# 4 The National Accounts process and structural change

4.1 The most important impact of structural change on official statistics comes through the role of industry information in the construction of key National Accounts measures. The estimation processes for both timely and benchmark measures of Gross Domestic Product (GDP) are built-up from industry measures based on business sources.

4.2 This chapter is primarily concerned with explaining this role played by industry information, and, in turn, how well this information reflects the existing structure of the economy. Clearly, this discussion is mainly set in the context of the increased importance of the service sector to the economy that was detailed in our First Report. It provides background to a revisiting of the industry requirement in Chapter 5 and then to the recommendations for business sources set out in Chapter 6.

4.3 The ONS has not ignored the development of the service sector: significant economic survey initiatives over the past years have all been aimed at improving the balance of ONS estimates, in the context of both timely and benchmark measures. Annual and monthly inquiries that recognise the importance of services have been put in place; a business register covering all industrial sectors of the economy now underpins all ONS surveys; and the ONS has made significant steps in the measurement of service sector prices. On the other hand, there is still a number of shortcomings, largely but not entirely concerned with the measurement of prices, which might be more fully addressed. This position is well recognised by the ONS, as well as by key users.

4.4 In terms of the actual processing of survey sources in the National Accounts system, the main drawback is the less than full exploitation of the new survey sources. Under proposals that are beginning to emerge as part of the modernisation programme, the role of the industry dimension is likely to change: in particular a fuller and more coherent role for both output and price estimation is envisaged. The discussion therefore closes with a look at this work and the wider implications.

## THE INTERNATIONAL FRAMEWORK AND STRUCTURAL CHANGE: BACKGROUND

### The international framework and GDP

4.5 The National Accounts set GDP measurement in an accounting framework that has evolved through international discussions that stretch back to the end of the Second World War. As a member of the EU, the UK is legally required to produce data according to European System of Accounts 1995 (ESA95) that is based on the latest international standard, the United Nations System of National Accounts 1992 (SNA92).

4.6 It is widely agreed that the system provides a recognised and sound method by which users are able to analyse economic activity.[1] The international standard allows meaningful cross-country comparisons and ensures that there is a full internal coherence to data via the National Accounts structure. Most fundamentally, it is a comprehensive framework that captures economic activity in a way that need not be distorted by structural change (a degree of flexibility is also in-built, see below).

[1] *The emphasis on GDP-based National Accounts is not to say that this approach is the only way to measure economic activity. A number of other techniques and approaches have long-standing support and have been developed and constructed either by official statisticians or academics; the example of growth accounting is discussed in Chapter 10.*

4.7 The effect of structural change mainly comes through the techniques used to complete the framework. While the framework itself is tightly defined, countries have a degree of autonomy to decide how they collect, process and estimate the data required to complete the framework.[2] These techniques have two main dimensions:

- the broad conceptual and methodological processes by which the framework is completed;
- the surveys and sampling framework that are used.

**Sub-macro data requirement**

4.8 The EU framework also sets out requirements for sub-macro data. The First Report emphasised the key role of the NUTS classification for regional breakdowns, and discussed the role of the Standard Industrial Classification (SIC, or EU equivalent, NACE) for industrial breakdowns. From the specific perspective of industrial data, EU legislation requires that Member States provide the Commission with annual estimates for all four-digit codes of the SIC (see Box 5.1 of the First Report for more detail on the SIC) as well as more frequent estimates for manufacturing output at this level. As discussed, the SIC itself is heavily skewed towards the manufacturing sector. An important part of our story is that the manner in which the ONS chooses to meet the EU requirements is a key determinant of how industry data feeds into the Accounts.

4.9 More generally, the EU demand sits alongside the other demands for industry data set out in Chapter 3. From the perspective of economic policy, there is a compelling argument for the availability of detailed industry data, but according to sectors of interest rather than any particular specific level of SIC. Indeed, the requirement for information at four-digit SIC has failed to meet the existing demands in certain sectors and provided a great deal of superfluous information in other sectors. This is clear in the case of the measurement of the ICT industry: as interest in the sector began to emerge, data at the required detail were simply not available.

**Changes to the framework**

4.10 The broad international framework itself also affords a degree of flexibility towards structural change. It is subject to ongoing scrutiny and discussion as economies and economic processes, or understanding of them, evolves. Occasionally, revisions of the framework are issued; under the ESA, Member States are then required to comply with any such changes.

4.11 Some changes to the framework result in changes to the actual measurement of GDP through movements of the 'production boundary'. Here, a critical dividing line is that between intermediate consumption and fixed investment. For example, extending a factory scores as fixed investment and hence contributes to GDP, but the purchase of stationery by a firm scores as intermediate demand and does not contribute to GDP – instead it is deducted from turnover. If the definition of investment and intermediate goods changes, then there is an impact on aggregate GDP.

4.12 There are presently a number of issues related to this boundary under international discussion. Prominently, there is a widely-held view that business expenditure on research and development (R&D) should be treated as investment rather than as intermediate consumption. There is now international agreement that the change should be made for the next System of National Accounts Revision, due in 2008. Box 4.1 looks at the broader picture: the treatment of 'intangibles'.

