong growth in labour supply.
[5] *UK Weekly,* Oxford Economics, October 2006.
[6] *Economic Review No: 198,* NIESR, October 2006.
[7] *UK Economics Analyst*, Goldman Sachs, November 2006.

Differences in estimates of trend growth

Measurement and assumptions

5.3 Estimates of trend output growth can vary as a result of the choice of output measure used and differing underlying assumptions as well as due to different methodological approaches.[1] The Treasury's preferred measure for estimating trend output growth is non-oil GVA, because the North Sea oil and gas sector has little direct impact on the sustainable level of employment and non-oil activity. The estimates provided in Table 4 are based on whole economy GDP, which matters to the extent that it can result in slightly different estimates of trend output growth.

5.4 In particular, assumptions about the rate of decline in oil and gas output, which are typically not made explicit by external organisations, will cause estimates of growth on a non-oil GVA basis to deviate from estimates based on whole economy GDP. With North Sea production on a structural trend decline, non-oil GVA growth will exceed whole economy GDP growth by the weight of North Sea production in whole economy output (currently around 1 ½ per cent) multiplied by the difference between non-oil and North Sea GVA growth. The Treasury is currently projecting an average rate of decline in North Sea output of about 3 per cent a year between 2006 and 2011, reflecting a stronger underlying downward trend for existing fields, partly offset in 2007 and 2008 by additional output from new fields coming on stream. This implies trend growth in whole economy GDP is 0.1 percentage points lower than for non-oil GVA. Thus trend output growth on a non-oil GVA basis of 2.75 per cent would imply growth of 2.65 per cent on a whole economy GDP basis. To the extent that external institutions have an implicit assumption about the trend rate of decline in oil output, then their estimates of trend output growth on a whole economy GVA or GDP basis will tend to be lower than their implied estimates on a non-oil GVA basis.

5.5 Given the prospective trend decline in North Sea production, the Treasury's revised cautious assumption for trend output growth post-2006 (which is subject to NAO audit) of 2 ½ per cent on a non-oil GVA basis is equivalent to 2.4 per cent when translated onto a whole economy GDP basis.

5.6 Other assumptions, for instance on population growth, underlying external institutions trend output growth estimates are also often not made explicit. So it is not obvious to what extent external estimates have allowed for the effects after 2006 of post-war baby-boom women reaching State Pension age. Similarly, the trend output growth projections of external institutions are not always explicit about whether they have taken account of more recent data on migration. For such reasons, small differences between institutions in their estimates of trend output growth may to some extent reflect variance in measurement conventions and assumptions.

Revisions to external estimates

5.7 A number of the estimates of UK trend output growth for the post-2006 period made by external institutions listed in Table 4 reflect recent upward revision. These include the estimates by:

- the Organisation for Economic Cooperation and Development (OECD);

[1] There are several alternatives to the Treasury's method of estimating and projecting trend output growth, and there is no definitive approach. Techniques used by external organisations include statistical filtering, economic models and production functions. Estimates of trend output growth may therefore differ partly as a result of the different techniques employed, although there is no evidence to suggest that any particular method will deliver systematically biased estimates.

- the National Institute of Economic and Social Research (NIESR);
- Oxford Economics; and
- Goldman Sachs.

5.8 Significantly, upwardly revised assessments of UK labour supply growth are cited by these institutions as raising the level of potential output for the UK economy. Among these, the OECD, Oxford Economics, Goldman Sachs, and also other institutions such as UBS,[2] Credit Suisse,[3] and the Ernst & Young ITEM Club,[4] have been explicit about the role played by higher inward migration or population growth.

OECD

5.9 In its December 2006 Economic Outlook,[5] the OECD stated, *"Record high inward migration has been adding to potential growth while fuelling domestic demand. Official government projections suggested that the pace of net inward migration was likely to slow over 2006 and the following years. To date, however, migration inflows have remained strong and projections for the following few years seem conservative, suggesting an upside risk to the growth trajectory"*.

