

# Measuring market sector activity in the United Kingdom

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A measure of private or market sector activity is useful for assessing demand pressures and productivity trends in the economy. This article discusses the practical issues involved in constructing a measure of the market sector's gross value added (MSGVA) for the United Kingdom. It looks at the existing estimates currently constructed by the ONS and the Bank of England using National Accounts data, and discusses how the Bank of England uses these estimates when analysing demand pressures in the economy.

## Introduction

Macroeconomic analysis typically focuses on the headline measure of activity in the economy, namely gross domestic product (GDP). GDP reflects the contribution, or 'gross value added', of both the private and public sectors to the production of final goods and services in the United Kingdom. But for certain purposes the contribution of the private or market sector alone may also be of interest. For example, when making productivity comparisons across countries it is common to look at trends in the market sector of the economy. That is because these trends are likely to be a better reflection of the relative degree of competitiveness in international trade between countries. A previous *Quarterly Bulletin* article<sup>(1)</sup> also noted that private sector value added is an important input into the calculation of the total demand for resources in the economy, which is likely to be a more appropriate indicator of demand pressures than GDP.

This article discusses the issues that arise when attempting to measure activity in the private or market sector of the economy, within the current System of National Accounts in the United Kingdom.<sup>(2)</sup> It presents the estimates that are currently constructed by the ONS and the Bank of England using National Accounts data. Currently these estimates are experimental, but in the longer term it is intended that they will become regular outputs of the *Quarterly National Accounts* process.

## The usefulness of 'market' sector activity in a macroeconomic context

There are a number of different ways of measuring the output or economic activity of an economy. For the purposes of

macroeconomic analysis and, in particular, the analysis of the determination of inflation, it is useful to appeal to theory for a guide to the relevance of different measures of activity.

The inflation target in the United Kingdom is for the consumer prices index (CPI), which is a basket of marketed goods and services. The prices of marketed goods and services in the economy are set by the companies that produce them. These companies sell their goods and services in (imperfectly competitive) markets, at prices that maximise profits, given the demand curve that they face. Final goods and services are ultimately bought by households, the government and by companies themselves for investment purposes, as well as being sold as exports overseas. The government and households themselves may produce their own 'output'. But this output typically does not involve an exchange of goods or services at a market price, either because it is for own consumption (eg housework, childcare) or because it is usually supplied free at the point of delivery (eg public services such as health and education).

This suggests a particular definition of 'output' that is directly relevant for price-setting firms, namely output that is sold at a market-determined price. This suggests that it is strictly a measure of 'market' or 'business' sector output rather than 'private' sector output that is the appropriate concept, even though these terms are often used interchangeably. This distinction is discussed further in the next section.

The focus on market sector output does not mean that activity in non-market sectors like public services has no impact on

(1) Hills *et al* (2005).

(2) The current System of National Accounts in the United Kingdom is based on the European System of Accounts 1995 (ESA95) standard. This, in turn, is based on the international 1993 System of National Accounts (SNA93, see ONS (1998)) standard.

inflationary pressure in the economy. As discussed in Hills *et al* (2005), government spending will affect inflationary pressure in the economy through two channels. First, the government purchases goods and services directly from firms that operate in the market sector — often referred to as procurement spending. So government procurement has a direct impact on the demand for market sector output. Second, the government also uses factors of production (most notably labour inputs) that could otherwise have been used to produce market goods and services. So there is an 'opportunity cost' associated with the government's use of factors of production.<sup>(1)</sup>

Hills *et al* (2005) show that, in this context, an appropriate measure of aggregate demand pressures in the economy, requires that the total demand for market sector output be added to the opportunity cost of the factors of production used by the government. This measure of aggregate demand is referred to as 'the aggregate demand for resources'. In order to measure the opportunity cost of the factor inputs used by the government, measures of market sector productivity are required, which in turn require estimates of market sector output. So the ability to estimate market sector activity is important in constructing appropriate measures of aggregate demand in the economy.

## Defining and deriving market sector output using the National Accounts

How can market sector output be measured in practice? The natural data source is the National Accounts, which provides an integrated system of income, production and expenditure accounts for the various sectors, industries and products in the economy.

The current headline measure of activity in the UK economy is GDP measured at market prices. But when considering the aggregate contribution of all the different industries and sectors to the output of the economy, the more appropriate measure of activity is GDP measured at basic prices, often referred to as gross value added (GVA). This measure excludes the value of taxes (less subsidies) on products<sup>(2)</sup> from GDP measured at market prices. Including these taxes in the valuation of the output of a particular industry or sector may be a misleading guide to their contribution to economic activity.