[2] *Although certain techniques are recommended, in the First Report we noted how the EU recommends measurement of regional GVA according to the production approach; for measurement of national figures, the EU supports the use of chained volume supply-use balancing (discussed later in this chapter).*

**Box 4.1: Intangible Assets**

Fixed assets are those that businesses use repeatedly or continuously in production over several years. The National Accounts distinguish between tangible assets (such as computers) and intangible assets (such as software). Over the past few years it has been argued that the definition of intangible assets recognised by the System of National Accounts (SNA) is too restrictive. While the SNA definition of intangibles now includes software, mineral exploration and artistic originals, it does not include research and development (R&D), education and worker training, organizational infrastructure, or the value of brands and trademarks. These are all argued to be business activities produced in one period with the intention of improving products, processes, or knowledge for use in future production.

US authors[1] have attempted to quantify business spending on intangible capital formation according to a broad definition including scientific R&D, other product development and research expenses, firm-specific human capital, organisational structure, and brand equity created via advertising. They find that recognizing all these expenditures as intangible investment in the late 1990s could add as much as $900 billion a year to capital formation and US GDP; and that returns to R&D make a significant contribution to GDP growth (US GDP in 2003 was $11,000 billion; non-residential investment was $1,100 billion).

However, a number of important issues remain to be resolved in the data on intangible capital formation and asset values. Accounts of enterprises are not designed to provide information on all types of intangible capital formation. For some types of intangible investment, it often is not clear whether expenditures have an expected service life of more than one year – which is a criterion for judging whether expenditure is 'capital'. Some have argued that data and measurement considerations with intangible assets (other than those already recognised by the SNA) mean that estimates should be developed as part of satellite accounts (discussed in Chapter 10) and not immediately added to the core SNA asset boundary. In turn, if these analyses demonstrate the feasibility of producing robust and useful estimates, it would then be appropriate to propose adding them to the core Accounts at a later date.

[1] *Much of the discussion here and the associated figures are based on Moulton (2002).*

4.13 Another common area of discussion is illegal activities, some of which are included in the Accounts, others are not. For example, the consumption and production of illegal drugs and prostitution are not recorded in the Accounts, but estimates for smuggling, adjustments for tax evasion and other frauds are included. While it is inherently difficult to make estimates for activity that, by its nature, is hidden from the authorities, the SNA argues that all illegal activities constituting transactions between two willing parties should be included.[3]

4.14 This international dialogue serves to ensure that important developments are under scrutiny with regard to their treatment and inclusion in the National Accounting framework. However, in practice, the nature of the process means that there can be a very long lag between the start of any international discussion and the final realisation of conclusions in terms of adjusted National Accounts datasets.

[3] *Most recently the UK made an adjustment for VAT 'missing trader intra-Community' fraud – see Ruffles* et al *(2003).*

**Other aspects of structural change**

4.15 As noted above, the key dimension of structural change from the perspective of our Review is the increasing importance of the service sector to the UK economy. The First Report looked at trends over the second half of the twentieth century, noting how the share of manufacturing in national income has almost halved since 1970. Structural issues, of course, go way beyond this specific perspective. Statisticians and economists recognise a wide range of phenomena related to how firms do business, how people work and the wider environment that they operate in.

4.16 Such changes not only lead to new demands on the statistical system, but also challenge measurement techniques to keep pace so that key economic indicators are not distorted. Globalisation, for example, has seen firms' domains of activity expanding way beyond national borders. As firms become global players, their specific activities in national markets become harder to distinguish and hence to measure accurately.[4] At the same time, flows of finance dwarf trade flows around the world and 'e-commerce' challenges standard survey processes. The ONS makes a substantial contribution to international debate on how best to treat these phenomena.

4.17 A change of particular interest to the discussion here is firms' 'contracting-out' activities that used to be carried out 'in-house', such as catering. Traditional timely measures of activity based on turnover have difficulty capturing such changes in the short-term,[5] but technical developments, in particular the introduction of chain-linking, have helped measures catch up (see below and also Box 4.3). These changes also have a wider importance through contributing to the increased importance of the service sector, with activity once conducted within the manufacturing sector shifting to the service sector.

## PROCESSES FOR MEASUREMENT OF NATIONAL ACCOUNTS

4.18 This section examines the specific use of the industry dimension as an input into the National Accounts. The process for constructing National Accounts data is complex and not widely understood. This complexity partly arises from the 'timeline' demand to provide both timely and benchmark measures of GDP. This leads not only to the use of different sources, but also to the adoption of different methodological techniques. The complexity is compounded by the additional (albeit obvious) requirement for both current price and chained volume estimates, with further different techniques used along the timeline.

4.19 The industry issues differ according to the timeline in a manner that also reflects the deflation perspectives: volume measurement considerations are most relevant to the timely measure of GDP, but cash measurement considerations are most relevant to the benchmark measure because expenditure deflation is adopted at this stage.[6] A key theme is that the use of the industry dimension as an input to the Accounts is heavily influenced at present by the EU requirement set out in the previous section.

