



National Audit Office

Audit of Assumptions for the 2008 Pre-Budget Report

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL | HC 1150 Session 2007-2008 | 24 November 2008

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Comptroller and Auditor General
National Audit Office

21 November 2008

This report can be found on the National Audit Office web site at www.nao.org.uk

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REPORT

Audit of Assumptions for the 2008 Pre-Budget Report

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 Chancellor of the Exchequer has asked me to audit a new assumption:

- that on the basis of existing data it is a reasonable view that the economic cycle which began in the first half of 1997, as defined by the Treasury, ended in the second half of 2006.

3 The Chancellor has advised me that none of the other assumptions examined in my previous reports on Budget and pre-Budget Report assumptions has been changed. In view of recent financial turbulence the Treasury has informed me that it will, however, base its forecasts of interest rates for the purposes of projecting the public finances on market expectations of three month forward interest rates calculated by the Bank of England, rather than on data from Bloomberg¹. This is to avoid erratic forecasts of interest rates. I have not audited this change though I am due to audit the interest rate projection methodology at the time of Budget 2009. As at Budget 2008, and for the 2007 Pre-Budget Report, the Treasury will make an adjustment to the interest rate projections for the 2008 Pre-Budget Report to ensure they are on a like-for-like basis with previous forecasts².

4 The Treasury has advised me that in light of the emerging evidence on the impact of the credit crunch on the economy a downward adjustment has been made to the trend output assumption from mid 2007. Full details are set out in the 2008 Pre-Budget Report. I have not been asked to audit this change, although I expect to be invited to do so at the time of Budget 2009.

5 At the time of the March 2000 Budget, the Chancellor asked me to carry out a three year rolling review of the assumptions I have audited previously. This is to provide a check both that the assumptions remain reasonable and cautious, and to see whether they have indeed resulted in reasonable and cautious projections in the period since they were 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:
- 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
- to check that it remains a reasonable and cautious assumption to use in future projections of the public finances.

6 The rolling review on this occasion covers the assumption examined for the Pre-Budget 2005 Report³, that the end of the then most recently completed cycle occurred in the first half of 1997, rather than in 1999. The end date of that cycle, running from 1986Q2 to 1997H1, also represented the start date of the next economic cycle, which the Treasury now believes to have ended in the second half of 2006, (assumed to span the period from 1997H1 to 2006H2). In effect, therefore, I have been asked to review the evidence on both the beginning (the rolling review) and the end (the new assumption) of the last economic cycle, so I have considered them together.

¹ See *Audit of Assumptions for Budget 2006*, HC 937, session 2005-06, paragraphs 31 and 32 for a description of the methodology for projecting interest rates.

² See paragraph 5, *Audit of Budget Assumptions for Budget 2008*, HC 345, Session 2007-08.

³ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06.

7 I also audited the convention for forecasting oil prices at the time of the Pre-Budget Report 2005, and I have reviewed it again now under the rolling review arrangements. A further element of my 2005 Pre-Budget Report audit was an examination of the 2002 VAT Strategy designed to produce additional tax revenue⁴. At that time, the Treasury indicated that I was to be asked to carry out a review of the forecasting assumptions underlying VAT receipts as a whole, on which I reported for Budget 2007⁵, and no rolling review assessment is needed now.

8 As before, the Treasury remains responsible for making projections of future public expenditure and revenue on the basis of the audited and other assumptions.

Basis of Report

9 For all assumptions, I have considered evidence gathered for this audit from relevant papers and discussions with officials in the Treasury. In addition, I have reviewed the published work of a number of external organisations in examining the assumption for the date for the end of the most recently completed economic cycle. I have also consulted the organisations listed in Appendix 1.

Report

Dating the end of the most recently completed economic cycle

10 I have been asked by the Chancellor to examine a new assumption for the 2008 Pre-Budget Report, which is whether on the basis of existing data it is a reasonable view that the most recently completed economic cycle ended in the second half of 2006.

11 In 2005, I examined whether the then previous cycle ended in 1997 or 1999⁶, concluding that there were reasonable grounds to date the end of that cycle to 1997⁷. This therefore became the start date of the next cycle, the end date of which I have been asked to examine for this Report. My 2005 work on the cycle is now due to be examined under the three year rolling review arrangements, and I have combined this assessment with that for the new assumption that the most recently completed cycle ended in the second half of 2006.

The Treasury's approach to defining and identifying an economic cycle

12 There are a number of ways of defining economic cycles, which I described in my 2005 Report⁸. Along with many other policymaking institutions around the world, the Treasury uses a growth cycle approach, defined in terms of up-phases and down-phases around a long run trend level of output. A movement in output across the trend may complete either an up-phase or down-phase. The Treasury, however, judges such movements to mark definitely a completed phase of a cycle only when output passes through trend "decisively". In making this assessment, the Treasury relies on judgement based on examination of data trends.

13 There is also a variety of ways of identifying economic cycles from the data, all of which have advantages and disadvantages, as set out in my 2005 Report⁹. Some methods derive a trend value for output, and the cycle is measured between points when the estimated output gap, actual less trend output, is zero. One methodology under this approach is statistical filtering, which isolates fluctuations around the trend based on assumptions about how smooth the estimated trend should be. An alternative is the production function methodology, which estimates trend based on assumptions about long run non-inflationary levels of factors of production and a relationship between factors of production and output.

14 The Treasury uses a different method, identifying on-trend points (when the output gap is zero), based on a range of cyclical indicators related to capacity pressures in the economy, **Figure 1 overleaf**. Trend output growth is then measured as the average rate of growth between adjudged start and end cycle on-trend points or over half-cycles. The cyclical indicators used are indirect measures of the size of the output gap but allow a wide range of relevant data to be incorporated into a judgement. The indicators used currently by the Treasury include all those used in 2005¹⁰, but also now include information from the Bank of England's regional Agents. The Bank's twelve regional offices speak to 700 business contacts a month, which represent a cross-section of sectors, locations and sizes. From these face-to-face interviews, inferences about the latest economic developments are made, and summaries from each region are amalgamated into national scores¹¹. The score for each economic indicator ranges from -5 to +5, with -5 typically

⁴ See *Audit of Assumptions for the 2002 Pre-Budget Report*, HC 109, Session 2002-03 for further details.

⁵ *Audit of Assumptions for Budget 2007*, HC 393, Session 2006-07.

⁶ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06.

⁷ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraph 77.

⁸ See *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraphs 19-22.

⁹ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraphs 25-32.

¹⁰ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, Figure 3.

¹¹ See *Bank of England Quarterly Bulletin*, 2008 Q1.

1

Treasury cyclical indicators currently used for dating the end of the most recently completed economic cycle

Source	Indicator (using quarterly data)
CBI Industrial Trends Survey	Percentage of manufacturing firms operating at full capacity; Percentage of manufacturing firms experiencing skilled labour recruitment difficulties.
CBI/PWC Financial Services Survey	Percentage balance of financial services firms with levels of business above or below normal.
British Chambers of Commerce Quarterly Economic Survey	Percentage of manufacturing firms operating at or below full capacity; Percentage of services firms operating at or below full capacity; Percentage of manufacturing firms experiencing recruitment difficulties; Percentage of services firms experiencing recruitment difficulties; Percentage of manufacturing firms experiencing difficulties in finding skilled manual and technical staff; Percentage of services firms experiencing difficulties in finding skilled manual and technical staff; Percentage of manufacturing firms experiencing difficulties in finding professional/managerial staff; Percentage of services firms experiencing difficulties in finding professional/managerial staff; Percentage of manufacturing firms experiencing difficulties in finding clerical labour; Percentage of services firms experiencing difficulties in finding clerical labour; Percentage of manufacturing firms experiencing difficulties in finding semi/unskilled staff; and Percentage of services firms experiencing difficulties in finding semi/unskilled staff.
Office for National Statistics (ONS), seasonally adjusted	Number of vacancies per 100 employee jobs, 3-month average.
ONS	Year on year rate of Consumer Price Inflation (CPI) and Retail Price Inflation excluding mortgage interest payments (RPIX); Year on year growth rate of ONS' quarterly Average Earnings Index, seasonally adjusted, for the private sector (all industries and services, including bonuses); Year on year growth rate of ONS' quarterly Average Earnings Index, seasonally adjusted, for the whole economy (manufacturing and services, including bonuses); Year on year percentage change in unit wage costs, whole economy, seasonally adjusted (and unit wage cost growth deflated by RPIX); and Total compensation of employees divided by GVA at basic prices expressed as a percentage.
Non-Accelerating Inflation Rate of Unemployment, NAIRU, estimates from OECD, European Commission; unemployment data from ONS	Estimated UK NAIRU minus unemployment rate seasonally adjusted ILO definition, percentage points difference.
Bank of England Agents	Manufacturing firms' expected capacity constraints over the next six months; Services firms' expected capacity constraints over the next six months; and Quantitative judgement on the scale of general recruitment difficulties across the whole economy (and skill shortages before January 2005).

Source: HM Treasury

denoting a rapidly falling level and +5 denoting rapid growth¹². Data on these indicators were not available to the Treasury at the time of the previous assessment and so could not be used in dating the cycle at that time.

Rolling review assessment of the assumption that a cycle ended in 1997

15 For the 2005 Pre-Budget Report, I concluded that 1997 was a reasonable date for the end of the economic cycle starting in 1986Q2, based on a review of the cyclical indicator evidence used by the Treasury at the time¹³. The evidence I reviewed then has not materially changed. Data for the large majority of the indicators, from surveys, have not altered. The impact of data revisions on the other indicators has been small. My conclusion also rested on revised national accounts data, the effect of which was to lift the estimate of the output gap for 1999, making it less likely that this date was the end of the cycle rather than 1997. While uncertainty inevitably remains, further national accounts data revisions since my 2005 review strengthen the evidence that dating the end of that cycle to 1997 is reasonable. The 2008 Blue Book dataset, produced by the ONS, has revised up GDP growth estimates (as discussed below, see Figure 6) indicating that there was a positive output gap throughout the period between 1997 and 2001.

Assessment of whether the most recently completed cycle ended in the second half of 2006

Movements in the cyclical indicators are not easy to interpret

16 To assess the Treasury's judgement for the end date of the most recently completed cycle as 2006H2, I have reviewed the cyclical indicators in Figure 1, and the Treasury's estimates of the output gap. I also examined a range of available published information from external organisations and consulted those listed in Appendix 1.

17 Appendix 2 shows the time series for the indicators, together with their average levels. To avoid bias which might otherwise be introduced, the period used by the Treasury for the calculation of the average is not always based on the whole sample for which the data are available. For example, averages based on information from only an above trend part of an economic cycle would be likely to overstate the true long run trend value across a cycle as a whole. To the extent that there are uncertainties about the "normal" on-trend levels of some

cyclical indicators, there will also be uncertainty in the comparison between the level of an indicator and its long run average. The Treasury checks whether a series is normally distributed around the average to help alleviate this concern.

18 The results of these tests show that a number of the cyclical indicators, in particular the British Chambers of Commerce indicators, do not appear to be normally distributed in the period since 1989, because the protracted down-phase of the early 1990s biases downwards the long term averages. The Treasury therefore excludes some earlier data from the early 1990s in the calculation of the averages for the affected indicators, re-performing the tests to check the series are normally distributed. Though statistically more satisfactory, the need for such adjustments introduces an additional element of interpretation.

19 A further important issue is that the cyclical indicators are not necessarily coincident with the cycle. They may, for example, lag behind a change in output. For instance, the measured margin of spare capacity in the economy might not be affected immediately if demand falls, because it may take time for employment to respond to the fall in activity. This factor means that a given indicator may not be at its trend value when the economy crosses its long run trend path, and instead reaches its on-trend value some time later. ONS data suggest, for example, that peaks and troughs in employment growth tend to follow those of output growth with a lag.

20 As discussed in my 2005 audit¹⁴, the cyclical indicators approach adopted by the Treasury has the advantage of relating trends in overall output to a wide range of variables. As a test of the usefulness of the indicators, the Treasury has calculated correlations between year-on-year changes in the indicators and changes in non-oil Gross Value Added, which generally show statistically significant linkages¹⁵.

21 Although in principle some indicators might be given more weight than others, there is no clear-cut methodology for doing so. As a result, conclusions drawn using the method may not be replicable by others unless the judgements are made widely known. I recommended in my 2005 review that to address this issue, the Treasury should publish a full account of how it has used the cyclical indicators in forming its judgement on the cycle end date. This has been published with the 2008 Pre-Budget Report¹⁶.

¹² Ellis, C and Pike, T *Introducing the Agents' scores*, Bank of England Quarterly Bulletin, Winter 2005, pages 424–30.

¹³ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraphs 49–63.

¹⁴ See *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraph 31.

¹⁵ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraph 43.

¹⁶ *Evidence on the economic cycle*, HM Treasury, November 2008.