GVA is calculated, in current price terms, as the sum of each sector's or industry's gross value added,<sup>(3)</sup> using what is called the production approach. So a simple method of constructing market sector GVA (MSGVA) would be to add up the gross value added of those sectors that constitute the market sector of the economy. Or, equivalently, we could start with GVA for the whole economy, and then exclude the gross value added of

the sectors that make up the non-market sectors. In other words:

$$\begin{aligned} \text{MSGVA} &= \text{Sum of gross value added of the} \\ &\quad \text{'market' sectors} \\ &= \text{GVA at basic prices for the whole economy} \\ &\quad \text{less} \\ &\quad \text{gross value added of the 'non-market' sectors.} \end{aligned}$$

There are a number of practical issues that need to be addressed before applying this approach. The key issue is to define the market and non-market sectors of the economy. The 1993 System of National Accounts (SNA93) provides clear definitions of market sector activity. It defines market output as output that is disposed of, or intended to be disposed of, on the market, or on which an economically 'significant' price is charged that influences the supply of and demand for that output. A detailed analysis of how this definition is applied in practice in the United Kingdom is provided by Mahajan (2006), together with examples of different activities in the United Kingdom that constitute market and non-market sector output. But no single definition of market sector output is likely to meet every need or be appropriate to answer every question. So there are some instances, discussed below, in which users might want to employ something other than the SNA93 definition. In particular, there are a number of practical issues raised by the SNA93 definition of market sector activity:

- First, it is important not to equate the non-market sector with the definition of the 'public sector' in the SNA93. The public sector consists of the general government sector (central and local government) and public corporations.<sup>(4)</sup> Public corporations' output is treated as market output in the National Accounts. This is because public corporations do have some degree of financial autonomy from central and local government, and typically charge prices that are at least partly motivated by market conditions. The size of this sector has fallen over time, reflecting the privatisation of many businesses, especially during the 1980s and 1990s. So their inclusion in the definition of market sector GVA is helpful when analysing trends in activity over longer horizons, as it avoids arbitrary shifts in the historical time series resulting from the reclassification effects of individual privatisations.<sup>(5)</sup>
- Second, some bodies in the general government sector also produce marketed output (eg sports facilities, car parking

(1) Hills *et al* (2005) also discuss some other channels through which government activity might affect both the demand for and the supply of market sector goods and services over the longer term.

(2) For example VAT and excise duties.

(3) The gross value added of a sector or industry is simply the value of the output of that sector less the value of goods and services (including imported goods and services) that are used as intermediate inputs to produce that output.

(4) See [www.statistics.gov.uk/downloads/theme\\_economy/MA23.xls](http://www.statistics.gov.uk/downloads/theme_economy/MA23.xls) for examples.

(5) A complete list of privatisations between 1979 and the mid-1990s is available in ONS (2006).

fees).<sup>(1)</sup> So, it would not necessarily be desirable to exclude all of the central and local government sectors' gross value added when defining market sector GVA. In practice, the market output of the general government sector is relatively small — in current prices, market output generated by general government in 2004 accounted for 8.2% of total output produced by this sector.

- Third, there are also bodies outside the public sector, eg charities and universities, that produce non-market output that is not sold under profit-maximising conditions or at market-determined prices. These bodies are included in the non-profit institutions serving households (NPISH) sector in the National Accounts. So the non-market output of this sector should be excluded. The NPISH sector also produces market output; in 2004 this accounted for 22.3% of the sector's total output. One problem is that a full set of accounts for the NPISH sector is not presently available in the United Kingdom, although it is treated as a distinct sector in the current SNA93.
- Fourth, the role of housing services in market sector activity needs to be carefully considered. Both consumption spending and GDP in the National Accounts include household spending on the renting of dwellings and an imputed amount of 'rental spending' by owner-occupiers. Actual expenditure on rentals represents payments on marketed housing services, so in the SNA93 it is treated as market sector activity. However, owner-occupiers are assumed to consume their own output of housing services that they 'produce' from their ownership of dwellings. So imputed rentals might be excluded from the definition of market sector output, given that this is a form of output for 'own consumption'.

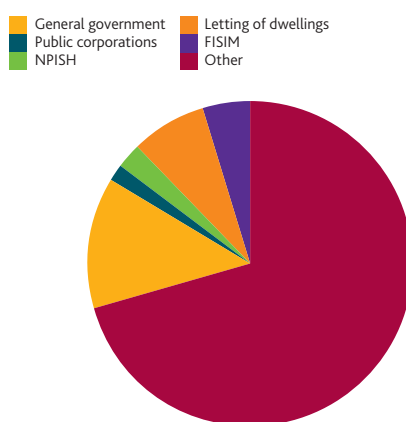
But one of the reasons for including imputed rentals as a form of final expenditure and output in the National Accounts is to ensure that there are no effects on GDP arising from shifts between renting and owner-occupancy, for a given level of housing services or stock of dwellings in the economy. It also facilitates comparisons of GDP across countries that have different degrees of owner-occupancy. So excluding just the imputed rentals of owner-occupiers from the definition of MSGVA might potentially reintroduce problems that their original inclusion in GDP was meant to solve, for example when analysing movements in activity over periods when the degree of owner-occupancy is changing. For this reason, the Bank also looks at a measure of market sector output that excludes both actual and imputed rental spending to give a measure of market sector gross value added excluding all housing services.<sup>(2)</sup>

- Finally, the role of Financial Intermediation Services Indirectly Measured (FISIM) must be considered. This is discussed in more detail in Mahajan (2006). The value of

these services is not, at present, allocated across the market and non-market sectors. Neither are they currently allocated between final consumers of these services and those who are implicitly purchasing them as an input into production. So a decision has to be made about whether to adjust MSGVA by the same amount as GDP is currently adjusted for these services.