---

[4] *Lynch and Clayton (2003).*

[5] *For the catering example, the increase in intermediate consumption will not be picked up when using turnover as a proxy, but the increase to catering industry turnover is likely to be recorded.*

[6] *A benefit of the National Accounts modernisation programme is that the methods along the timeline will be brought closer together, and the envisaged framework will expose methodological differences in a more transparent way. These issues are discussed in the last section of this chapter.*

## The timely GDP measure

**Background** 4.20 Underpinning the timely measure of quarterly real GDP are two key assumptions:

- movements in the production measure of GDP can be approximated, in the short term, by movements in turnover; and
- the indicator so defined and measured in real terms provides a better short-term estimate of real GDP growth than expenditure and income figures, which are therefore adjusted accordingly.

**Survey sources** 4.21 The three main ONS survey sources for turnover data are the Monthly Production Inquiry (MPI), the Monthly Inquiry into the Distribution and Service Sectors (MIDSS) and the Retail Sales Inquiry (RSI).[7] The MIDSS surveys roughly 29,000 firms a month and is about three times the size of the MPI, which surveys 9,000 firms a month. The RSI surveys roughly 5,000 firms each month. In this way, the sample sizes are well balanced against the relative importance of each sector. (The same survey sources are also used to construct the advance individual monthly indices of production, services and retail sales – see Chapter 7.)

4.22 In addition, ONS surveys are supplemented with other sources. For the service sector, there are a number of volume measures (for example, rail freight and parcel post volumes) as well as information on government services. The measurement of other industries: agriculture, energy, mining and construction, is based on sources from other government departments (see Box 4.2).

[7] *The MIDSS does not cover the retailing sector.*

**Box 4.2: The 'compartmentalisation' of the measurement of economic activity**

**The responsibility for measurement of a number of broad industrial sectors does not rest solely with the ONS. Instead, statisticians in the government departments related to specific activities manage surveys and produce estimates. This de-centralised arrangement has most relevance for the production of the timely estimate of GDP. The table below sets out these broad industrial sectors against the department(s) with lead role.**

## Industrial activity: broad sectors

| Activity | Share of GDP Per cent[1] | Lead departments(s) |
|---|---|---|
| Agriculture, forestry, and fishing | 1 | DEFRA |
| Mining & quarrying inc. oil & gas extraction | 3 | DTI |
| Manufacturing | 18 | ONS |
| Electricity gas and water supply | 2 | DTI |
| Construction | 5 | DTI |
| Distribution hotels and catering; repairs | 16 | ONS |
| Transport storage and communication | 8 | ONS |
| Business services and finance | 24 | ONS/BoE |
| Government and other services | 23 | ONS/HMT |

*[1] 2000 weights.*

**While the ONS is responsible for measuring the great majority of activity by weight, these de-centralised arrangements apply to a significant amount of activity. Furthermore, an additional consequence of this structure of departmental responsibility has been a 'compartmentalisation' of activity into these broad economic sectors, with distinct survey and measurement techniques applied (this is discussed further in Chapter 6).**

**The Annual Business Inquiry was a major step away from this structure. While not comprehensive in terms of all broad sectors, it is a business inquiry rather than an inquiry of a specific sector.**

Deflation

4.23 The survey turnover data then need to be deflated in order to obtain real, or chained volume measures. (A structural perspective on chain-linking is considered in Box 4.3.) Industry detail is crucial to this technique, and, in turn, the specific technique adopted is reliant on the SIC.

4.24 Manufacturing and service sector turnover estimates are deflated at the four-digit level of the SIC. This has implications for both the collection of turnover data and the construction of deflators that coincide with the EU requirement on the manufacturing side. In order to make estimates of turnover at this level of disaggregation, the ONS stratifies the monthly turnover surveys (predominantly) at the four-digit level of the SIC.[8]

[8] *Stratification is a technique used for sample efficiency, but also to guarantee the ability to make estimates at specific levels of interest (see Chapter 5).*

**Box 4.3: Chain-linking and structural change[1]**

**Under chain-linking, all volume figures are now derived in prices of the previous year and are referred to as chained volume measures rather than the previous 'constant prices'.[2]**

**The impetus for adopting chain-linking was itself related to structural considerations: the process essentially allows volume measures to be more responsive to changing patterns of output, expenditure and relative prices over time. Advocates of chain-linking have given particular emphasis to the impact on the 'information and communications technologies' (ICT) sectors, where large price falls have been accompanied by large output and consumption increases. Prior to chain-linking, the Accounts gave output and expenditure movements in these sectors too great a weight, as they were based on the relative contribution in the previous 'base year' (1995) prices which were rather higher. Chain-linking takes the relative prices of the previous year and thus allocates a more appropriate weight to the movement. The adoption of the technique in the UK saw a clear negative impact on growth rates in the relevant sectors.**

**Chain-linking has the added benefit that the value-added weights of the timely output measure of GDP are updated annually and correspond to the most recent supply-use estimates. This means that movements in intermediate consumption will be reflected faster, and therefore that the turnover proxy is a better guide to GDP than under the previous constant price systems.**

[1] *Tuke and Beadle (2003) provides helpful background.*

[2] *However, prices for the most recent estimates are not based on the previous year's prices but the latest year derived from the supply-use process (i.e. 2001).*

4.25 The specific price indices used to deflate turnover at the four-digit level of the SIC differ for the manufacturing and service sectors. For the manufacturing sector, deflation is based on the use of the Producer Price Indices (PPIs) and Export Price Indices (EPIs). The PPIs are long-standing, covering 9,000 products and based on a sample of around 5,000 firms. The EPIs are newer and cover a similar level of detail. At present, the product indices are aggregated to deflate around 250 separate four-digit headings; in addition, individual producer price indices are published for 1,000 products.[9] The aggregation of detailed product estimates is based on the PRODCOM survey – discussed below.