22 A final point on the use of the cyclical indicators approach is that the long term averages for the indicators are also affected as new data are produced. This might not normally be a concern, but with prospects for a less buoyant economy than in the past, a period of lower growth could influence the historic average rather more. As a result, views of what the “normal” levels of indicators are may be changed, affecting judgements about the end date of the cycle at a later point. The Treasury’s approach to testing whether the data are symmetrically distributed around the trend is designed to reduce this problem.

23 The Treasury’s methodology for dating the economic cycle is to examine the cyclical indicators to identify on-trend points and then use estimates of the output gap to assess whether on-trend points are dates for the end of the economic cycle. Under the Treasury’s definition, an on-trend point is only an end date of the cycle if output crosses its trend decisively.

24 The work I undertook for my 2005 review of the dating of the economic cycle indicates, however, that making judgements about the date of on-trend points on the basis of cyclical indicators is an uncertain process. In particular, it is unlikely to be the case that all cyclical indicators will be at their long term average at an on-trend point in output¹⁷ and it may not be straightforward to identify on-trend points if the economy is operating close to trend. Given this possible ambiguity, I have examined Treasury estimates of the output gap, to see when they suggest that the economy was passing through trend.

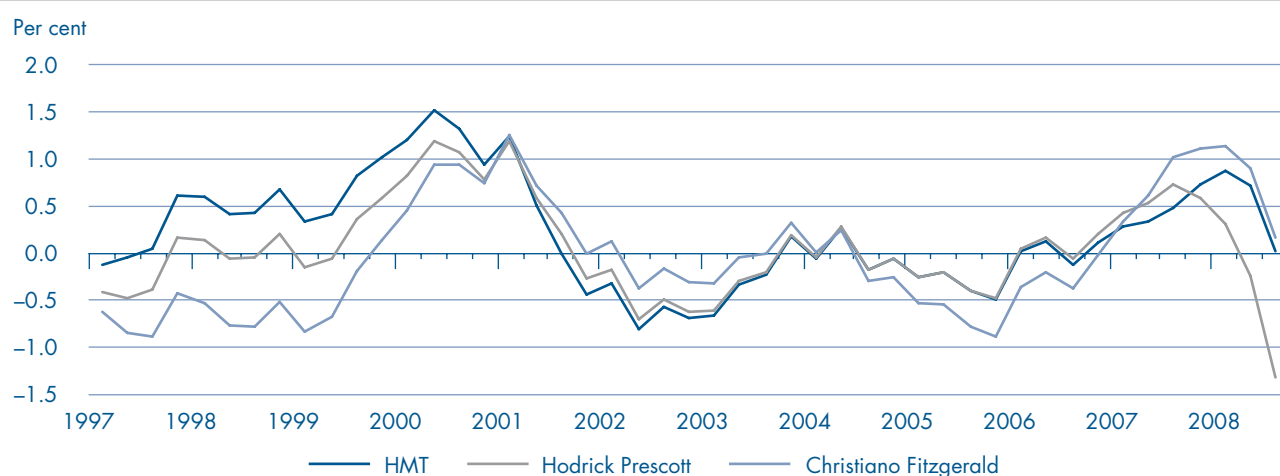
25 The output gap is calculated by subtracting an estimate of the trend level of output from actual output. Details of the Treasury’s approach to estimating trend growth, based on the decomposition of output, are set out in *Trend growth: new evidence and prospects*¹⁸. The Treasury’s latest estimates of trend output growth and its decomposition are set out in Annex A of the 2008 Pre-Budget Report.

26 In line with my recommendation in 2005¹⁹, the Treasury has made additional estimates of the output gap, using the Hodrick-Prescott and Christiano-Fitzgerald statistical filtering methods. **Figure 2** shows the results. All estimates indicate that there was an on-trend point in 2006, but they also suggest the possibility of an on-trend point in late 2003/early 2004 as well.

Assessment of the cyclical indicators supports both 2004 and 2006 as on-trend points

27 **Figure 3** presents an assessment of the position of each cyclical indicator in the second half of 2006 relative to its long run average. Given the evidence above that 2004H1 may have been an on-trend point, Figure 3 also presents information on the position then. Since the indicators may be lagged in relation to output, Figure 3 additionally shows whether an indicator passes upwards through trend within three quarters, as a simple way of recognising that some variables will lag output.

2 Alternative Treasury estimates of the output gap, percentage points difference from trend, quarterly non-oil GVA, up to 2008Q3



Source: HM Treasury

¹⁷ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraphs 51, 52.

¹⁸ HM Treasury, 2006. The 2008 Pre-Budget Report provides an updated assessment.

¹⁹ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraph 79.

3 Position of the cyclical indicators in relation to their long run averages¹, above (+), below (-) or at its average level (on), in 2004 H1 and 2006 H2

	Indicator		First half 2004	Lag before passing upwards through trend ²	Second half 2006	Lag before passing upwards through trend ²
1	Percentage of manufacturing firms operating at or above full capacity		On	n/a ³	+	n/a
2	Percentage of manufacturing firms operating at full capacity		On	n/a	On	n/a
3	Manufacturing firms' expected capacity constraints over the next six months		On	n/a	+	n/a
4	Percentage of services firms operating at full capacity		On	n/a	+	n/a
5	Services firms' expected capacity constraints over the next six months		-	1 quarter	+	n/a
6	Percentage of financial firms with business above or below normal		+	n/a	+	n/a
7	Quantitative judgement on the scale of general recruitment difficulties across the whole economy		+	n/a	-	3 quarters
8	Percentage of manufacturing firms experiencing recruitment difficulties		+	n/a	-	3 quarters
9	Percentage of services firms experiencing recruitment difficulties		-	2 quarters	-	1 quarter
10	Percentage of manufacturing firms experiencing skilled labour recruitment difficulties		On	n/a	On	n/a
11	Percentage of manufacturing firms experiencing difficulties in finding skilled manual and technical staff		+	n/a	+	n/a
12	Percentage of services firms experiencing difficulties in finding skilled manual and technical staff		+	n/a	+	n/a
13	Percentage of manufacturing firms experiencing difficulties in finding professional/managerial staff		+	n/a	+	n/a
14	Percentage of services firms experiencing difficulties in finding professional/managerial staff		On	n/a	On	n/a
15	Percentage of manufacturing firms experiencing difficulties in finding clerical labour		-	1 quarter	+	n/a
16	Percentage of services firms experiencing difficulties in finding clerical labour		On	n/a	On	n/a
17	Percentage of manufacturing firms experiencing difficulties in finding semi/unskilled staff		+	n/a	-	3 quarters
18	Percentage of services firms experiencing difficulties in finding semi/unskilled staff		+	n/a	On	n/a
19	Number of vacancies per 100 employee jobs		On	n/a	-	1 quarter
20	Estimated UK NAIRU minus unemployment rate seasonally adjusted (ILO definition, percentage points difference)	OECD EC	+ On	n/a n/a	On -	n/a No
21	Year on year rate of Consumer Price Index (CPI) and Retail Price Index excluding mortgage interest payments (RPIX)	RPIX CPI	- -	No ⁴ No	+ +	n/a n/a
22	Year on year growth rate of ONS' quarterly Average Earnings Index, seasonally adjusted, for the private sector (all industries and services, including bonuses)	All private sector industries Private sector service industries	On -	n/a 1 quarter	- On	1 quarter n/a

3 Position of the cyclical indicators in relation to their long run averages¹, above (+), below (-) or at its average level (on), in 2004 H1 and 2006 H2 (*continued*)

Indicator		First half 2004	Lag before passing upwards through trend ²	Second half 2006	Lag before passing upwards through trend ²
23 Year on year growth rate of ONS' quarterly Average Earnings Index, seasonally adjusted, for the whole economy (manufacturing and services, including bonuses)	Manufacturing	–	No	+	n/a
	Services	–	1 quarter	–	No
24 Year on year percentage change in unit wage costs, whole economy, seasonally adjusted (and unit wage cost growth deflated by RPIX)	Unit wage costs	–	2 quarters	On	n/a
	Real unit wage costs	–	No	–	No
25 Total compensation of employees divided by GVA at basic prices expressed as a percentage		Stable	n/a	Declining	n/a

Source: National Audit Office

NOTE

1 Where a complete data series is not normally distributed, the Treasury uses a shorter time period to calculate the average, see Appendix 2 for details. In these cases, the assessments above are based on the shorter time series. Otherwise, assessment has been made against the average of the full data series. A data series has been taken as "on" trend if it is at its long term average value in either quarter of the half year being examined.

2 Indicators which are not on-trend at 2004H1 or 2006H2 may become on-trend later if the indicator lags output changes. The "Lag" measures whether the series passed through trend within three quarters after the half year in question. This is to allow for the fact that some indicators may lag output. The Treasury believes, for example, that hours worked lag output by one quarter and employment lags by three quarters. This test was applied only if a series was moving up through trend, since output was assumed to be in an up-phase.

3 n/a = not applicable because data series not passing upwards through trend.

4 No = no upward crossing of the long run trend for the series within three quarters.

28 Figure 3 shows that only a minority of the cyclical indicators were at their long term trend value in either 2004H1 or 2006H2. About a third of the indicators in 2004H1, mainly those relating to capacity, were on trend. Only about a quarter were on trend in 2006H2. In my 2005 review of the economic cycle ending in the late 1990s, around a half of the indicators were on trend²⁰. This indicates the uncertainty in dating the cycle from 2004 until 2006.

29 Furthermore, one indicator that was previously well linked to on-trend points,²¹ the labour share of national output, does not indicate that 2006 in particular was an on-trend point. **Figure 4** shows that labour incomes as a percentage of national income were falling in 2006.

30 Allowing for possible lags strengthens the case for both 2004H1 and 2006H2 as on-trend points. Around half of the indicators were or could be regarded as being on trend if lags are taken into account using the method used. This is, however, a simple approach, as there is some uncertainty as to what the appropriate lag structure is.

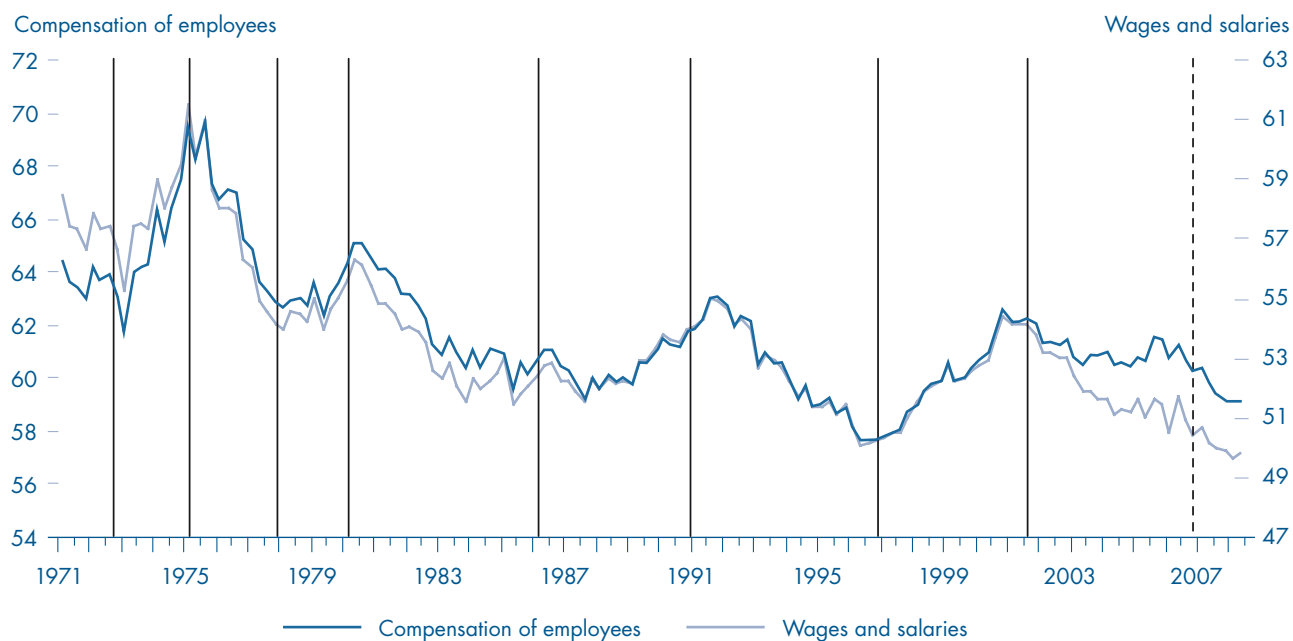
The evidence suggests that output crossed trend more decisively, as required by the Treasury's definition of an end cycle date, in 2006 than in 2004

31 For an on-trend point to qualify as the end date of the economic cycle, the Treasury requires that output must cross trend decisively. The output gap estimates in Figure 2 above show that output crossed trend more strongly in 2006 than 2004. Further evidence to this effect comes from looking at the output gap calculated for the market sector. The market sector responds more directly to pressure of demand than measured by the whole economy, including the non-trading public sector. The market sector may therefore be a more direct indicator of the cycle. **Figure 5** shows the Treasury's estimate of the output gap for both the whole economy and the market sector, conditional on the assumption that 2006H2 was an on-trend point. The market sector based measure of the output gap suggests that output moved decisively through trend in 2006 but not at all in 2004.