Chart 1 summarises the importance of the various sectors and components discussed above in terms of their contribution to whole-economy GVA.

**Chart 1** Contributions of sectors and components to total gross value added<sup>(a)</sup> in 2004



(a) Whole-economy GVA plus the FISIM adjustment.

## Approaches to estimation

Like GDP, different measures of market sector GVA can, in principle, be constructed using an expenditure, production or income approach. And, also like GDP, there is interest in measuring market sector GVA in both nominal (current price) and real (chained-volume) terms and at a quarterly frequency. In principle, the expenditure, production and income approaches should deliver the same estimate in both nominal and real terms. But in practice, like all statistical estimates, there are errors and omissions, which mean that in general the three approaches yield different results. So there is a need to reconcile or 'balance' estimates derived from the three approaches.

As discussed earlier, there are also two different perspectives from which MSGVA estimates can be derived:

(1) A detailed list is provided in Mahajan (2006).

(2) There are also some other reasons why the Bank of England looks at a measure that removes both actual and imputed rental spending. One issue is that flows of housing services arguably do not represent a claim on scarce resources since they require little or no primary factor inputs (ie non-housing capital and labour inputs) to produce, but are rather the flow of services arising from the existing stock of dwellings. This is the approach taken in the Bank's quarterly forecasting model, where output is defined to exclude housing services, see Harrison *et al* (2005). Also, in traditional productivity analysis, which typically compares output growth to primary input growth, housing services are often excluded from the measure of output (see Oulton and Srinivasan (2005)).

- 'Bottom-up' estimates, based on identifying and aggregating together the market components of all the different industries, products and sectors in the economy.
- 'Top-down' estimates, based on removing identifiable components of non-market sector activity from existing estimates of whole-economy activity.

The bottom-up approach is likely to be the more reliable of the two methods in practice, given that it identifies all the relationships between the different industries, sectors and products in the economy. Top-down estimates are likely to be simpler to construct, but inevitably involve some simplifying assumptions and approximations that mean it is harder to achieve balanced estimates across the income, expenditure and production approaches.

The main advantage of the bottom-up approach is that it identifies the different goods and services being supplied as a result of market sector production, and analyses the demand for those market goods and services by different sectors and industries. Comparing the estimates of supply and demand for market goods and services in this way should, in theory, produce the most robust final estimate of MSGVA; and it should also provide a more reliable allocation and breakdown of MSGVA into the different components on the income, expenditure and production side of the National Accounts. This is the same principle by which GDP is estimated using the three approaches.

For both GDP and MSGVA, a fully balanced bottom-up analysis, in both nominal and real terms, is best done using the Input-Output Supply and Use Tables framework (see ONS (1998) and ONS (2006)). The box on page 408 discusses how, in principle, this framework should be applied to the estimation of MSGVA.

However, it is not currently feasible to achieve fully balanced quarterly estimates of market sector GVA, in either current price or real (chained-volume) terms, using this bottom-up approach. Later in this article, some of the problems that would need to be resolved to use the bottom-up approach are discussed, as well as the various steps in train to address them. Before that, the article outlines the more approximate bottom-up and top-down methods that are currently available for estimating MSGVA.

### Annual current price estimates of market sector GVA from the Input-Output Supply and Use Tables 1992–2004

Each year the ONS publishes detailed information and statistics covering the UK economy in the Input-Output Annual Supply and Use Tables. These tables are chiefly used to construct balanced estimates of GDP in current price terms by combining information from the income, expenditure and

production sides of the National Accounts. But it is possible to use these tables to separate out market sector activity in current prices over the period 1992 to 2004. Mahajan's (2006) analysis of market sector and non-market sector activity is in accord with the 1995 European System of Accounts (ESA95), and provides details and estimates of market output produced by the non-market sectors.

The key shortcoming of these data is that they are annual and in current price terms. And the latest available estimates are for 2004. This limits their use in current policy analysis where timely quarterly volume estimates are also required. But these current price estimates are still important as they are needed to provide the annual weights for chain-linked volume estimates of market sector GVA.

### Chain-linked volume measures of market sector GVA using a bottom-up production approach

As discussed earlier, on the production (output) side of the National Accounts, a current price measure of GVA can be estimated by adding up the gross value added of all the different industries in the economy. Similarly, a chained-volume index of GVA at basic prices — sometimes referred to as GDP(O) or GDP(P) — is constructed by weighting together the volume of output of all the different industries.<sup>(1)</sup> So to construct a chained-volume measure of MSGVA from the production (output) side of the accounts — MSGVA(P) — it is possible to aggregate, from a bottom-up basis, all of the components of GVA excluding output that can clearly be attributed to non-market activity.