4.26 Service sector deflation is less straightforward and less firmly based. There are a number of issues, the most important being that systems are new and still under-developed, and that key product information is not available.[10] Deflation techniques are also less uniform than for the manufacturing sector. In practical terms, price measurement is mainly based on newly developed Corporate Service Price Indices (CSPIs), components of the Consumer Prices Index (CPI) and Average Earnings Index (AEI), and occasionally aggregate measures such as RPIY (the Retail Prices Index excluding mortgage interest payments and indirect taxes).

[9] *For example, the manufacturing SIC class 3420 (Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers) is deflated according to an aggregate of 16 product deflators for the SIC sub-classes 34201, 34202, 34203.*

[10] *Specific difficulties for government and financial services are discussed in Chapter 7.*

4.27 The key issue for the present discussion is the use of CSPIs. As discussed in the First Report, these measures have been developed over the past 10 years, and represent a significant step forward in the adequacy of the measurement of real service sector output. However, the use of this technique is work in progress, with more CSPIs needing to be developed. Where CSPIs do not exist or have not reached appropriate quality standards, other techniques are used:

- aggregate measures as above (for example, legal services uses the relevant industry components of the average earnings index and the RPIY);
- prices paid by consumers are used to proxy those paid by both businesses and consumers (for example, purchases of motor vehicles uses components of the consumer prices index even though they may sometimes differ);
- volume measures are used instead of deflated turnover (for example, rail freight is measured in tonnes).

4.28 At present, only 19 aggregate indices are used to deflate service sector turnover measures. The ONS estimates that this accounts for roughly 40 per cent of relevant corporate services activity.[11]

4.29 While some areas may justly use alternative techniques, the ONS' aim is to extend the use of CSPI deflated turnover as far as possible (see also Chapter 7). The fuller validity of chained volume service sector measurement thus depends on this gradual transition.

4.30 There are also specific technical issues concerning the level of product detail that CSPIs are built up from. The CSPI measures cover 5,000 products and are based on a panel of 1,500 firms, and are hence proportionately less detailed than manufacturing counterparts. Furthermore, there is no formal survey process for product estimation. This is discussed in the next section; the relevant level of detail is discussed in the next chapter.

**Publication of industry detail**

4.31 Aside from contributing to the timely aggregate measure of GDP, industry detail is also published so that users can interpret headline GDP figures. For example, recent growth has been influenced by the strength of construction sector output, as well as ongoing robust outturns for the service sector. The ONS publishes various industry aggregates based on the timely measures.[12] However, information on manufacturing is available at a far more detailed level than the information on the service sector. This only partly follows from the imbalance of the SIC, but there are also concerns about the robustness of service sector survey data at the detailed level. Conversely there are concerns that manufacturing output is available at too high detail, given likely sampling errors. The ONS will be looking at making a more balanced portfolio of output detail available.

[11] *In total, the ONS calculates and publishes 32 CSPIs, estimated as covering 55% of corporate services activity. The use of volume measures accounts for the gap between those published as price indices and those used for deflation (in these cases, not using deflated turnover reflects either the weakness of the turnover measure or concerns with the CSPI).*

[12] *Key paper sources of chained-volume output measures are Table A4 of the quarterly publication* UK Economic Accounts *that provides a breakdown of the service sector into twelve industries; and the 'Index of Production' First Release that provides a breakdown of the manufacturing sector into seven industries and four 'market sectors' (consumer goods, intermediate goods etc.). Electronically, the ONS 'Time Series Data' facility provides 20 sectors of service data (a mixture of SIC divisions and sectors) but around 250 manufacturing sectors (at four-digit SIC level).*

## Annual benchmark estimates

**Supply-use balancing**

4.32 The benchmark measure of GDP relies on a fuller method of balancing within the supply-use framework.[13] The framework allows confrontation and reconciliation of the detail underpinning the three measures of GDP to produce a consistent and coherent single measure. The fundamental claim made for this technique is that a more accurate fix on aggregate GDP can be achieved through these confrontations. In the UK, the approach has been used since 1991.

4.33 Supply-use tables link the components of industry inputs, outputs and gross value added and final demands within a single framework. The data used to compile the tables are predominantly derived from ONS business inquiries. While the primary purpose of these tables is their use for the compilation and benchmarking of National Accounts information, there are a number of other uses. Components of the tables are used as inputs to various other products such as Regional Accounts, Environmental Accounts, weights for Producer Price Indices and for the timely measure of GDP. In addition, users such as the Bank of England, HM Treasury and the DTI use these tables to analyse various aspects of the economy, for example, import penetration, the impact of BSE or an oil price rise on the UK economy, and the effect of changes in taxation.