²⁰ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, Figure 4.

²¹ *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06, paragraph 60.

4 Turning points in the labour share in national income



Source: HM Treasury

NOTE

Vertical lines indicate on-trend points as judged by the Treasury.

5 Treasury estimates of the whole economy and market sector output gap, percentage difference from trend, non-oil GVA, 1997 to 2008



Source: HM Treasury

32 The case for regarding 2004 as an on-trend point has become weaker in light of data revisions since Budget 2008.

Figure 6 shows the most recent Treasury estimates, as set out in the 2008 Pre-Budget Report, incorporating ONS data revisions to non-oil GVA since the 2008 Budget and trend output as indicated in paragraph 4. While trends in 2006 are largely unchanged by the revised data, the extent to which the economy as a whole rose above trend in 2004 is now limited. It remains to be seen what impact any further data revisions will have on the estimates of the output gap, which exhibit some volatility. The evidence from the cyclical indicators does, however, provide some reassurance on the current profile of the output gap. In particular, many of the cyclical indicators remained elevated in 2007, supporting the evidence from the output gap estimates that the move through trend in 2006H2 was “decisive”.

33 Organisations including the OECD, EC and IMF make estimates of the output gap using the production function approach, though the EC also produces an estimate using a statistical filter, **Figure 7**. I consulted other organisations and estimates made by Oxford Economics using a production function approach are also shown in **Figure 7**. Not all organisations consulted publish estimates of the output

gap, because they are not needed within their forecasting methodology. Others were able to provide general views but were not able to provide up to date estimates of the output gap within the time available for my audit.

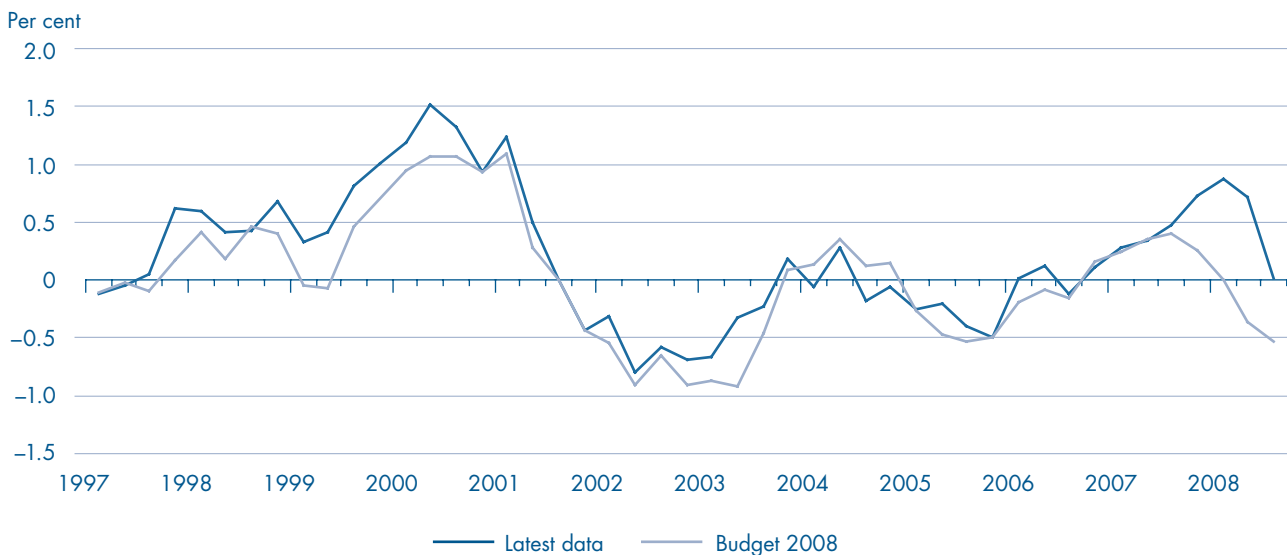
34 The external organisation estimates of the output gap in **Figure 7**, other than the IMF’s, suggest that 2004 was a period of buoyancy in the economy. The IMF estimates indicate that 2004 could be considered as an on-trend point, though the upturn was short lived. The evidence for 2006 as on-trend point is somewhat stronger, though only the OECD and IMF estimates show a crossing of trend.

35 The external organisations I consulted were keen to stress the uncertainties in estimating the output gap, and judging if the economy was on trend and whether a given point was the end of an economic cycle. They felt that actual output had been closer to trend in recent years than in the past, which made it difficult to assess whether movements in the output gap represented real cyclical movements. They also pointed to data revisions as a source of uncertainty and ambiguity surrounding economic cycle dating, which might in the future change opinion about the end date of the previous cycle, as was the case for my 2005 review²².

6

Treasury estimates of the whole economy output gap based on data available at Budget 2008 and up to 2008Q3, non-oil GVA, percentage difference from trend

Treasury estimates of output gap from 1997 to date based on Budget 2008 and latest revisions of non oil GVA



Source: HM Treasury

²² See paragraphs 15 to 18, *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06.

Conclusion and recommendations on the assumption that 2006H2 represents the end date of the most recently completed cycle

36 There are many uncertainties in dating economic cycles. The main Treasury methodology is based on a wide range of cyclical indicators and provides support for regarding 2006H2 as an on-trend point, but this is also true for 2004H1. At both dates the evidence in terms of the numbers of indicators being at trend level is weaker than in the late 1990s, when that cycle was judged to have been completed, though allowing for possible lags in the indicators provides better support.

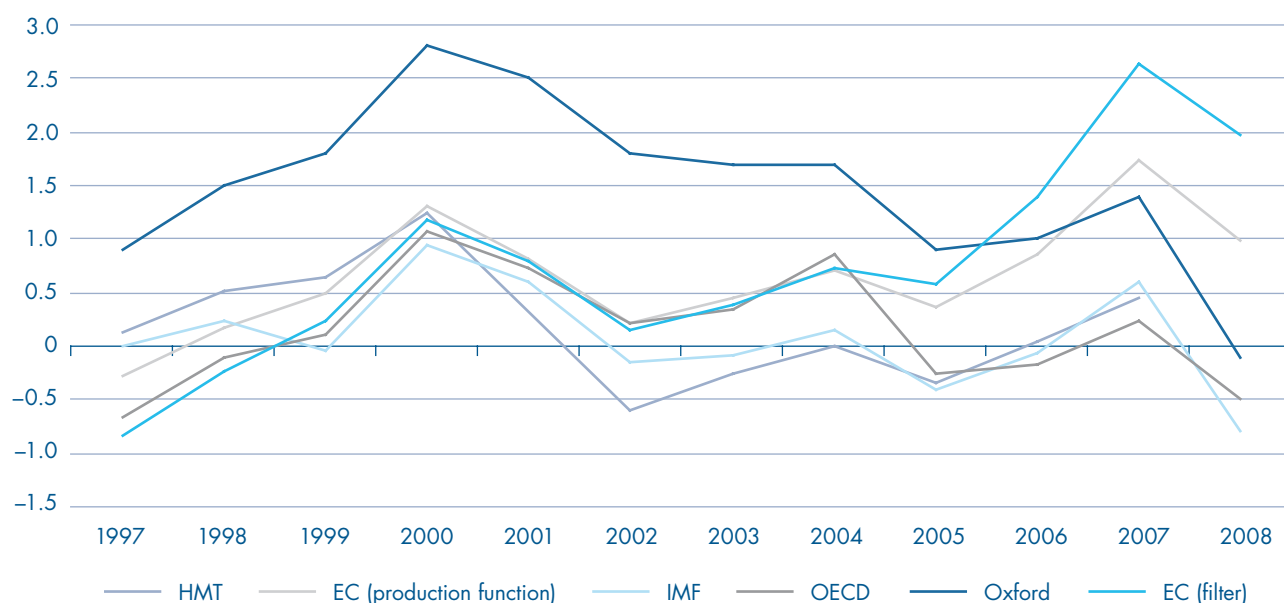
37 Evidence from the wide range of cyclical indicators monitored by the Treasury, taken together with the Treasury's latest output gap estimates – particularly those based on market sector activity, which may reflect cyclical developments more closely – suggest that output crossed trend “decisively” only in 2006, though the evidence on this from external organisations is more mixed.

38 No one element of the evidence I have reviewed is conclusive by itself, nor is the evidence free of inconsistencies. This is true of all methodologies for judging the cycle, and as set out in my 2005 report, the Treasury's methodology is a reasonable one, bringing a wide range

of information to bear. Taking all the evidence available as a whole, the data provide support for concluding that 2006H2 was an on-trend point for the economy and that on the basis of some output gap information, this is a more likely date for the end of the cycle than 2004. On this basis, it is reasonable to conclude currently that the second half of 2006 marked the end date of the most recently completed economic cycle.

39 Looking forward, the uncertainties raised by the prospect of asymmetric developments around trend, with the onset of recession, and the impact of new data in the future, may shed further light on the point of transition between the previous cycle and the current one. As has happened in the past, such developments could lead to a change of judgement. Only when the new cycle is further advanced, and its shape is more apparent, will it be possible to make a more complete judgement on when it began, as was the case for the start date of the now completed cycle. I therefore recommend that the Treasury keeps the assumed date for the end of the most recently completed economic cycle under review in the light of the uncertainties and that it continues to assess the conclusions to be drawn from using a variety of approaches for estimating the output gap, which has proved useful to date.

7 Estimates of the output gap made by external organisations¹



Sources: OECD Economic Outlook, No 83, June 2008; IMF World Economic Outlook Update, November 2008; European Commission, Autumn Forecast, October 2008; Oxford Economics, Economic Outlook, October 2008

NOTE

¹ Figures for 2008 are based in part on forecast output for quarters where outturn is not yet known.

The convention for future oil prices

The Treasury bases its projections of future oil prices on the average of independent forecasts

40 The oil price convention is formulated in terms of the US dollar price of Brent crude oil in real terms, where the deflator used is an index of world manufactures prices. The Treasury requires forecasts of future oil prices on this basis mainly for estimating revenues from the oil industry. These currently amount to around two per cent of all tax revenues. The Treasury estimates that, other things being equal, a \$1 increase in oil prices would raise North Sea tax revenues by £150 million in the first year. In the past two years, the paths for oil and gas prices have diverged sharply at times, but if gas prices moved in line with oil prices the Treasury puts the fiscal impact of a \$1 increase in oil prices at £200 million in the first year.²³

41 The oil price convention used by the Treasury assumes that:

- “The oil price will be based on the average of independent forecasts for one year ahead. If the average of independent forecasts shows a fall in the oil price, that price in real terms will be used for the remainder of the five year forecast period. If the average of independent forecasts one year ahead shows a rise, then oil prices are taken to be close to their current levels in nominal dollar terms over the coming year, and assumed to remain flat in real terms thereafter.”

42 Within the convention, “current levels in nominal dollar terms” are taken to be the average price of the previous three months. The independent forecasts used are those contained in the Treasury’s publication *Forecasts for the UK Economy*.

43 **Figure 8** shows that the oil price convention used by the Treasury between 2005 and 2008 produced forecasts consistently below actual prices for each Budget and Pre-Budget forecast. The average outturn oil price in 2006

was \$8.7 per barrel higher than forecast in Budget 2006, and in 2007 was \$14.3 greater than forecast in Budget 2007. Using the Treasury estimate above for just oil rather than oil and gas prices, revenues were under forecast by about approximately £1.3 billion and £2.1 billion in these two years respectively. In the light of this the oil price convention proved cautious over the rolling review period.

44 For the future, very considerable uncertainty attaches to forecasts of oil prices. My previous reports discussed alternative approaches for forecasting oil prices, such as using information from the oil futures market and extrapolation of past trends²⁴. Both of these approaches had and continue to have significant deficiencies. The futures market tends to be highly influenced by the spot market and so may well not be a reliable indicator of longer term prices. Extrapolation may miss turning points and be unreliable.

45 To add further caution for the future the Treasury proposes a small change to the way the convention is applied. Rather than take “current” levels of oil prices as the average nominal price over the last three months, the Treasury will use the lower of either this or the average nominal price over the last month. This change will act to increase the level of caution in a period when the oil price has been consistently falling over the previous three months, as has been recently experienced.