Goldman Sachs

5.10 Goldman Sachs[6] also note that as a result of a steady rise in net inward migration, *"population growth has risen from 0.1 per cent a year in the 10 years from 1975 to 1985, to 0.4 per cent a year in the past 10 years"*. They estimate that working-age population will continue to grow and will contribute about 0.7 percentage points a year to GDP growth over the next five years, up from 0.6 percentage points over the past 10 years.

Oxford Economics

5.11 Similarly, Oxford Economics[7] estimates *"that over the period 2007–2008 the population of working age will expand by around 0.7 per cent per annum, adding 0.5 percentage points to potential growth."* They note *"the vast majority of inward migrants are of working age, [which] represents a significant boost to the UK labour supply and raises the level of potential output for the UK economy"*.

NIESR

5.12 NIESR[8] also note *"the scale at migration to the UK has been well in excess of the reasonable estimates made before 2004"* and estimate that trend GDP growth over the medium term has risen to 2.6 per cent due to an increase in labour input.

Bank of England

5.13 While the Bank of England does not publish estimates of the economy's trend rate of growth, their recent Inflation Report[9] also cited net inward migration as a factor supporting growth in the UK workforce. They state that although there is great uncertainty over the scale of migration in recent years, *"it seems likely that recent migrant inflows to the UK have boosted [labour] supply"*.

5.14 In summary, there appears to be broad consensus among external institutions that net inward migration has boosted the UK's labour supply. While there is some uncertainty about the extent of net inward migration and its contribution to potential output, the cited external institutions generally concur that the post-2006 trend rate of output growth is likely to be around 2.7 per cent a year, which is in line with the Treasury's revised neutral estimate.

---

[2] *UK Weekly Economic Focus,* UBS, November 2006.
[3] *UK Economics: If the gap fits*, Credit Suisse, November 2006.
[4] ITEM Club Special Report; Finding Our Potential, Ernst & Young ITEM Club, September 2006.
[5] *Economic Outlook,* OECD, December 2006.
[6] *UK Economics Analyst,* Goldman Sachs, November 2006.
[7] *UK Weekly,* Oxford Economics, October 2006.
[8] *Economic Review*, NIESR, October 2006.
[9] *Inflation Report*, Bank of England, November 2006.

A

ANNEX A: DATA DEFINITIONS AND CONCEPTS

A.1 The data definitions and sources underpinning the analysis in Table 2 are set out below. All data refer to the UK and are seasonally adjusted unless specified otherwise. Where possible National Statistics data series identifiers are shown in brackets.

Trend output growth

A.2 Non-oil output is defined as gross value added at basic prices, chained volume measure (UIZY). The series prior to 1977 is compiled by using growth rates of whole economy GVA (ABMM) up to and including 1977.

Productivity (output per hour worked)

A.3 Defined as non-oil output divided by total actual weekly hours worked (YBUS) scaled by the ratio of total employment (MGRZ) to working-age employment (YBSE) from the Labour Force Survey.

Underlying productivity

A.4 Underlying productivity growth is defined as the rate that would have occurred had the employment rate remained constant. New entrants to employment tend to have lower productivity than existing workers, so increases in the employment rate tend temporarily to depress the average level and growth rate of productivity. Underlying productivity growth is derived by adding to actual productivity growth the growth in the employment rate multiplied by one minus the ratio of new to average worker productivity levels.

Average hours worked

A.5 Total actual weekly hours worked (YBUS) scaled by the ratio of total employment (MGRZ) to working-age employment (YBSE) from the Labour Force Survey.

Working-age employment

A.6 All persons in employment aged 16–59/64 (YBSE) from the Labour Force Survey.

Population of working-age (household basis)

A.7 UK household population aged 16–59/64 (YBTF) from the Labour Force Survey.

ISBN 1-84532-224-X