4.34 It is through industry and product breakdowns that matching of supply and use at product level (across rows), and outputs and inputs at industry level (across columns) can be carried out. The supply-use tables break down the UK economy into 123 industries, with inputs and outputs shown according to a 123-product breakdown (see Box 4.4 for a discussion of the distinction). The 123 industry/product classification maps directly to the SIC, although according to a 'wavy line' approach, insofar as the supply-use industries do not correspond to any specific level of SIC classification, but are a mixture of aggregations of industries at different levels. For example, 'Tobacco products' relates to the two-digit SIC sub-section 16, but 'Legal activities' relates to the four-digit SIC class 74.11. As our First Report noted, these industries are more skewed towards the manufacturing sector than the SIC itself (77 out of 123 or 63 per cent refer to the manufacturing sector compared to 48 per cent referring to manufacturing in the SIC).

4.35 The existing ONS industry/product breakdown in the supply-use tables was last examined in 1994, when it was extended from 102 to 123 groups. The extension was based an a number of key criteria, for example:

- to distinguish industries/products with very different input and output structures, and distinct consumers for the outputs;
- data availability, quality and stability of sources;
- disclosure issues;
- a specific requirement for expansion of the distribution and service sector (which moved from 14 groups to 35 groups); and
- a general balance between compilation, balancing and publication needs.

The discussion in the next chapter looks to a re-examination of these categories as part of a review of the industry data requirement due to National Accounts compilers.

[13] *See First Report paragraphs 5.18-5.27.*

**Box 4.4 Industries and products**

**It is obviously common for a firm to make more than one product. Where a firm has more than one product, it is allocated to an 'industry' according to 'primary product' – the one that generates the largest turnover.[1] National Accounts processes require an ability to estimate the product dimension for both deflation and supply-use processes.**

**More generally, the classification of firms is 'industry' rather than 'activity' based. A firm might conduct its own intermediate activities such as an accountancy or distribution. These activities are classified as part of the primary product industry, rather than the accountancy or distribution industry. Some argue that there are benefits to the identification of such functions as part of the accountancy or distribution industry.**

**From a structural perspective, an industrial breakdown is perhaps increasingly artificial, since many firms have a number of different 'core' products. Nevertheless, there are a number of technical demands for the industry dimension:**

- **the industry perspective on a supply-use table allows confrontation of the outputs and payments to the factors of production;**
- **estimates of value added by industry provide the weights for the timely measure of GDP;**
- **the industry dimension underpins the wider Input-Output Analytical Tables (see First Report, paragraph 5.20); and**
- **analyses of the returns to the factors of production are made at the industry level, and industry estimates are required as weights for detailed growth accounting work (see Chapter 9).**

**While it is arguable that industry analyses may be distorted by secondary and other products, it is implausible to envisage a system that fully distinguishes activity according to product. Realistically, a survey structure can only be developed around businesses, not products.**

[1] *It is possible that a business may move from one industry to another and even back again as the relative turnovers change over time. An additional complexity from the regional perspective is that some individual units may be geared wholly to the 'secondary product' (this leads to inconsistencies between industry totals built up from regions and national industry totals).*

Survey data

4.36 The primary source of data used to fill the supply-use framework is the Annual Business Inquiry (ABI). Here, annual accounting variables are available at the 123-industry level through a stratification at the four-digit level of the SIC that echoes the EU requirement. Notably, the industry provision from the survey is far more extensive than the dimension of the supply-use table. Product estimates are discussed in the next section. The ABI data are not only used to complete most of the domestic supply part of the 'supply' table, but also provides estimates for much of the 'use' table: intermediate demand, gross fixed capital formation, changes in inventories and some estimates of goods consumption, through ABI estimates of retailers' sales.

4.37 The aim of moving to the ABI was to give equal emphasis to all parts of the economy within a single coherent framework (except for some financial, agricultural and government activities – see our First Report paragraphs 5.48 – 5.54 for further discussion). In 2002, information was collected from 15,500 production companies, 6,500 construction companies, 9,000 retailers and 42,500 other distribution and service sector industries. The survey is therefore fulfilling its broad aim and is drawing a sample of activity that is balanced in terms of the number of forms sent out. The dimensions of the supply-use tables have not, however, been changed in the light of this new data becoming available. More generally, we have not been able to assess the specific quality of the actual survey results in the time available. Chapter 6 looks to a review of the quality of the results as part of a wider review of producer demands for annual industry data.

## PRODUCT DETAIL AND SURVEYS

4.38 Product data are important to both the benchmark and the timely measurement techniques that were described above. While this requirement is theoretically for all industries, in practice only data for the manufacturing sector are available. The structural bias in this case is hence extreme.

4.39 The requirement for product detail arises from four main perspectives, two technical and two due to users:

- the Producer Price Index (and deflation processes more widely) requires the identification of relevant products for pricing within each industrial category, and information to aggregate these products according to their relative importance;
- supply-use processes requires translation from industry output to product detail in order to match supply with expenditure;
- manufacturing data are required according to the EU Commission Regulation on the implementation of the PRODCOM list (see Box 4.5); and
- business users desire information on sales and trade by product.