Conclusion and recommendation on the use of the oil price convention

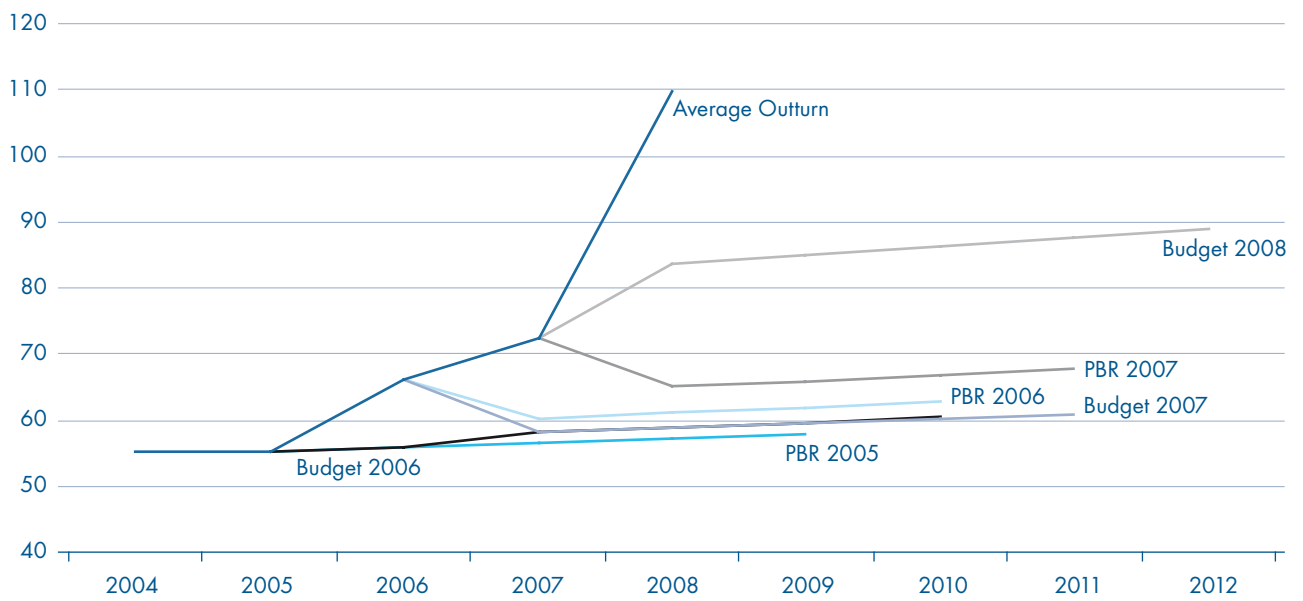
46 The convention was a cautious one over the three year period of the rolling review from 2005 and embodies elements designed to provide caution in the future. There is no clearly better method available and the convention remains a reasonable one for establishing the level of oil tax revenues incorporated in the fiscal projections. Large uncertainties in predicted oil prices remain, however, and given recent movements in oil prices in both directions, the Treasury should continue to monitor each previous forecast as a new one is made, to assess the degree of caution achieved.

²³ The Treasury notes, however, that there are a number of offsetting effects that mean the impact of higher oil prices on the public finances as a whole will be reduced. For example, higher pump prices reduce demand and thus revenues from fuel duties. Temporarily higher inflation will increase the indexation of various allowances and benefits and then payments made.

²⁴ *Audit of the Future Oil Price Convention for the November 1999 Pre-Budget Report*, HC 873, Session 1998-99; *Audit of Assumptions for the 2002 Pre-Budget Report*, HC 109, Session 2002-03; and *Audit of Assumptions for the 2005 Pre-Budget Report*, HC 707, Session 2005-06.

8

Annual average price of Brent crude, US \$ and Treasury forecasts over the three year rolling review period since the 2005 Pre-Budget Report



Source: HM Treasury

APPENDIX ONE

List of organisations consulted

International Monetary Fund

ITEM Club

Morgan Stanley

National Institute of Economic and Social Research

Oxford Economics

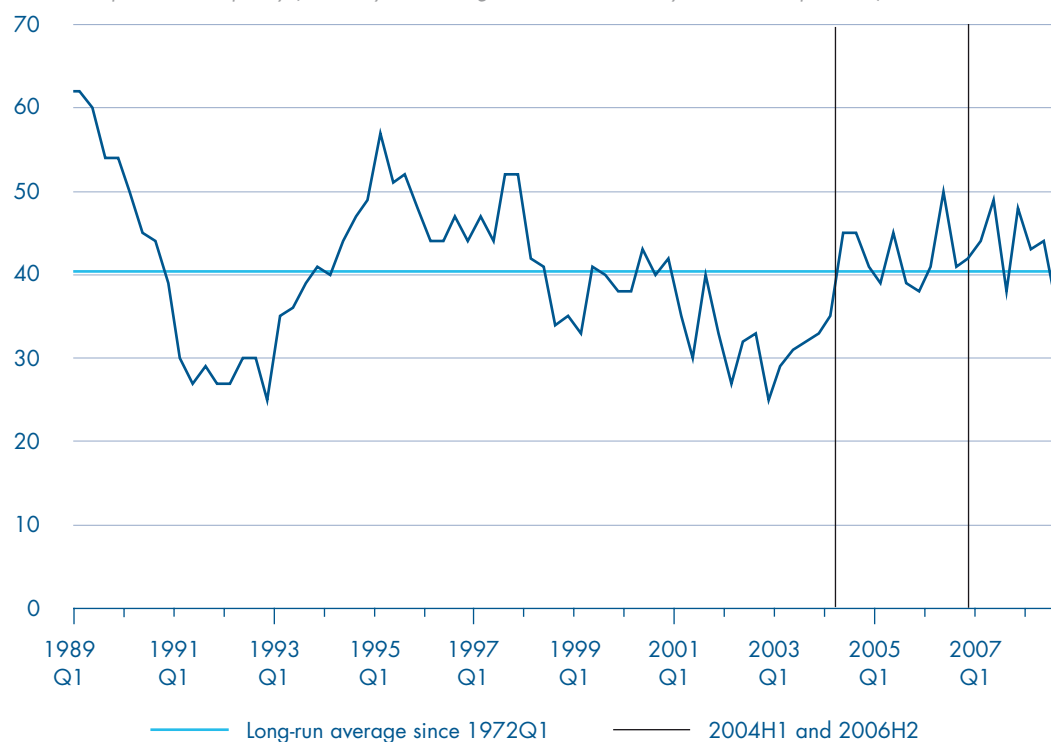
APPENDIX TWO

Cyclical Indicators used by HM Treasury

The following charts show the data series as provided by the Treasury for each cyclical indicator and its long run average. The vertical lines denote the first half of 2004, taken as between Q1 and Q2, and the second half of 2006, taken as between Q3 and Q4.

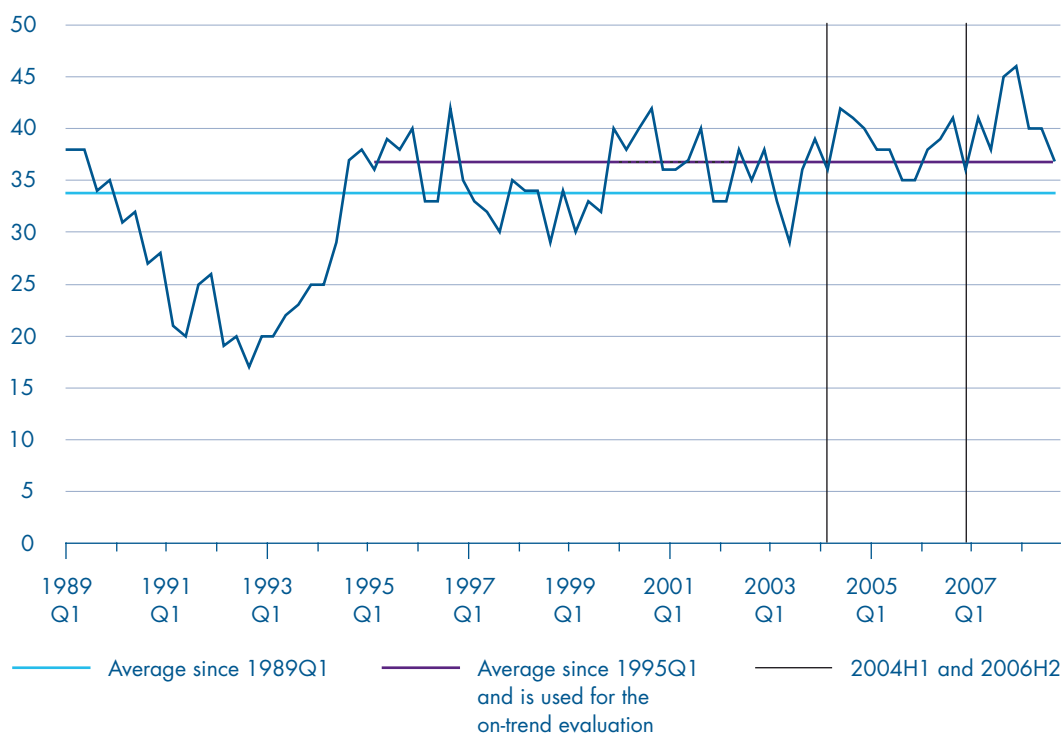
1 CBI Industrial Trends Survey: Capacity Utilisation (Manufacturing)

This shows the percentage of firms operating at or above full capacity. The survey question is "Is your present level of output below capacity (i.e. are you working below a satisfactory full rate of operation)?"



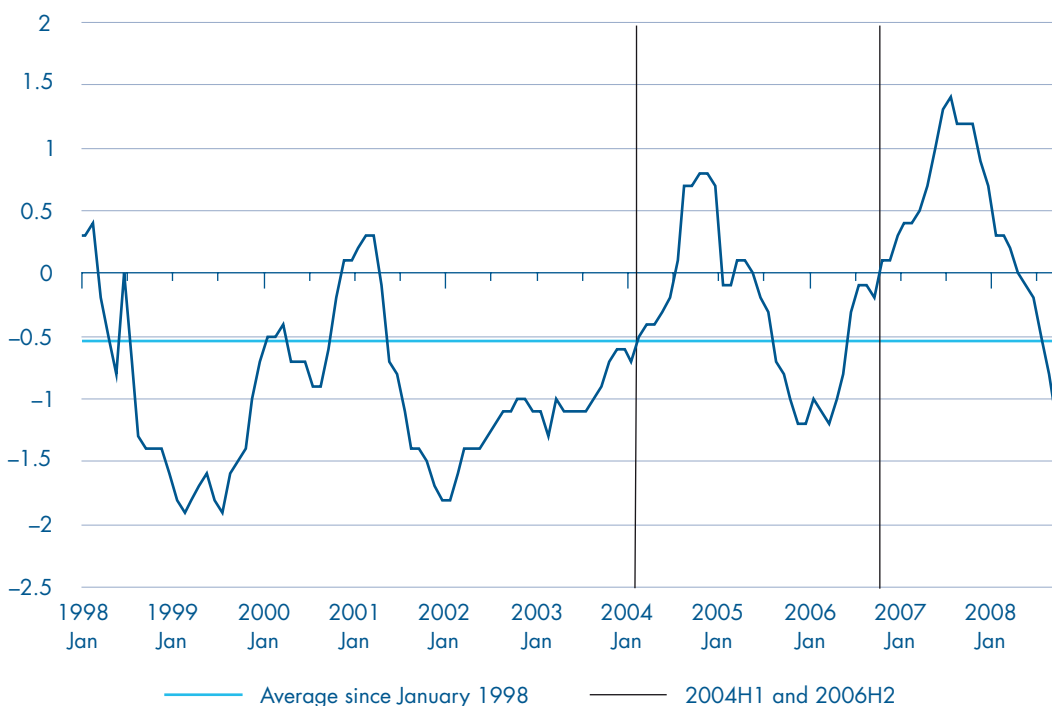
2 British Chambers of Commerce Quarterly Survey: Capacity Utilisation (Manufacturing)

This shows the percentage of firms operating at or below full capacity. The survey question is "Are you currently operating at full capacity/below full capacity?"