A new experimental National Accounts aggregate was introduced by the ONS in 2005 that uses this approach to construct quarterly estimates of market sector GVA in chained-volume terms.<sup>(2)</sup> Prior to 2005, it was possible to calculate an approximate top-down estimate of market sector GVA by excluding the output contribution of three industry groups — Education, Health and social work, and Public administration and defence. But, although these industries are dominated by the public sector and largely produce non-market output, the bottom-up method introduced by the ONS in 2005 is more accurate. That is because this approach is carried out at a low level of aggregation and so it is possible to remove just the central and local government components of the health and education sectors, along with other non-market output such as sewage and refuse disposal and museum activities. However at present it is not possible to identify the

(1) See Table 2.4 in the *Blue Book*, [www.statistics.gov.uk/statbase/Product.asp?vlnk=1143](http://www.statistics.gov.uk/statbase/Product.asp?vlnk=1143), and Tables B1 and B2 of the *Quarterly National Accounts* release, [www.statistics.gov.uk/statbase/Product.asp?vlnk=818](http://www.statistics.gov.uk/statbase/Product.asp?vlnk=818). GDP(P) is essentially an aggregate annually chain-weighted Laspyeres index, where the output indices of all the industries in the economy are weighted together using current price industry value added shares in the previous calendar year.

(2) See Herbert and Pike (2005).

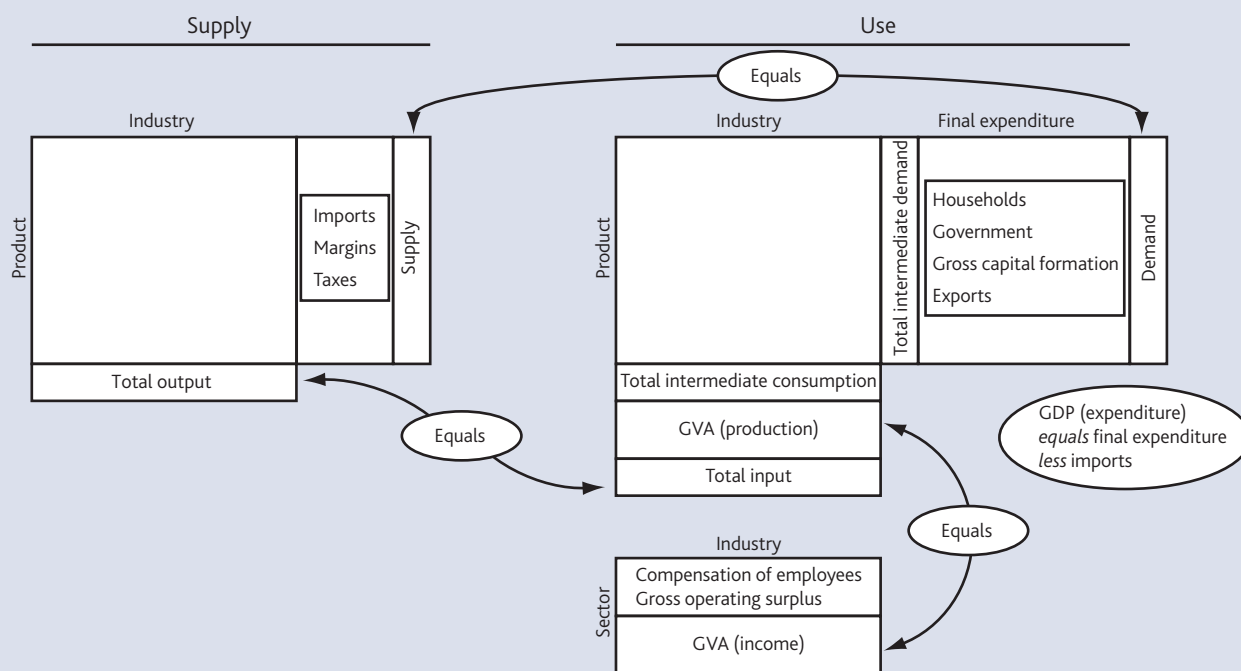
## An Input-Output Supply and Use Tables approach

The Input-Output Supply and Use Tables consist of two matrices, which bring together the production, income and expenditure measures of GDP, integrating the components of GVA, inputs, outputs and final demands. These tables show the supply and demand for products in terms of 123 industries (represented by columns in the tables) and 123 products (represented by rows). The Supply Table shows the output of each industry by type of product as well as showing imports of goods and services separately. The industrial dimension of the Use Table shows, for each industry, the costs of intermediate inputs of goods and services incurred in the production process (known as intermediate consumption) along with the costs of primary inputs such as labour costs and profits (which constitute the GVA of each industry). The product dimension of the Use Table shows both the intermediate demand and

final demand for each product and, includes goods and services both domestically produced and imported. These tables are represented in **Diagram A**.

In terms of applying this approach to the market sector, these tables would show the market sector and non-market sector industries and products separately, including a breakdown of imports from overseas. With these additional rows and columns, the supply and demand for market sector products can be balanced and analysed separately from the non-market sector industries and products. The ONS has only compiled such analyses in current prices — for example, Input-Output Supply and Use Tables, where imports of goods and services are included within the consumption estimates, and Input-Output Analytical Tables, where direct and indirect imports have been separated out. The ONS is investigating the feasibility of incorporating this level of detail in its new Input-Output Supply and Use Tables system currently under development.