**Box 4.5: The PRODCOM survey and classification**

**The Products of the European Community survey (or PRODCOM) is required by EU legislation. Member States are obliged to provide estimates for the sales of about 5,000 products, defined by the PRODCOM list. This classification is based on an extension of the SIC/NACE and is maintained by the Commission (who update it each year).**

**The PRODCOM Classification Codes (PCC) extend the SIC code to eight digits, although in practice the effect is to disaggregate the four- and five-digit SIC codes into a number of products ranging between two and forty. For example, the five-digit SIC industry 'manufacture of caravans' (SIC 34202) is dis-aggregated into products as follows:**

- **folding caravans (PCC 34202230);**
- **caravans of a weight not exceeding 750kg (PCC 34202293);**
- **caravans of a weight exceeding 750kg but not exceeding 3,500kg (PCC 34202295); and**
- **caravans of a weight exceeding 3,500kg (PCC 34202297).**

**The actual PRODCOM survey comprises annual and quarterly components. In 2002, around 23,300 firms were surveyed in the annual component and 3,300 each quarter. The survey is stratified by employment band and industry at the five-digit SIC level. It is the fourth largest ONS survey in terms of compliance cost (see Table 11.1 of the First Report); this large cost is mainly because firms find the information difficult to provide at this level of detail.**

**Results are published on the internet as 'Product sales and trade reports', issued for 249 four- and five- digit SIC industries (most on an annual basis, some quarterly). These reports provide detailed information on specific product sales set against the total sales across all products of companies belonging to the same industry. The figures include cash and volume (i.e. number of items) estimates. Sales information is also set against import and export information (which can be obtained at the same level of detail from Customs surveys).**

**Producer demand** 4.40 From the technical perspective, the deflation/producer price requirement presently has the most extensive requirement for detailed data. The producer price index (PPI) sample is drawn from the PRODCOM sample. Individual companies are asked to price relevant items in each product category (six-digit PRODCOM), which are meant to reflect their products' overall price movement within that category. The ONS aggregates prices across products using PRODCOM sales information, up to the levels of classification required for deflation.[14]

4.41 The lack of service sector product information has two important consequences for deflation techniques:

- there is no 'benchmark' list of detailed service sector products that can be used to aid setting up surveys; and
- there are no product sales data to weight together individual product price indices.[15]

4.42 For supply-use analysis, the requirement for product detail is by no means as extensive. Broadly, data are simply required so that the output of the 123 industries can be mapped to the 123 products (although some analysis is carried out at a more detailed level). This then enables the matching of supply with final demand by product on the use matrix. With only manufacturing product information, the allocation of industry to product in non-manufacturing industries is less firmly based.

**User demands** 4.43 The user perspective is dominated by the EU, although there are a number of industry-based domestic users, particularly trade associations. Key intelligence for businesses is whether trends in product sales are due to wider changes in the market or firm-specific factors.

**Summary** 4.44 Overall, product identification of CSPIs, weighting of CSPI products and supply-use allocation of industry to product for the service sector is more subjective than for the manufacturing sector. The non-availability of a fuller and more formal process is a major factor holding back the full adjustment of the statistical system to the importance of the service sector.[16]

## ONS MODERNISATION AND THE NATIONAL ACCOUNTS

4.45 Processes planned and underway as part of the National Accounts modernisation programme will be addressing the wider coherence and balance of the National Accounts systems as a whole. (See Box 4.6 for a discussion in the context of the whole ONS modernisation programme.) Specific plans envisage the systems for the production of timely quarterly estimates and the annual benchmarks moving closer together, leading to a more balanced and coherent use of deflation techniques, ultimately through a chained volume supply-use technique.[17] It will also entail a re-evaluation of the technical demands for sectoral and product data.

[14] *Because the sample is drawn from PRODCOM, the ONS has the sales information for each company and each product, so prices can be individually weighted. The PPI data are also used to deflate the Gross Fixed Capital Formation (GFCF) component of expenditure data (for both timely and benchmark measures).*

[15] *Leaving aside difficulties due to reflecting appropriately the balance of consumer, business, government and overseas consumption.*

[16] *The ONS has looked at these issues before. A pilot study of the computer services sector was conducted on behalf of the EU, concluding that a full ongoing survey was feasible. For the recent exercise to rebase the CSPI, product identification within an industry and weights for CSPI products were updated based on information provided by an* ad hoc *and purpose-built turnover survey.*

[17] *The initial thoughts on the way in which the National Accounts modernisation is likely to proceed have been set out in a recent* Economic Trends *article – Tuke and Aldin (2004).*

4.46 In general terms, the likely developments through the National Accounts modernisation programme will constitute a significant extension of the existing processes, which have already been subject to substantial change via the introduction of chain-linking. Previous work on constant price supply-use has been confined to a number of *ad hoc* analyses and feasibility studies.[18] These reveal a number of complex technical and data issues that will be challenging to overcome.