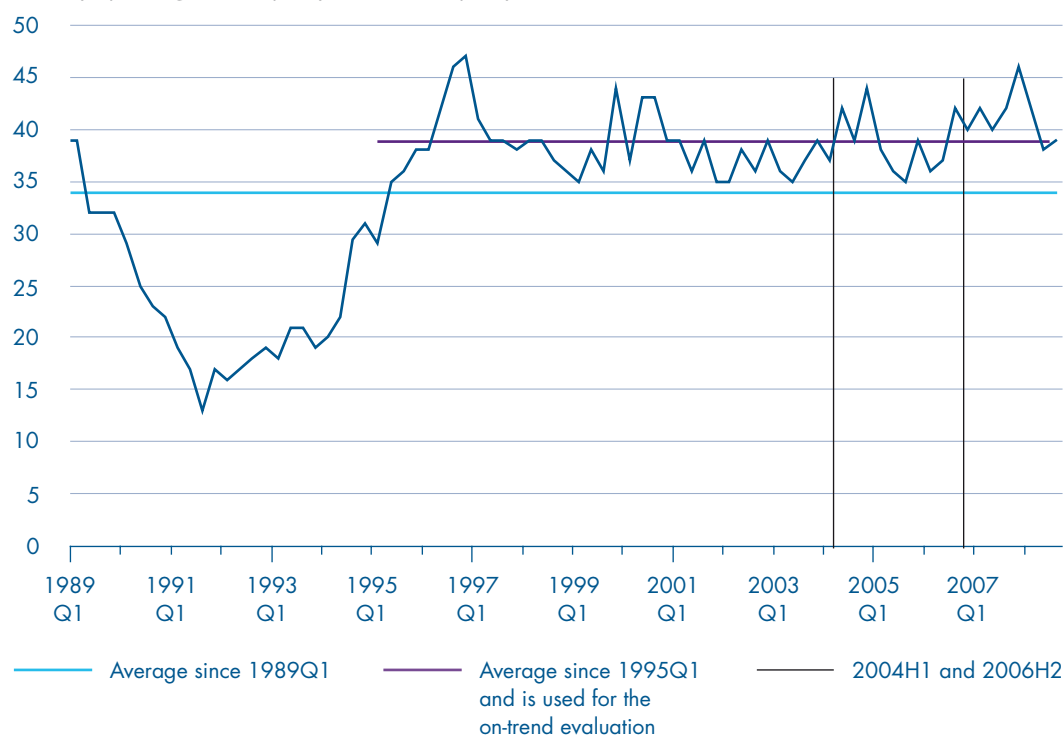
3 Bank of England: Capacity Utilisation (Manufacturing)

This shows the scores reflecting quantitative judgement on expected capacity constraints over the next six months. Before January 2005 the score was based on companies' current situation, rather than being forward-looking. Scores range from -5 to +5.



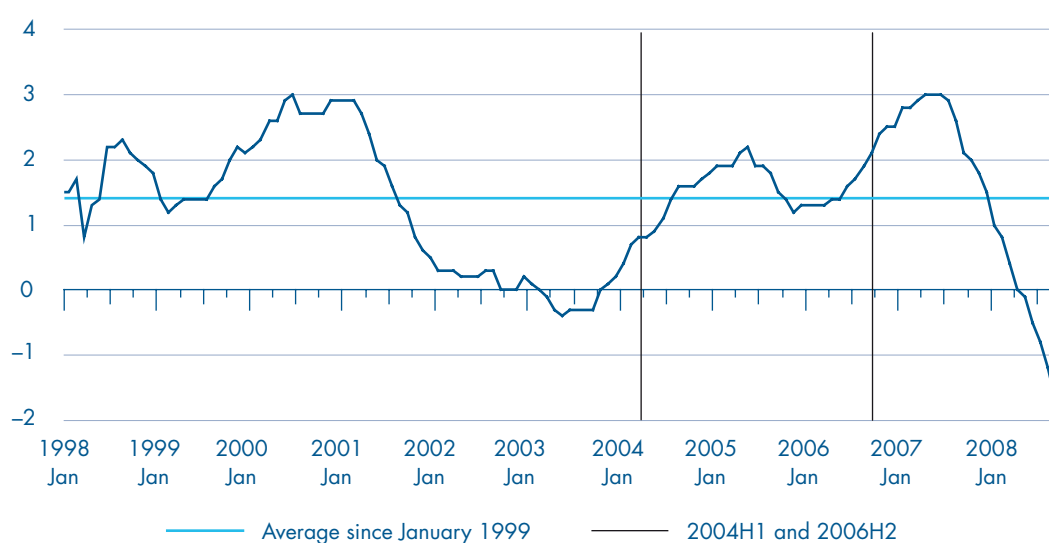
4 British Chambers of Commerce Quarterly Survey: Capacity Utilisation (Services)

This shows the percentage of services firms operating at or below full capacity. The survey question is "Are you currently operating at full capacity/below full capacity?"



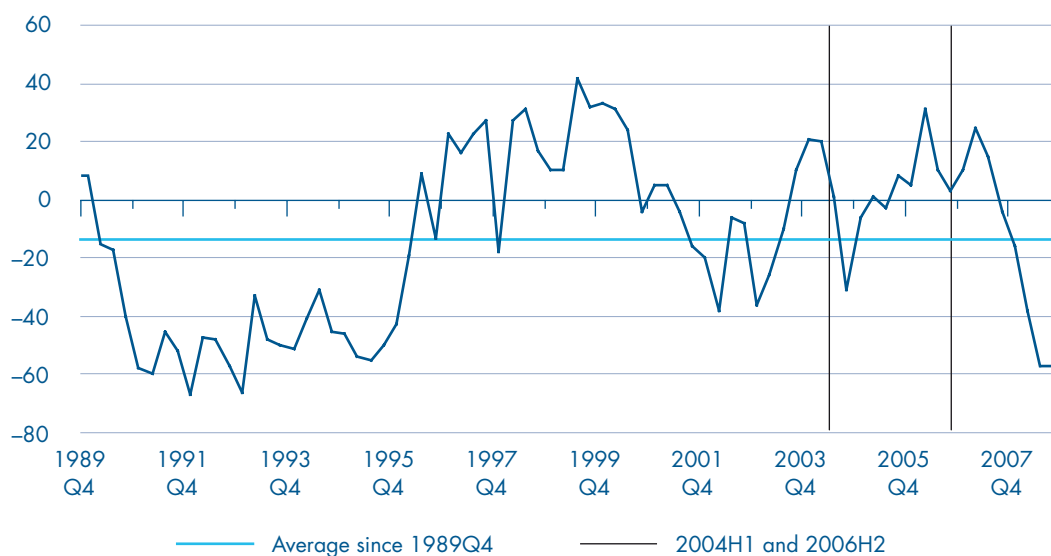
5 Bank of England: Capacity Utilisation (Services)

This shows the scores reflecting quantitative judgement on expected capacity constraints over the next six months. Before January 2005 the score was based on companies' current situation, rather than being forward-looking. Scores range from -5 to +5.



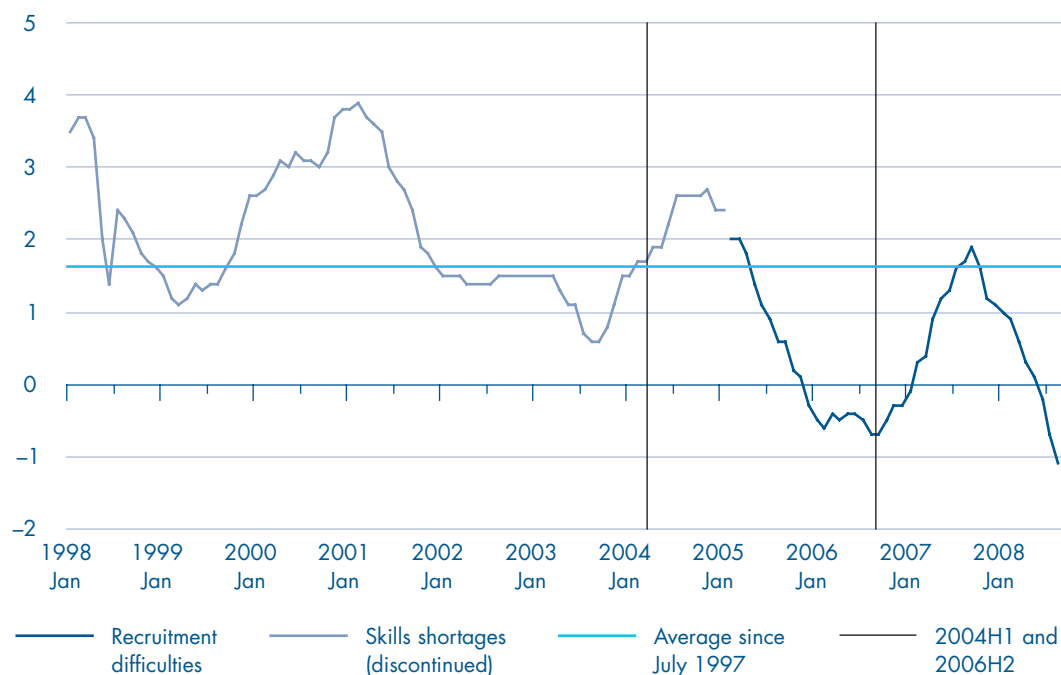
6 CBI/Price Waterhouse Coopers Financial Services Survey: Capacity Utilisation (Financial Services)

This shows the percentage point difference between financial services firms operating at above and below normal levels. The survey question is "Excluding seasonal variations, do you consider that in levels terms, your present level of business is above/below normal?"



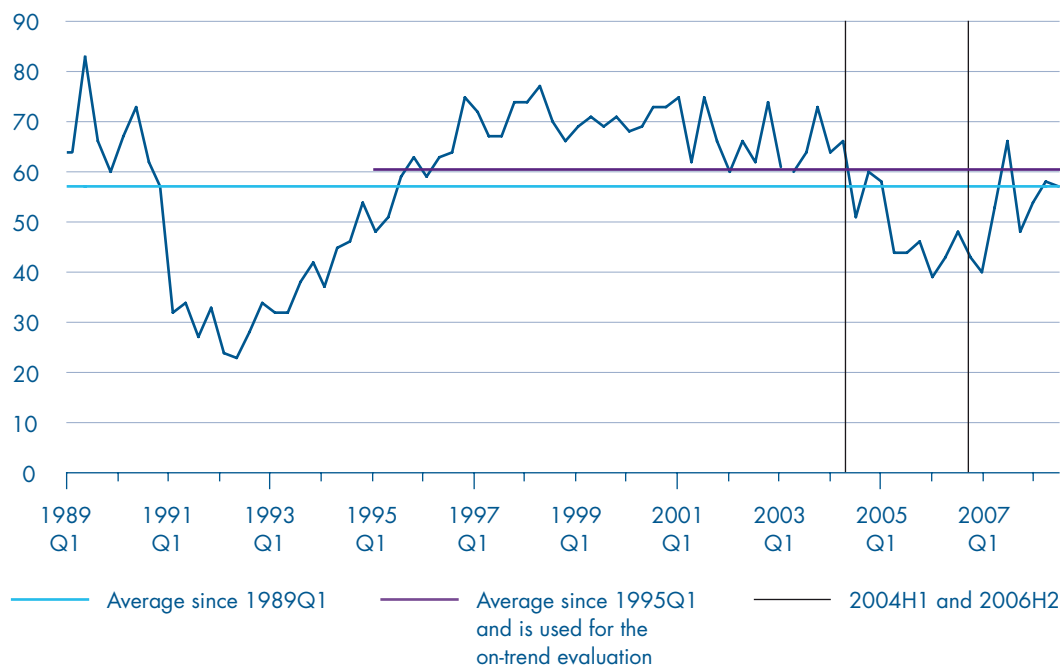
7 Bank of England: Overall Recruitment Difficulties (Whole economy)

This shows the scores reflecting quantitative judgement on the scale of overall recruitment difficulties across the economy. Before January 2005 the score reflected skill shortages. Scores range from -5 to +5.