Diagram A Balancing annual (I-O) Supply and Use Tables



non-market output of the NPISH sector. So this component is not currently removed and as a result this is still an approximate measure of MSGVA.

A number of variants are produced by the ONS that reflect some of the different uses to which estimates of MSGVA are put. As discussed earlier, one variant excludes actual and imputed rentals. A non-oil measure of MSGVA is also produced that HM Treasury uses to help assess the size of the output gap.<sup>(1)</sup> The ONS publish these estimates each quarter in experimental data releases, available at the same time as

the *Output, Income and Expenditure (OIE)* and *Quarterly National Accounts (QNA)* data releases.<sup>(2)</sup>

### Current price and chain-linked volume measures using a top-down expenditure approach

Bank staff have also constructed quarterly current price and volume measures of market sector GVA based on the expenditure side of the accounts — MSGVA(E). This facilitates

(1) See HM Treasury (2005).

(2) See [www.statistics.gov.uk/statbase/Product.asp?vlnk=14065](http://www.statistics.gov.uk/statbase/Product.asp?vlnk=14065).

the analysis of demand pressures on market sector producers broken down in terms of the different components of expenditure. This measure is only approximate in current price terms, as it is not possible to estimate all of the required expenditure-based components on an annual, let alone a quarterly, basis (for example, the quantity of market output produced by the general government sector is only available annually up to 2004).

The box on page 412 discusses the basic arithmetic of this approach in terms of conventional National Accounts identities. Essentially it is a top-down estimate that starts with GDP from the expenditure side (GDP(E)) and then removes general government gross value added from general government final consumption expenditure. The approximation involved in this top-down method is that the government's demand for market sector output is represented by a measure of 'net' rather than 'gross' procurement, ie it is the government's purchases of market output net of its supply of market output. This measure also excludes the gross value added component of both actual and imputed spending on rentals.

To derive a real, or chained-volume, estimate of market sector GVA from the expenditure perspective, the additional requirement is a price deflator for government procurement so that the measure of net government procurement in current price terms can be converted into a volume measure. The method the Bank uses to construct this deflator is discussed in the box on page 413. The implied volume of government procurement is then combined with the other components of final expenditure using annual chain-linking methodology.

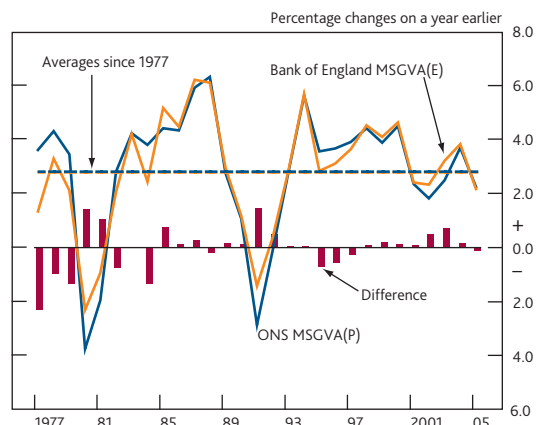
**Table A** summarises the construction of the various approximate measures discussed above.

## What do the estimates of market sector GVA tell us?

### Comparing production and expenditure measures of MSGVA in volume terms

**Chart 2** compares the ONS's experimental estimate of MSGVA, using the production approach (MSGVA(P)), with the Bank's top-down, expenditure-based measure (MSGVA(E)), over the period since the late 1970s. To facilitate this comparison the variant of MSGVA(P) that excludes both actual and imputed rentals is used. Both estimates exhibit a similar pattern over time, and the average growth rates of the two measures are almost identical, over both the whole sample and the past ten years. But there are periods where the estimates of growth from the two methods of calculating market sector output do differ.

**Chart 2** Market sector GVA using Expenditure (E) and Production (P) approaches (excludes actual and imputed rents)



Sources: ONS and Bank calculations.

**Table A** Summary of currently available MSGVA estimates

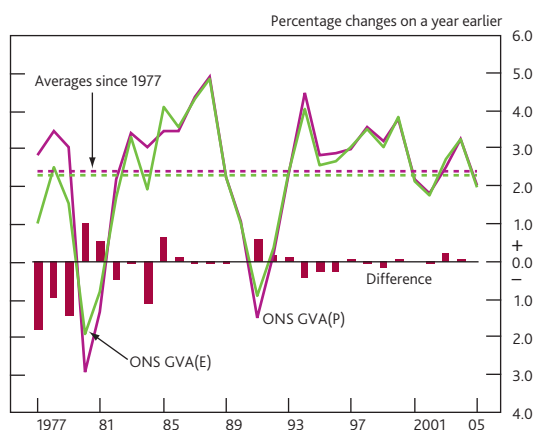
	Current price		Chained-volume measures	
	Input-Output approach <sup>(a)</sup> (ONS)	Expenditure approach <sup>(b)</sup> (Bank)	Production approach <sup>(b)</sup> (ONS)	Expenditure approach <sup>(b)</sup> (Bank)
Frequency	Annual only to 2004	Annual and quarterly	Annual and quarterly	Annual and quarterly
<b>Bottom up</b>				
Bottom up excluding imputed rents	✓	✗	✓	✗
Bottom up excluding actual and imputed rents	✓	✗	✓ (shown in Chart 2)	✗
Bottom up excluding NPISH sector	✓	✗	✗	✗
<b>Top down</b>				
Top down excluding imputed rents	✗	✓	✗	✓
Top down excluding actual and imputed rents	✗	✓	✗	✓ (shown in Chart 2)
Top down excluding NPISH sector	✗	✗	✗	✗

(a) Excluding FISIM adjustment.  
(b) Including FISIM adjustment.