**Box 4.6: The ONS modernisation programme, by the Office for National Statistics**

**When ONS was created from the merger of three smaller organisations, the new organisation inherited different methods, statistical tools, processes and practices, systems and technical infrastructures. This initial lack of integration and subsequent lack of investment led to inefficiencies in production processes, increased risk to the quality of statistics produced and, because of the complexity of existing systems, a high cost to even routine upgrading. The ONS modernisation programme will update the office systems and provide standardised tools across the whole of ONS. The principal high-level impetus for the programme came from Spending Review 2002, which provided additional funding of £75m over the period 2003-04 to 2005-06. A major element of the programme is the re-engineering of the systems that produce some of ONS's key outputs, the National Accounts, Labour Market Statistics, population and prices.**

**As part of the re-engineering of systems, the ONS is re-visiting business processes and methods for compilation of these outputs. In practice, though, the extent of methodological change is varying. In the specific case of the National Accounts, a fundamental re-engineering of the methods, business processes, data flows and computer systems that underpin National Accounts production is underway.**

**The overall programme is being managed in phases, each with clearly defined deliverables and benefits:**

**phase I – the development of a working Central ONS Repository for Data (CORD) that will present data on a website (due for completion at the end of 2004);**

**phase II – migration of key social surveys onto CORD;**

**phase III – migration of key business surveys onto CORD; and**

**phase IV – development of a full National Accounts system.**

**The re-engineering project is on course to deliver a fully tested, quality assured, operational National Accounts system by March 2006 that will be used 'live' for the delivery of the 2007 *Blue Book*.**

4.47 Aside from methodological and process issues, addressing the inflexibility of existing National Accounts systems is regarded as a key priority of this specific re-engineering programme. Existing systems are regarded as slow to adopt agreed classification and methodological changes, because changes can only be implemented once a year alongside the annual supply-use benchmarking exercise. Some revisions that go back a long way in time are implemented even less frequently. The use of automated processes is also more limited than it might be.

**Volume measurement**

4.48 As mentioned above, the ONS' deflation procedures are complex (the issues were raised in our First Report, paragraphs 5.114-5.117). Furthermore, the different techniques adopted for timely and benchmark measures give different data prominence in a manner that is recognised as not fully appropriate.

[18] *See Ahmad (1999), Powell (2002) and Powell and Swatch (2002).*

4.49 While the timely measures of GDP are underpinned by output deflation, the published 'GDP deflator' is in fact an expenditure deflator. This measure is not necessarily consistent with the implied aggregate deflator (which is not published) applied to the output figures. At the same time, under the present assumptions for the timely measure, the information for the expenditure and income measures play at most a marginal role in determining the overall growth in GDP. Moreover, the internal ONS technique for compilation of the figures does not permit an analysis of whether price or volume changes are responsible for the overall movement in the timely output figures (i.e. a timely current-price indicator is not published).

4.50 At the annual supply-use stage, once current-price output, expenditure and income figures are balanced, the chained voloume series is derived via expenditure deflation and the output deflators no longer play a role in establishing the aggregate estimate. The two alternative deflation perspectives are not reconciled, nor are the timely output measures fully reconciled with the new benchmark data.[19] There is then the additional complexity of double deflation (First Report paragraph 5.116): the timely estimate of GDP is derived under the assumption that deflated turnover is a reasonable proxy for Gross Value Added. Double deflation involves estimation of real gross value added via deflated turnover and deducting deflated intermediate consumption. While the use of expenditure deflation for the annual benchmark measure in part resolves the need for this technique, double deflation will be required for fuller constant price supply-use balancing.

4.51 Implementation of a fuller quarterly and annual constant price supply-use framework (with the introduction of double deflation) should resolve these inconsistencies and imbalances. The technique is recognised by ESA95 and recommended in subsequent guidance on how to meet its recommendations. The technique will allow the confronting of both chain volume measures and price measures of supply and use across the product categorisation.[20] Given a 'balance', both expenditure deflation and output deflation will be consistent. There will then be a single GDP deflator (as well as consistent detailed chained volume output data).

**Industry detail**

4.52 As noted, the modernisation programme will also be looking at the relevant detail for chained volume and current price supply-use balancing with a view to a potentially more balanced representation of economic activity. These discussions complement proposals about industry detail that are developed in the next chapter. Outside the specific issue of industry data, the use of double deflation would ideally require more extensive deflators for intermediate demand.

**Implications**

4.53 While developing existing supply-use techniques is clearly not a panacea for robust data, the framework should lead to better and more coherent measures of GDP that take a more balanced approach not only to industries but also to other perspectives on the economy as well. Their implementation would constitute a significant step forward from the present arrangement. However, the technique can only be as good as the basic inputs: the statistical surveys and the supporting infrastructure that are the subject of the next two chapters.

[19] *While an adjustment is made to bring the timely figures in line with the figures implied by the expenditure deflation of benchmark figures, this adjustment is made only to service sector industries.*

[20] *Just as the supply of products must equal the demand for products in current price terms, the same must be true in quantity terms. While there are some complications with the latter identity due to the measurement of quantities in chained volume terms (theoretically, the identity is valid only in continuous time using divisia indices), for practical purposes, the identity can be assumed to hold.*

4.54 Recommendation 46: In principle, the development of supply-use processes and the proposed integration of deflation processes within this framework should lead to more robust, coherent and transparent measures of GDP. Data requirements due to these changed procedures should be given high priority in developments to survey and register processes.