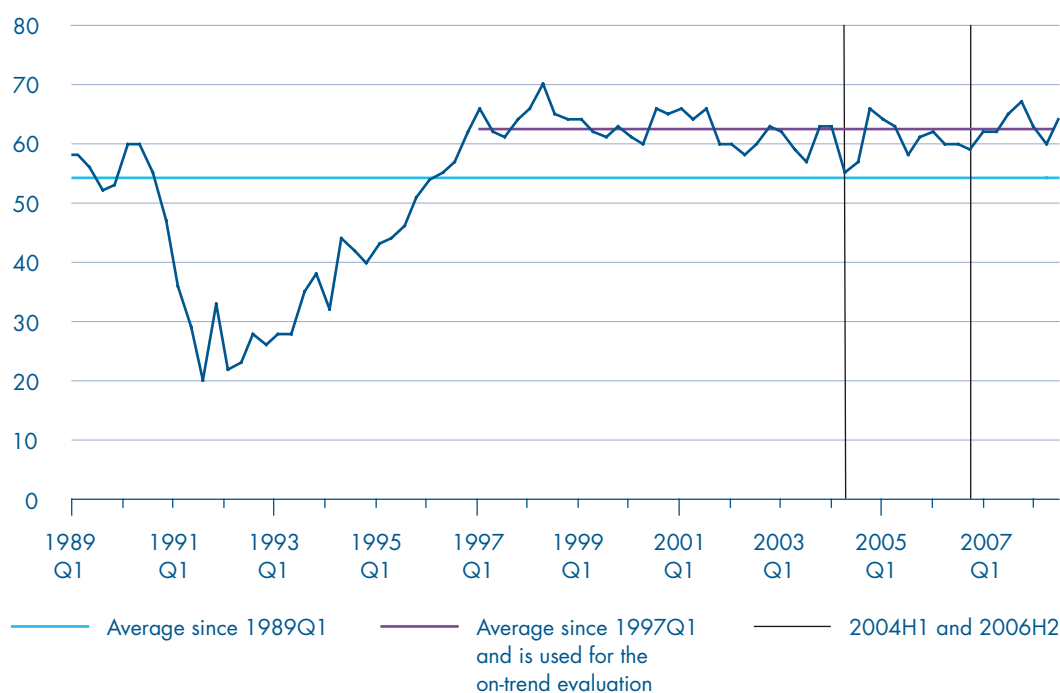
8 British Chambers of Commerce Quarterly Survey: Overall Recruitment Difficulties (Manufacturing)

This shows the percentage of manufacturing firms experiencing recruitment difficulties. The survey question is "Did you experience any difficulties finding suitable staff?" The data series reflects the percentage of firms answering "yes"



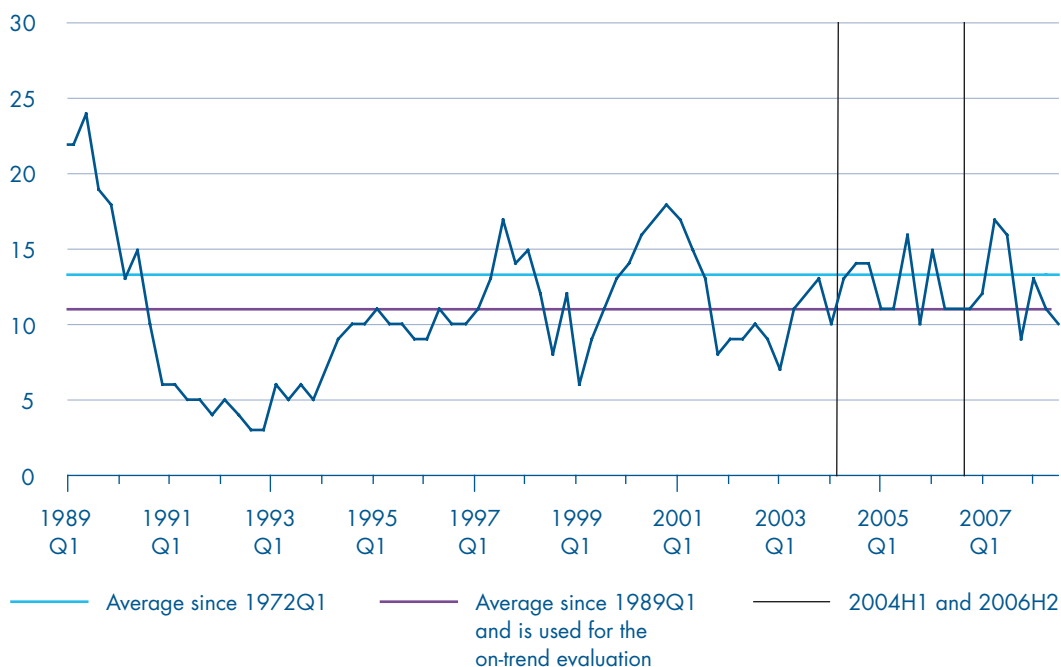
9 British Chambers of Commerce Quarterly Survey: Overall Recruitment Difficulties (Services)

This shows the percentage of services firms experiencing recruitment difficulties. The survey question is "Did you experience any difficulties finding suitable staff?" The data series reflects the percentage of firms answering "yes".



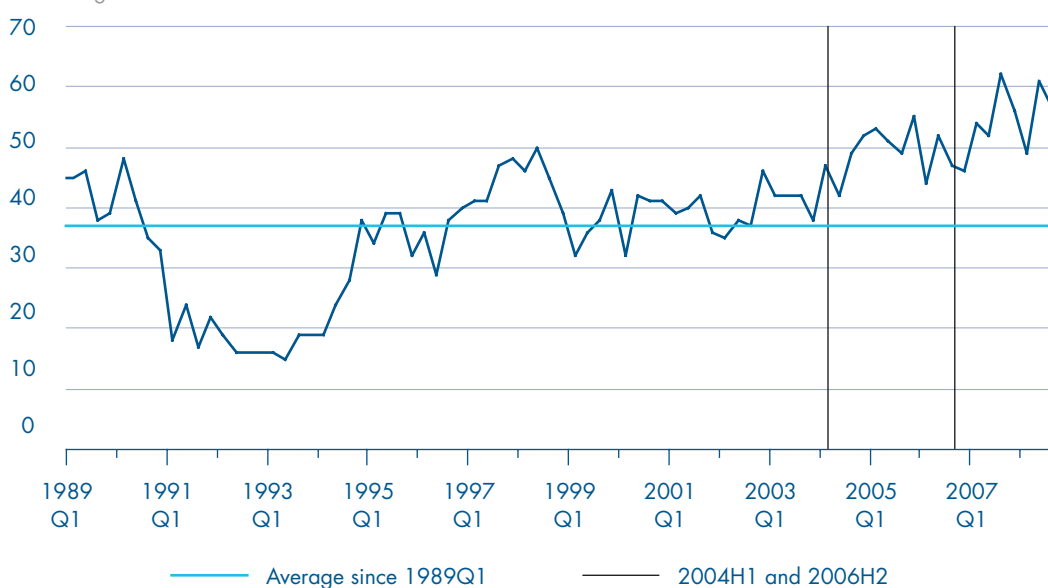
10 CBI Industrial Trends Survey: Skilled Labour Constraint on Output (Manufacturing)

This shows the percentage of manufacturing firms experiencing skilled labour recruitment difficulties. Survey question is "What factors are likely to limit your output over the next three months?" The data series reflects the percentage of firms answering "skilled labour".



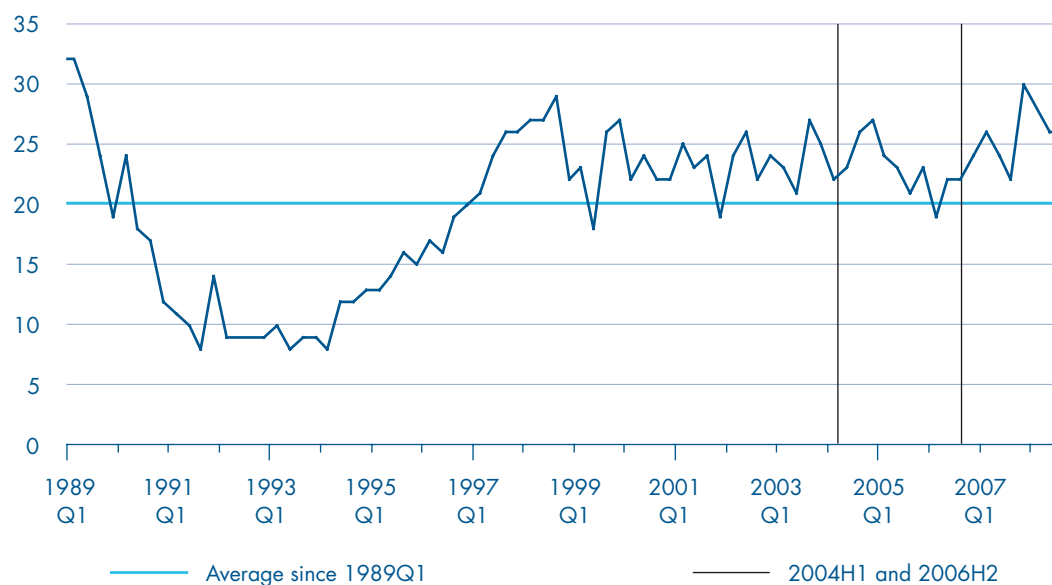
11 British Chambers of Commerce Quarterly Survey: Skilled Manual Labour Constraint (Manufacturing)

This shows the percentage of firms experiencing skilled manual labour recruitment difficulties. This question follows on from the 'overall recruitment difficulties' question. The survey question is "For which of the following categories did you experience difficulties in finding suitable staff?" The data series reflects the percentage of firms answering "skilled manual and technical".



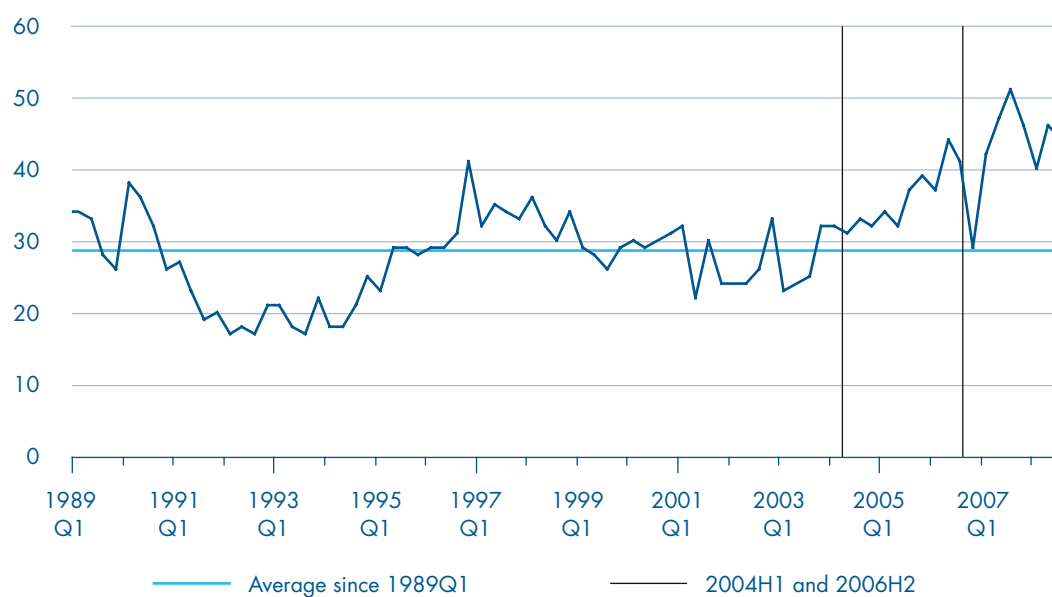
12 British Chambers of Commerce Quarterly Survey: Skilled Manual Labour Constraint (Services)

This shows the percentage of firms experiencing skilled manual labour recruitment difficulties. This question follows on from the 'overall recruitment difficulties' question. The survey question is "For which of the following categories did you experience difficulties in finding suitable staff?" The data series reflects the percentage of firms answering "skilled manual and technical".



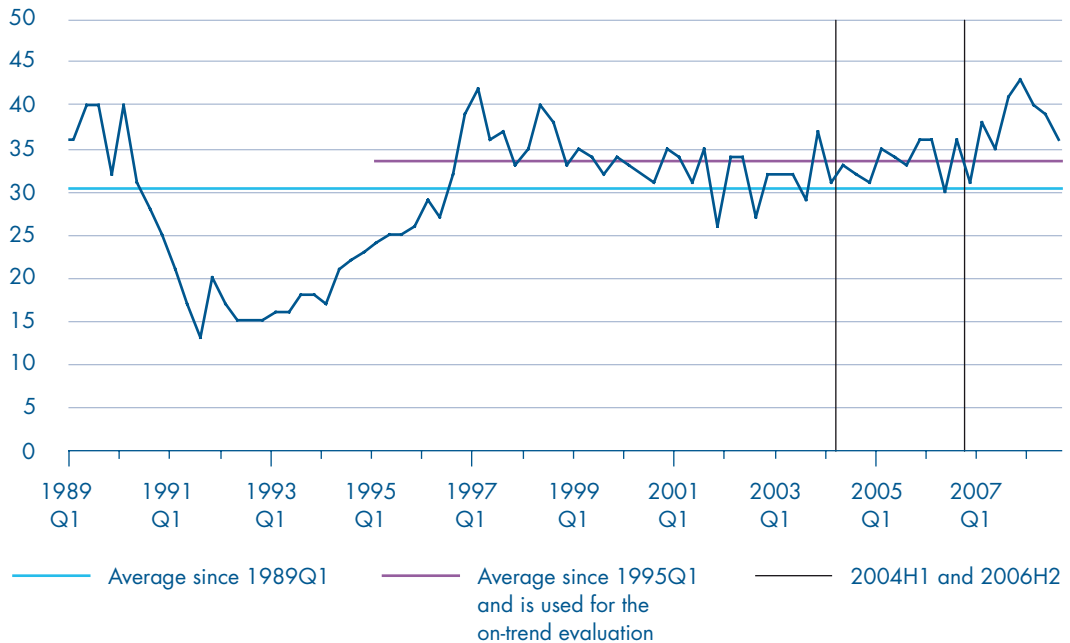
13 British Chambers of Commerce Quarterly Survey: Professional/Managerial labour constraint (Manufacturing)

This shows the percentage of manufacturing firms experiencing professional/managerial labour recruitment difficulties. This question follows on from the 'overall recruitment difficulties' question. The survey question is "For which of the following categories did you experience difficulties in finding suitable staff?" The data series reflects the percentage of firms answering "professional/managerial".