**Chart 2** highlights two key points. First, the match between the MSGVA(E) and MSGVA(P) estimates is remarkably close given all the conceptual issues discussed earlier, and the approximations and different implicit assumptions used in both estimates. Second, there are similar discrepancies between published GDP chain-linked volume estimates, based on the production and expenditure approaches (**Chart 3**). These discrepancies arise from a variety of sources:

- First, components of GDP based on survey data are subject to sampling error; and some components are based on projections and proxies.
- Second, differences between the volume measures of GDP necessitate the use of balancing adjustments which cannot always be accurately allocated to components or industries (and between the market and non-market sectors). In particular in recent years, coherence adjustments have been applied to annual volume estimates of GDP(P) that attempt to keep growth within 0.2 percentage points of the growth of the expenditure-based measure.
- Third, deflation techniques tend to vary in both appropriateness and robustness, and for some components deflators simply do not exist.

**Chart 3** Whole-economy GVA using Expenditure (E) and Production (P) approaches



The close match between the MSGVA estimates could reflect the various sources of discrepancy and approximations cancelling each other out. So there is no guarantee that such estimates will remain close in the future. Nonetheless the estimates in **Chart 2** provide some reassurance that the different approaches adopted by the ONS and Bank staff are broadly sensible and that the estimates are a reasonable guide to growth in market sector activity.

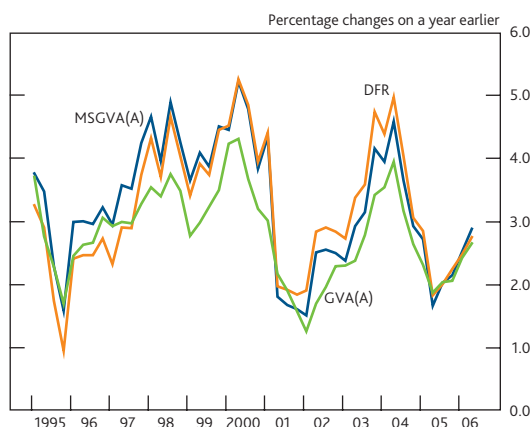
One natural step is to combine the production and expenditure-based estimates to give an 'average' measure of MSGVA, as is currently done for GDP. In the case of GDP, the ONS believes the expenditure method is likely to be a more

reliable indicator of medium and long-term trends in activity, while the production-based measure is likely to be a more reliable short-term indicator of growth, until such time as the National Accounts have been fully balanced in current price terms for these years. So, in a similar vein, Bank staff have created an 'average' measure of market sector GVA, MSGVA(A), where the Bank's top-down expenditure measure is used as the measure of growth in balanced years,<sup>(1)</sup> and the ONS MSGVA(P) production measure for the most recent period of growth.<sup>(2)</sup>

### Comparing MSGVA with GDP and the Demand for Resources

**Chart 4** compares the growth of the average measure of MSGVA with the growth rate of the average measure of whole-economy GVA, and an estimate of the growth rate of the 'Demand for Resources' (DFR) following the method outlined in Hills *et al* (2005).<sup>(3)</sup>

**Chart 4** Market sector GVA, whole-economy GVA (average measures) and the Demand for Resources



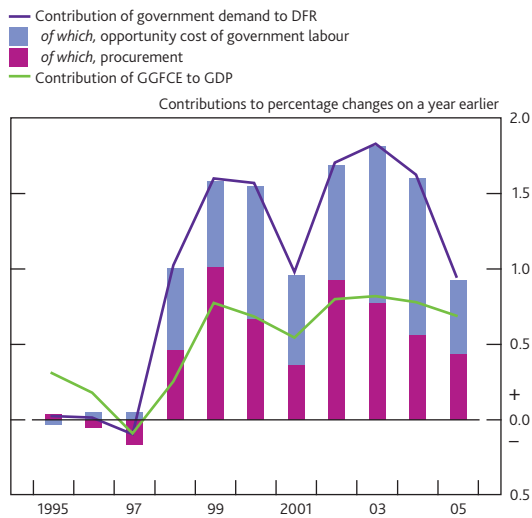
Sources: ONS and Bank calculations.

