

The use of GDP in fiscal ratio statistics

Introduction

1. It is common practice for public sector fiscal statistics to be presented as ratios of national income.
2. In the United Kingdom both of the statistical measures used for assessing progress against the Government's fiscal rules are presented as ratios between the measures and Gross Domestic Product (GDP). These are the Public Sector Current Budget, used for assessing progress against the Golden Rule, and Public Sector Net Debt, for the Sustainable Investment Rule.
3. The European Union's equivalent statistical measures, for the Excessive Deficit Procedure under the *Maastricht Treaty* and the *Stability and Growth Pact*, are also presented as ratios between the measures and GDP.
4. This article explains the methodology used for GDP ratios in these calculations, in particular for the Public Sector Net Debt ratio where a centred approach requiring forecasts is used.

Versions of GDP used in fiscal statistics

General Government Deficit and Debt ratios

5. The European Union's fiscal statistical measures are General Government Deficit and Debt. They are used in the Excessive Deficit Procedure under the *Maastricht Treaty* and the *Stability and Growth Pact*. Article 104 of the 1992 *Maastricht Treaty* obliges member states to avoid excessive budgetary deficits. The *Protocol on the Excessive Deficit Procedure*, annexed to the *Maastricht Treaty*, defines two criteria and reference values for compliance. Both are presented as ratios between the measures and GDP.
6. The *Protocol on the Excessive Deficit Procedure* defines the GDP series to be used as "gross domestic product at current market prices (GDP mp) (B.1*g), as defined in ESA 95." ESA95 is the *European System of Accounts* statistical manual that contains the international standards used in the National Accounts.
7. So, the GDP used in the Excessive Deficit Procedure statistics is the 'not seasonally adjusted current price' version of GDP. For the UK this was traditionally the time series, with identifier BKTL, published alongside the National Accounts.
8. However, a European regulation instructed EU member states to introduce the allocation of 'Financial Services Indirectly Measured' (FISIM), across consuming sectors, into their GDP statistics by 2005. The effect of doing so raises the level of GDP. The UK has not met this timetable and plans to

introduce FISIM into the GDP series published with the National Accounts have been delayed until September 2008.

9. A 'not seasonally adjusted' (NSA) estimate of the contribution of FISIM to GDP is available, with identifier C95M, and from March 2007 has been published by ONS as an experimental statistic.
10. A 'FISIM adjusted' GDP series has been produced so that, for Excessive Deficit Procedure purposes, the European Commission can compare government deficit and debt ratios across the European Union on a consistent basis. The 'FISIM adjusted' GDP series has identifier EP3H, where $BKTL + C95M = EP3H$

Public Sector Current Budget ratio

11. For the ratio between Public Sector Current Budget and GDP published in the UK public sector finances, the 'not seasonally adjusted current price' version of GDP (identifier BKTL) is currently used. In assessing performance against the Golden Rule the Current Budget is taken for each financial year of the economic cycle and divided by the financial year GDP.
12. One complication here is when the latest financial year has just been completed. At this point the financial year outturn for Current Budget is available but only three of the four quarterly GDP observations are available. Until this remaining quarter becomes available towards the end of June an ONS projection is made for it, as detailed below.
13. For the April and May versions of the *Public Sector Finances First Release* this projection is calculated by taking the annualised growth rate from the first three quarters of the financial year and applying it to the first quarter outturn from the previous financial year. In deriving the growth rate the seasonally adjusted (SA) version of the current market prices GDP series is used (identifier YBHA).

e.g. for the missing 2007 first calendar quarter observation (2007q1):

$$\text{NSA } 2007q1 = \frac{\text{SA } (2006q2 + 2006q3 + 2006q4)}{\text{SA } (2005q2 + 2005q3 + 2005q4)} \times \text{NSA } 2006q1$$

14. This estimation technique relies on the simple assumption that the year on year growth in the first part of the financial year is replicated in the final quarter. However, the provisional nature of early estimates of GDP is such that a more sophisticated forecasting technique would not necessarily produce a better estimate.
15. For the June version of the *Public Sector Finances First Release* this projection is simplified because the seasonally adjusted version of GDP for this quarter has been published towards the end of May. The not seasonally adjusted version is not available at this time. The estimate for it is:

$$\text{NSA 2007q1} = \frac{\text{SA 2007q1}}{\text{SA 2006q1}} \times \text{NSA 2006q1}$$