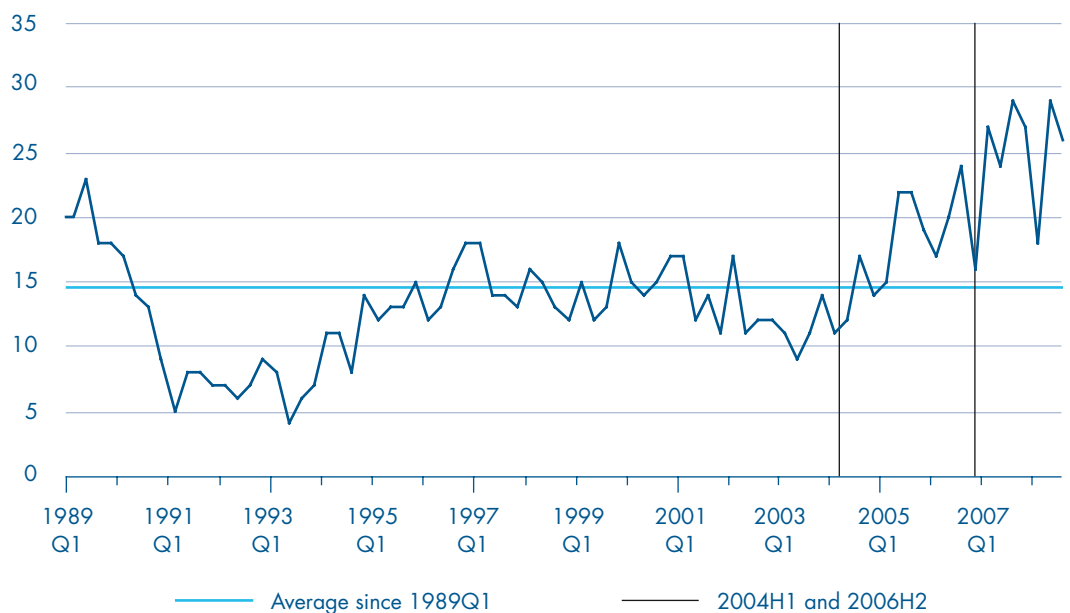
14 British Chambers of Commerce Quarterly Survey: Professional/Managerial labour constraint (Services)

This shows the percentage of services firms experiencing professional/managerial labour recruitment difficulties. This question follows on from the 'overall recruitment difficulties' question. The survey question is "For which of the following categories did you experience difficulties in finding suitable staff?" The data series reflects the percentage of firms answering "professional/managerial".



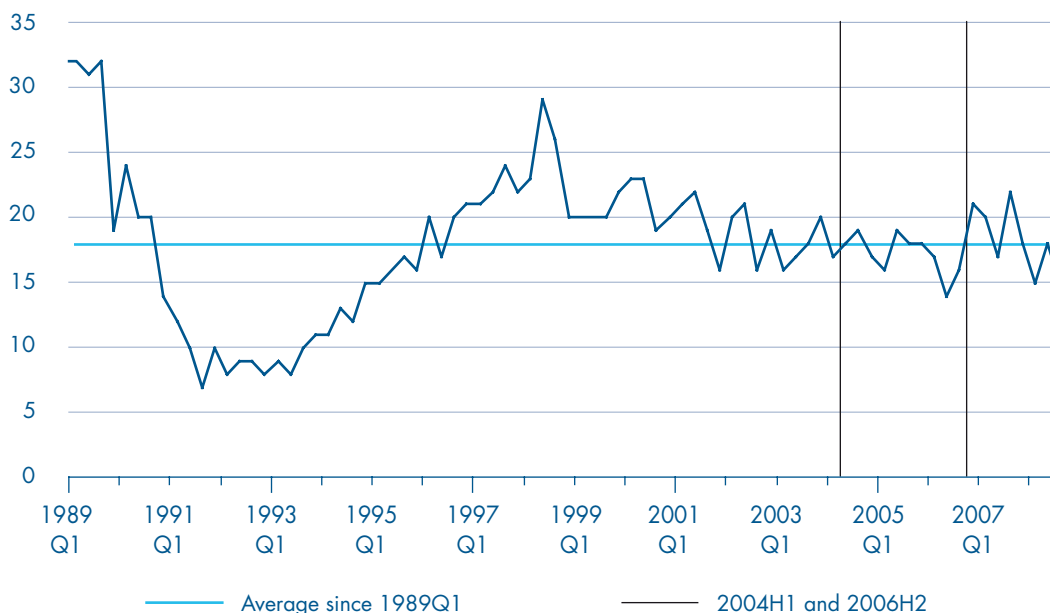
15 British Chambers of Commerce Quarterly Survey: Clerical labour constraint (Manufacturing)

This shows the percentage of manufacturing firms experiencing clerical labour recruitment difficulties. This question follows on from the 'overall recruitment difficulties' question. The survey question is "For which of the following categories did you experience difficulties in finding suitable staff?" The data series reflects the percentage of firms answering "clerical labour".



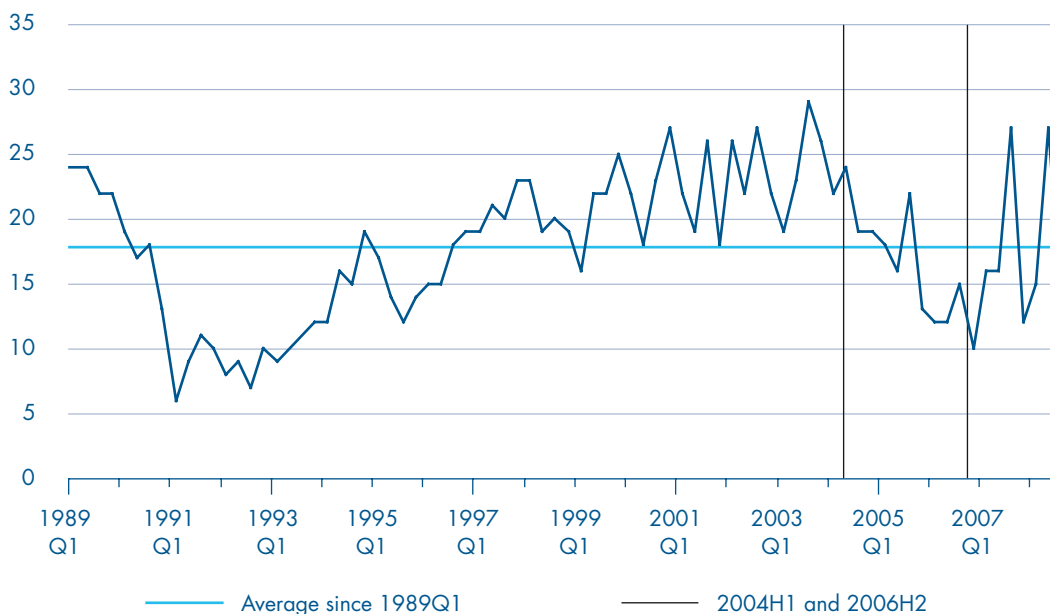
16 British Chambers of Commerce Quarterly Survey: Clerical labour constraint (Services)

This shows the percentage of services firms experiencing clerical labour recruitment difficulties. This question follows on from the 'overall recruitment difficulties' question. The survey question is "For which of the following categories did you experience difficulties in finding suitable staff?" The data series reflects the percentage of firms answering "clerical labour".



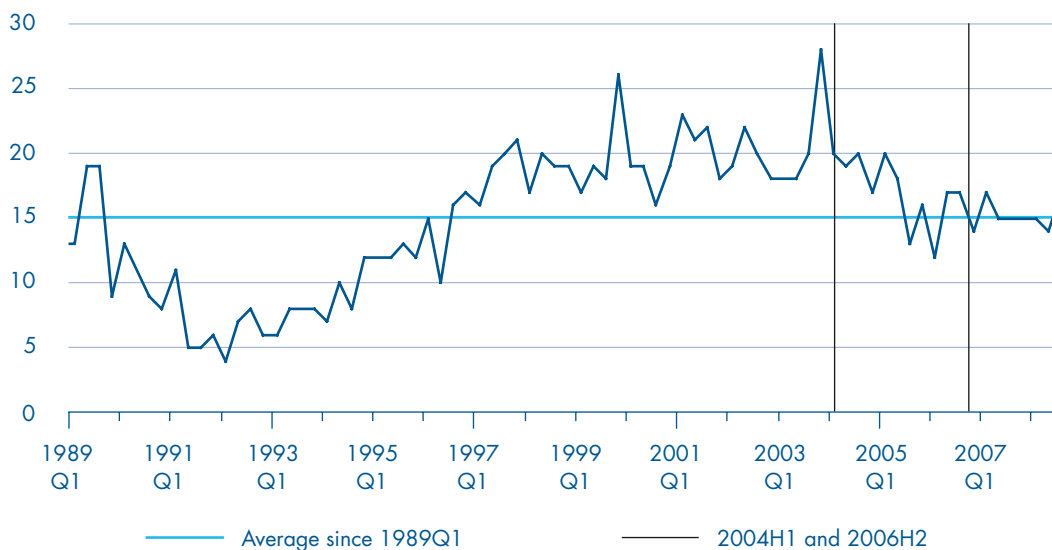
17 British Chambers of Commerce Quarterly Survey: Semi/Unskilled labour constraint (Manufacturing)

This shows the percentage of manufacturing firms experiencing semi/unskilled labour recruitment difficulties. This question follows on from the 'overall recruitment difficulties' question. The survey question is "For which of the following categories did you experience difficulties in finding suitable staff?" The data series reflects the percentage of firms answering "semi/unskilled".



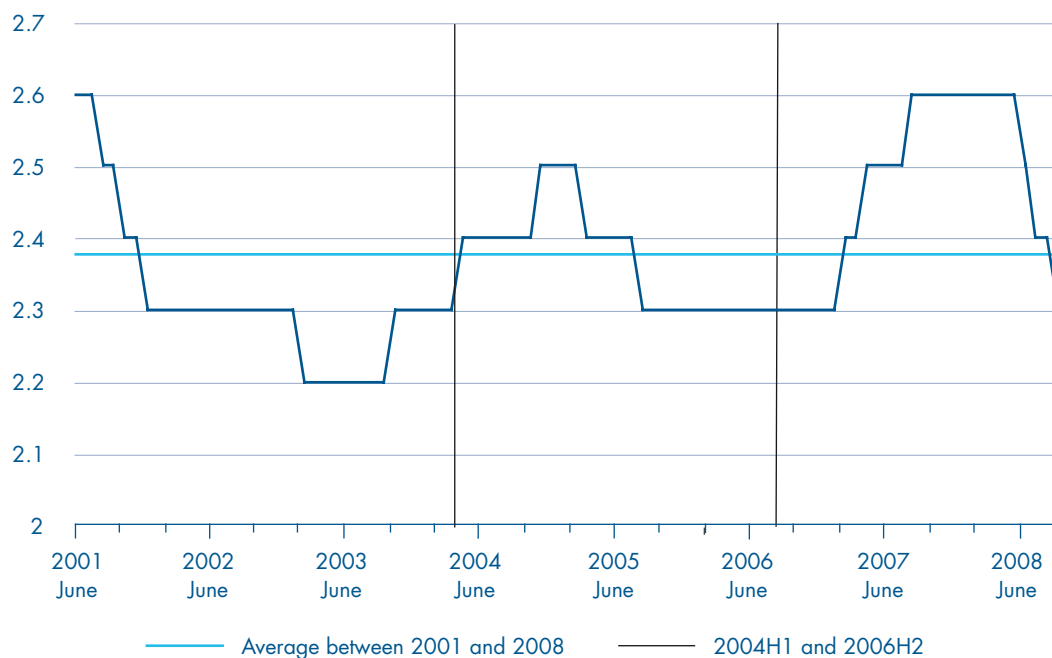
18 British Chambers of Commerce Quarterly Survey: Semi/Unskilled labour constraint (Services)

This shows the percentage of services firms experiencing semi/unskilled labour recruitment difficulties. This question follows on from the 'overall recruitment difficulties' question. The survey question is "For which of the following categories did you experience difficulties in finding suitable staff?" The data series reflects the percentage of firms answering "semi/unskilled".