The average measure of MSGVA has typically grown at a faster rate than that of headline whole-economy GVA for much of the past 30 years (by around 0.4 percentage points a year). This partly reflects, for example, the faster rate of productivity growth in the market sector than that estimated for the non-market sector. Moreover, in the late 1990s and early 2000s the aggregate Demand for Resources grew more rapidly than MSGVA and GVA. As discussed in Hills *et al* (2005), the faster growth rate of the government's demand for inputs of

- (1) Balancing of the accounts via the Input-Output Supply and Use Tables has only been applied to GDP in the years 1989–2004. So prior to this period Bank staff have used the average of the current price income, output and expenditure estimates of GDP to construct the Bank's top-down 'average' MSGVA estimate.
- (2) To achieve an expenditure breakdown of MSGVA over the period when the production measure is used, the Bank of England allocates the residual between the expenditure and production methods to net government procurement.
- (3) This method works out the opportunity cost of government labour by multiplying ONS estimates of general government employment by the average productivity of labour in the market sector. See Hills *et al* (2005) for a discussion of the issues with measuring the opportunity cost in this way. Note here the Bank's MSGVA(A) measure is used to construct the opportunity cost of government labour rather than the ONS MSGVA(P) measure used in Hills *et al* (2005).

labour and marketed goods and services, relative to the growth of its measured outputs, implies that GDP growth estimates over this period are likely to have understated the increase in aggregate demand for scarce resources in the economy. **Chart 5** shows the contribution of government procurement and employment to the growth of the total demand for resources compared with the contribution of general government final consumption expenditure (GGFCE) to GDP growth.

**Chart 5** Contributions of government spending to different measures of activity



More recently, the growth rates of the three measures of activity in **Chart 4** have converged. That reflects a slowing in both government employment growth and real procurement spending, relative to the growth in the volume of government final consumption expenditure.

## Future work

In the longer term, the ONS will be looking to derive its own estimate of MSGVA from the expenditure side of the National Accounts. In the meantime, ongoing initiatives should assist in better estimation of the existing Bank of England measure. In particular, work is under way to improve estimates of government procurement at current prices, and then to develop better deflators in conjunction with other government departments. These data are also required for the modernisation of the National Accounts, which is presently under way. The introduction of a methodology based on constant price Input-Output Supply and Use Tables should also provide a better foundation for the more accurate and coherent measurement of market sector GVA.

## Conclusion

This article has discussed the various issues that arise when constructing a measure of market sector gross value added in the United Kingdom. It has also presented some preliminary estimates that are consistent with the current set of National Accounts. These data are currently experimental but the production estimates are available on the ONS website. Various pieces of work are under way that will improve these estimates over time, such as improvements in the measurement of public sector inputs that form part of the recommendations of the *Atkinson Review*<sup>(1)</sup> which are being taken forward by the UK Centre for the Measurement of Government Activity (UKCeMGA).<sup>(2)</sup> When this work is complete, it is hoped that these estimates will become National Statistics and regular outputs of the *Quarterly National Accounts* process.

(1) See [www.statistics.gov.uk/about/data/methodology/specific/PublicSector/Atkinson/downloads/Atkinson\\_Report\\_Full.pdf](http://www.statistics.gov.uk/about/data/methodology/specific/PublicSector/Atkinson/downloads/Atkinson_Report_Full.pdf).  
 (2) See [www.statistics.gov.uk/ukcemga/](http://www.statistics.gov.uk/ukcemga/).



## Top-down estimates of market sector GVA in current prices using an expenditure approach

GDP measured using the expenditure approach, 'GDP(E)', is given, in current price terms, by the sum of final expenditure in the UK economy plus the value of net trade with the overseas sector. Because these expenditures are measured at market prices, GVA estimated from the expenditure side, is given by removing the basic price adjustment, which is the value of taxes net of subsidies on products. So:

$$\begin{aligned} GVA &= GDP(E) - BPA \\ &= C + I + G + X - M - BPA \end{aligned}$$

where  $C$  is private consumption spending of the household and NPISH sector,  $I$  is total private and public investment spending including changes in inventories (sometimes referred to as stockbuilding),  $G$  is total general government (central and local government) final consumption spending,  $X$  is the value of exports,  $M$  is expenditure on imports and  $BPA$  is the basic price adjustment.

In order to move to an estimate of market sector gross value added excluding housing services (the Bank's preferred measure), it is useful to split up some of the expenditure components. Private consumption can be written as:

$$C = C_X + C_N + C_R$$

where  $C_X$  is household final consumption expenditure excluding rentals,  $C_N$  is NPISH final consumption expenditure and  $C_R$  is the value added component of rentals expenditure.

In addition, both the NPISH and the general government sectors in the National Accounts are assumed to consume their own supply of non-market output. So the value of their final consumption expenditure is equal to the value of the non-market output they produce. In turn, the value of this final output is equal to the value of marketed goods and services bought in to produce that output (known as 'procurement' for the government sector) plus the value of payments to factors of production (ie capital and labour), which is the 'gross value added' by both sectors. Because, by definition, neither the NPISH nor the government sector earns a profit on their non-market output, the value of factor payments by both sectors is simply their labour costs plus an imputed amount of capital stock depreciation. This implies:

$$C_N = C_{NP} + GVA_N$$

$$G = G_p + GVA_G$$

where  $C_{NP}$  is the procurement of marketed goods and services by the NPISH sector,  $G_p$  is procurement by the government sector and  $GVA_N$  and  $GVA_G$  are respectively, the gross value added of the NPISH and general government sectors.