Public Sector Net Debt ratio

16. For the ratio between Public Sector Net Debt and GDP published in the UK public sector finances, the ‘not seasonally adjusted current price’ version of GDP (identifier BKTL) is now used. The ‘seasonally adjusted’ version (identifier YBHA) had previously been used, but this was changed in June 2007 to provide consistency across the measures and also consistency in approach between the numerator and denominator in the calculation.
17. This change in methodology was agreed by the Public Sector Finance Statistics Technical Advisory Group. At the same time the methodology for forecasting future GDP observations was simplified, and is now as described in the rest of this section.
18. An analysis of the change was made prior to implementation and showed little effect on the ratio whether the seasonally adjusted or not seasonally adjusted version of GDP was used. Of the 169 monthly observations between March 1993 and March 2007 108 were unchanged, 23 increased by 0.1 of a percentage point, 37 decreased by 0.1 and one decreased by 0.2.
19. The GDP denominator for each observation of the debt ratio in the time series is reworked so that it represents the 12 months centred around the observation, e.g. the six months before it and six months after it. In the absence of monthly current price GDP indicators, monthly GDP is calculated by simply dividing the quarterly data by three.
20. The centred approach thus requires estimates or forecasts to be available covering the period from six months before to six months after. The procedure for deriving GDP forecasts for periods when National Accounts outturn GDP are not available is described below.
21. HM Treasury’s latest Budget and Pre-Budget Report forecasts of ‘not seasonally adjusted’ current price GDP for financial years are published in table C3 of the relevant publication (see page 275 of *Budget 2007*).
22. The procedure first calculates the growth rate implied by HM Treasury’s last published forecast. This growth rate is then applied to ONS published outturn data for the corresponding quarters of the previous financial year to create forecasts for periods where there is no outturn.
23. As an example consider the May 2007 *Public Sector Finances First Release*. This published an estimate of Public Sector Net Debt for end-April 2007 for

the first time. The GDP denominator for this observation covers the period from November 2006 to October 2007. Outturn GDP is published for the fourth quarter of 2006, so the November and December contribution is simply two thirds of the fourth quarter outturn data. Forecasts are needed for the first, second and third quarters of 2007 to complete the calculations.

24. The first quarter of 2007 forecast is calculated by:

$$\hat{2007q1 \text{ GDP}} = \frac{\text{HMT GDP}_{fy2006/7}}{\text{HMT GDP}_{fy2005/6}} \times 2006q1 \text{ GDP}$$

25. The second quarter of 2007 forecast is calculated by:

$$\hat{2007q2 \text{ GDP}} = \frac{\text{HMT GDP}_{fy2007/8}}{\text{HMT GDP}_{fy2006/7}} \times 2006q2 \text{ GDP}$$

26. The third quarter of 2007 forecast is calculated similarly:

$$\hat{2007q3 \text{ GDP}} = \frac{\text{HMT GDP}_{fy2007/8}}{\text{HMT GDP}_{fy2006/7}} \times 2006q3 \text{ GDP}$$

27. In the third month of each quarter the above procedure is modified slightly so that the seasonally adjusted GDP outturn that is available is used to forecast the relevant quarter rather than the growth rate method.

28. For example in June 2007, when the seasonally adjusted version of the first quarter of 2007 is available, we use:

$$\hat{\text{NSA 2007q1}} = \frac{\text{SA 2007q1}}{\text{SA 2006q1}} \times \text{NSA 2006q1}$$

29. This assumes the four-quarter growth rate in the seasonally adjusted series is the same as the growth rate for the not seasonally adjusted equivalent series. An alternative approach would be to consider that the seasonal factor from the first quarter of 2006 was repeated in the first quarter of 2007:

$$\hat{\text{e.g. NSA 2007q1}} = \text{SA 2007q1} - \text{SA 2006q1} + \text{NSA 2006q1}$$

30. This additive approach would have the merit of being consistent with HM Treasury's approach to forecasting quarterly GDP, where the most recent outturn quarterly seasonal factor is treated as being constant for that quarter over the whole forecast period.

31. In practice, the provisional nature of the first GDP estimate overrides any conceptual debate about whether the multiplicative or additive approach is superior.
32. *Monthly Statistics on Public Sector Finances: A methodological guide* (1999) includes the following quote: “As a result of this estimation procedure, the debt ratio is provisional when first published and subject to later revision when outturn GDP become available. For this reason it should only be regarded as accurate to the nearest quarter percent of GDP.”