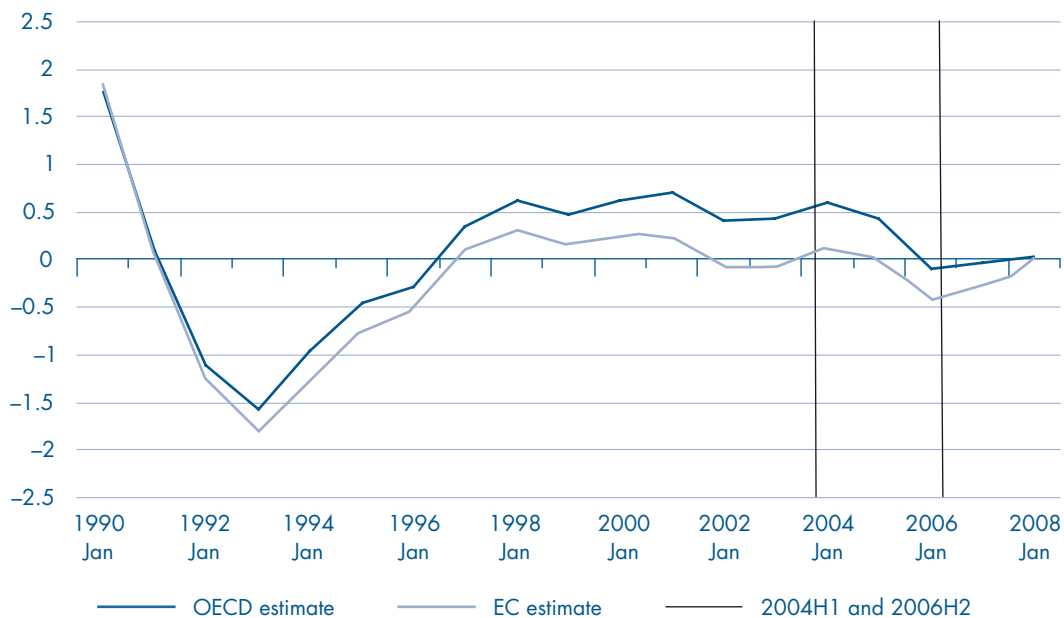
19 Office of National Statistics/HMT: Vacancy Ratio (Whole economy)

This shows the number of vacancies per 100 employee jobs, 3-month average.



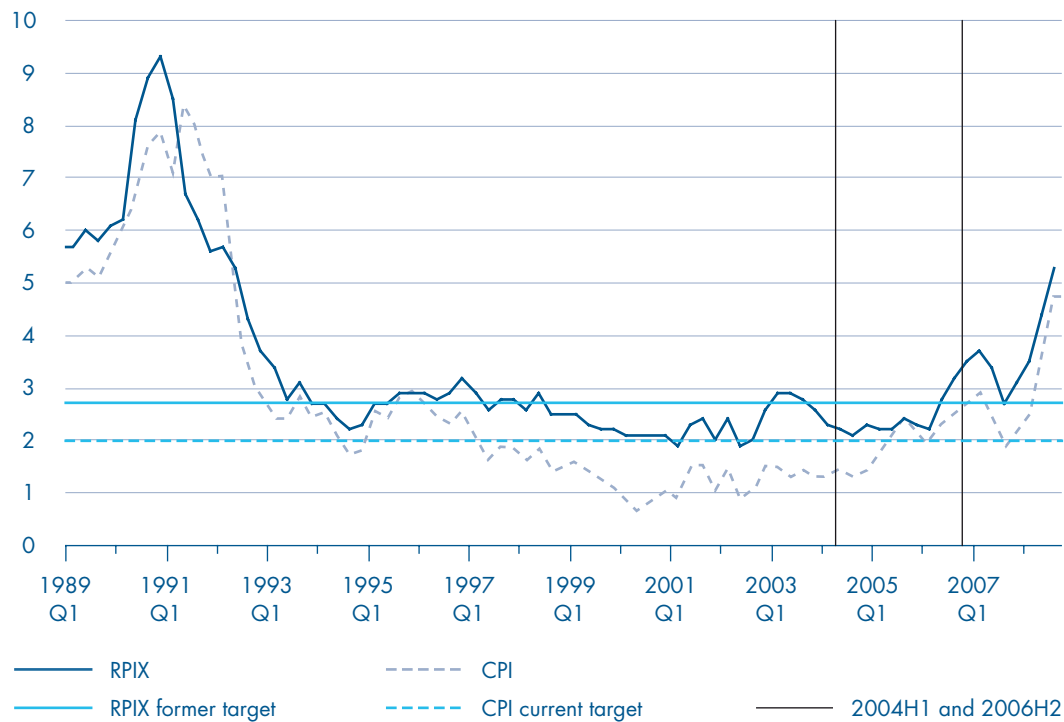
20 Office of National Statistics/OECD/EC: Deviation of Employment from NAIRU (Whole economy)

This shows the percentage point difference between the estimated UK NAIRU and the unemployment rate (NAIRU minus the unemployment rate).



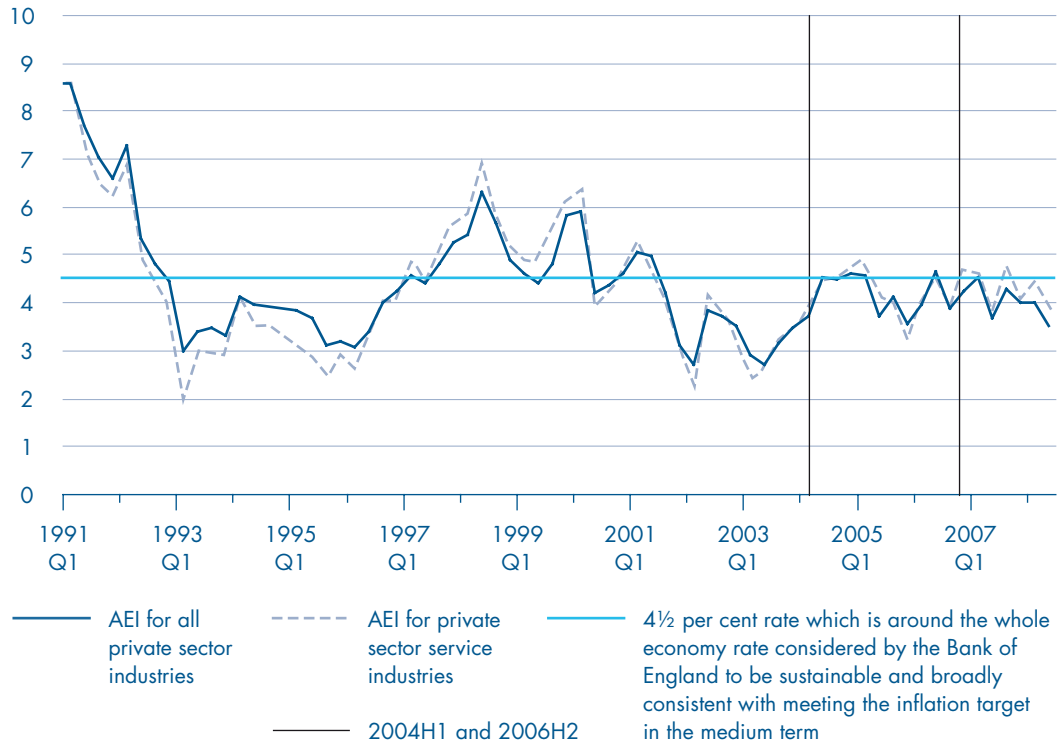
21 Office of National Statistics: Price Inflation (Whole economy)

This shows Consumer Price Inflation (CPI) and Retail Price Inflation excluding mortgage interest payments (RPIX) in relation to official targets, per cent.



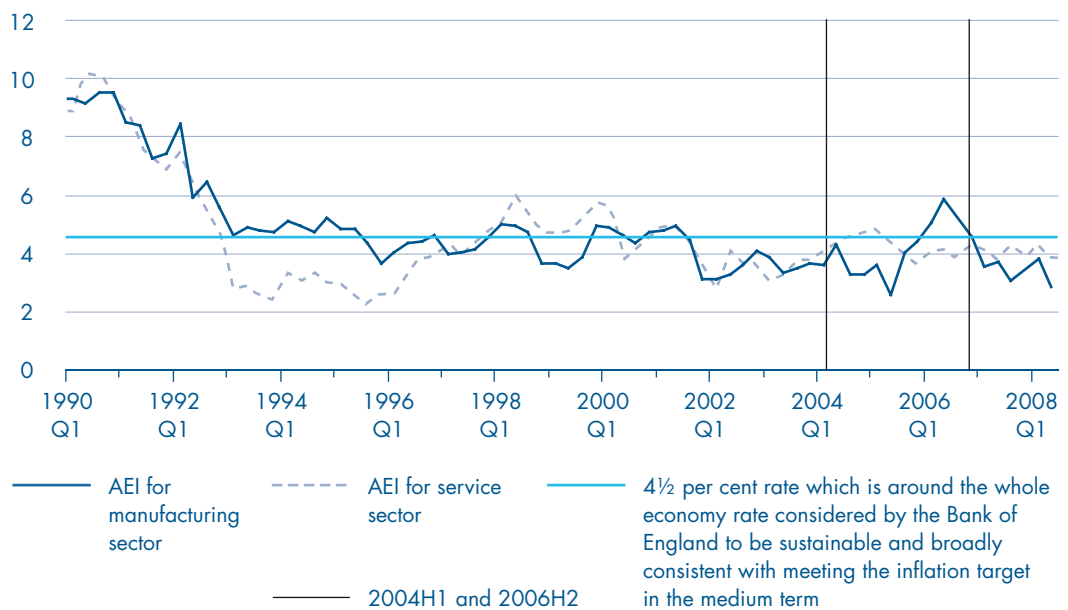
22 Office of National Statistics/HMT: Wage Inflation (All Private Sector Industries and Private Sector Service Industries)

This shows year-on-year growth rates of ONS' quarterly Average Earnings Index series (seasonally adjusted, private sector, including bonuses).



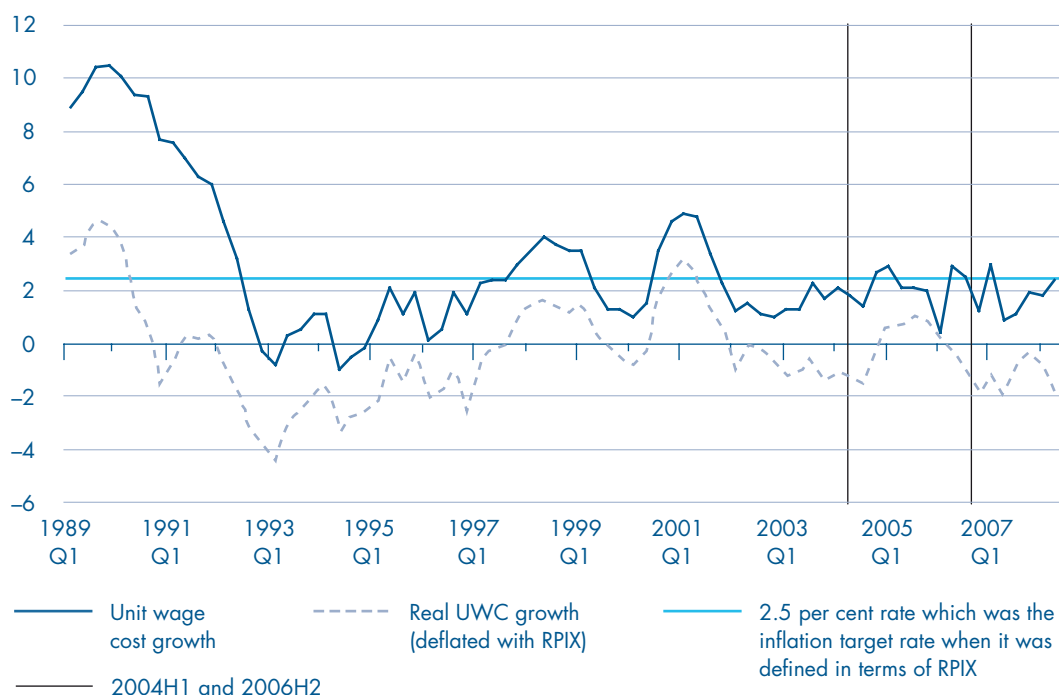
23 Office of National Statistics/HMT: Wage Inflation (Private and Public Sector Manufacturing and Services)

This shows year-on-year growth rates of ONS' quarterly Average Earnings Index series (whole economy, seasonally adjusted, including bonuses).



24 Office of National Statistics: Unit Wage Cost Growth (whole economy)

This shows unit wage costs, percentage change on year earlier, seasonally adjusted, whole economy.



25 Office of National Statistics/HMT: Labour Share of GVA (whole economy)

This shows the share of national income paid to workers: Total compensation of employees divided by GVA at basic prices, and expressed as a percentage. Both the numerator and the denominator are in current prices.