Breaking down the expenditure components in this way allows us to define market sector output,  $MSGVA(E)$ , as the sum of the expenditure components on non-housing private sector goods and services:

$$MSGVA(E) = C_X + I + C_{NP} + G_p + X - M - BPA$$

This is related to GVA by the expression:

$$MSGVA(E) = GVA - GVA_N - GVA_G - C_R$$

So the value of market output in the economy excluding housing services is derived by replacing the household and government final consumption expenditure components of GDP(E) with their expenditure on non-housing marketed goods and services. In turn, this can also be written as GVA minus the gross value added of the NPISH and general government sectors, less the value of rentals expenditure. In practice because estimates of the gross value added of the NPISH sector are unavailable, Bank staff currently remove just the total gross value added of the general government sector and the value of rentals expenditure from GVA:

$$MSGVA(E) = GDP(E) - GVA_G - C_R - BPA$$

$$MSGVA(E) = C_X + C_N + I + G_p + X - M - BPA$$

Throughout, this example has assumed that the government sector produces no marketed output. In practice, some of the gross value added of the government reflects its provision of market goods and services. As discussed in the main text, this means that the measure of procurement here is strictly government purchases of marketed goods and services net of its own provision of them.

## The procurement deflator

One of the main components of market sector GVA, when calculated from the expenditure side of the National Accounts, is government procurement ( $G_p$ ). This represents the marketed goods and services bought in by the government to produce their non-marketed output. Nominal general government procurement is currently available in the *Quarterly National Accounts* and in net terms can be calculated by subtracting government compensation and government gross operating surplus from general government final consumption expenditure. Expenses on compensation and the payment to capital do not reflect payment on goods and services, and are therefore subtracted from nominal government spending to leave nominal government procurement. But, to calculate a chained-volume measure of market sector GVA from the expenditure side (MSGVA(E)), an estimate of real government procurement is required.

The simplest way to calculate real government procurement is to divide nominal government procurement by an appropriate deflator. In general, this deflator will consist of price indices of goods and services that the government buys, weighted together according to the respective shares of the goods and services in nominal procurement. Unfortunately, these data are not currently available. Instead, the Bank currently uses private sector price indices to proxy the prices that the government pays for its goods and services.

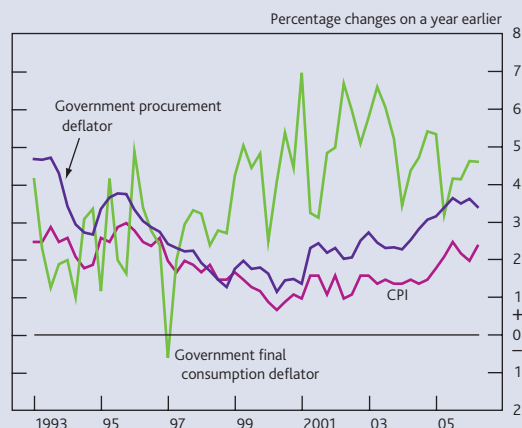
One way of calculating the procurement deflator, using private sector prices, is to take a weighted average of headline producer price inflation and headline CPI services inflation (CPI services), with the weights being the shares of goods and services in nominal procurement. However, this can be improved upon by using detailed information from the ONS Input-Output Supply and Use Tables<sup>(1)</sup> which splits government final consumption expenditure between 123 industry and product groups on an annual basis. These data can be combined with individual industry and product price indices to calculate a more accurate procurement deflator.

Of course, the most accurate deflator, given current data, would ideally link each good and service listed in the Input-Output Supply and Use Tables to its price index and weight it accordingly. However, the linkage between the product and its price is difficult to create because the mapping is not exact. A working approximation is to use product groups in producer price indices (PPIs),<sup>(2)</sup> and split the goods bought by the government between thirteen different PPIs. This is possible from 1997 Q4 onwards: before then, the simpler approach (outlined above) is used.

In theory, it should also be possible to measure the prices of services bought by the government using services producer prices indices (SPPIs), or disaggregated CPI services indices. But the coverage of these data is currently insufficient to do so accurately. Furthermore, CPI data may be misleading where (the price of) services provided to businesses are very different to those provided to consumers. For example, in transport services consumers may tend to travel economy class while many businesses could pay business class fares. In addition, SPPIs are not currently available for many of the services bought by the government (eg legal services). So the Bank of England currently uses the headline CPI services price instead to deflate the services procured by the government.

Chart A shows a government procurement deflator that weights together thirteen PPIs and the CPI services price index. On average, the government procurement deflator has risen by a little over 2% a year since 1996. That is slightly faster than the rate of increase in CPI over the same period, partly reflecting the higher share of services in government procurement. But, over the same period, it has risen more slowly than the government final consumption deflator.

Chart A Government procurement deflator



Sources: ONS and Bank calculations.

(1) For the latest tables see [www.statistics.gov.uk/about/methodology\\_by\\_theme/inputoutput/latestdata.asp](http://www.statistics.gov.uk/about/methodology_by_theme/inputoutput/latestdata.asp).  
 (2) See pages 4 and 5 of the PPI data release, available at [www.statistics.gov.uk/statbase/Product.asp?vlnk=790](http://www.statistics.gov.uk/statbase/Product.asp?vlnk=790).

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