# 5 Industries and products

5.1 The previous chapter exposed the role of industry data in the National Accounts process. This role translates into a requirement that industry data is measured well and appropriately at the levels of detail adopted by these processes. This requirement, which is a user requirement from within the overall statistical system, is referred to here as a 'producer' requirement, and it has to be balanced with other user requirements, from both within and outside government, for industry data for analytical and policy purposes. The discussion illustrates how, for industry surveys, the ONS implicitly gives more weight to external user requirements.

5.2 Given our more general position on user requirements for industry data, this chapter develops the argument that requirements for industry data should be revisited with more prominence given to producer considerations.[1] In practical terms there are implications for stratification of industry surveys. The argument essentially endorses existing work in the ONS as part of the modernisation programme, with National Accounts re-engineering processes looking at the requirement for industry detail and survey methodologists looking at stratification techniques.

5.3 This approach to industry data sits alongside the specific *user* requirement for regional data at the NUTS 1 level. The grounds for a more *producer*-orientated approach are partly due to efficiency, but also should lead to a more flexible approach that aids responding to structural change. The discipline of revisiting industry demands should also improve the balance of industry inputs to the various processes described in the previous chapter.

## INDUSTRY CLASSIFICATION AND STRATIFICATION

5.4 The present industrial stratification for surveys feeding into National Accounts systems is based primarily on the EU/SIC requirement for industry detail[2], and the use of industry detail in National Accounts methods operates at this level of detail or aggregations thereof. Recommendations 6 and 30 of our First Report already looked at an alternative approach to industrial classification; the aim of this chapter is to more fully justify these recommendations and to set out a clearer way forward. The industry requirements are also inseparable from product detail requirements, which therefore also form part of the discussion.

**Purpose of stratification**

5.5 In the statistical sense, the purpose of stratification is to improve sample efficiency. Stratification leads to efficiencies in survey design if the within strata variances are small and the between strata variances are large.[3] But, in practice, stratification is also used to facilitate estimation of specific domains of interest. If the estimates for domains of interest are required to a specific degree of accuracy, then stratification is a convenient way to achieve this. In fact, the introduction of stratification according to regions/countries will be necessary to meet the requirement for accurate NUTS 1 data. As discussed in the next chapter, sample sizes and their allocation to strata (in terms of size, region and industry) can then be adjusted to provide the required level of accuracy. For industry requirements, stratification is used to guarantee an ability to make estimates at the specific level of interest.

[1] *Although such a requirement is really an element of a broader dialogue, given producer requirements must ultimately depend on accuracy considerations that are largely dictated by sample size.*

[2] *The EU requirement is for outputs, not for stratification.*

[3] *The most important strata are those due to employment size.*

5.6 The procedure adopted by the ONS guarantees an ability to estimate each industry stratum total with an anticipated reliability. However, it does not guarantee that the quality will be sufficient for user needs. Indeed many strata will be based on very few observations that will be too small to usefully reflect the specific detailed population under consideration.

5.7 Furthermore, the requirement for statistical efficiency may clearly conflict with requirements to make estimates at specific levels of interest. In particular, as we discussed in our First Report (paragraph 5.58), it is possible to over-stratify a survey. Stratification means that all strata have to have a sample allocated to them; furthermore, the ONS procedures also adjust sample size at stratum level to meet a specified minimum.

5.8 Outside the specific business inquiries emphasised in the previous chapter, the level of industry stratification used by the ONS varies. For example, the Monthly Survey of Wages and Salaries is based on two-digit SIC, the Quarterly Stocks and Capital Expenditure Inquiries are based on three-digit SIC, the annual inquiry into service industry trade is based on a mixture of levels of the SIC.

5.9 While the industry surveys in the previous chapter do not rigidly adhere to the four-digit SIC, they come close. The ONS has emphasised to us that for these surveys there needs to be a better balance between over-stratification, domains of interest and design efficiency.

**The imbalance of the SIC**

5.10 A related point is the imbalance of the SIC. Our First Report (paragraphs 9.9-9.11 and Table 9.1) drew attention to how the SIC is far more detailed for the manufacturing industry than the service industry. The consequence of this imbalance is that any survey that draws a sample according to industrial strata based on levels of the SIC classification will to some extent over-emphasise the manufacturing against the service industry. Similarly, the key technical procedures underpinning the construction of timely and benchmark GDP data are based on more detailed information for the manufacturing than the service industry.

5.11 A revision of the SIC is currently being developed through extensive international collaboration. The 'SIC 2007' will go some way towards redressing the balance between sectors; although as Table 5.1 shows, the number of SIC divisions for the service sector will still fall sort of the relative weight of the sector in the whole economy.[4]

### Table 5.1: Structure of SIC 2007 according to divisions[1]

| | GDP[2] | SIC(1992) | | SIC(2007) | | Change |
|---|---|---|---|---|---|---|
| | *Per cent* | Number | *Per cent* | Number | *Per cent* | Number |
| Agriculture, forestry & fishing | *1* | 3 | *5* | 4 | *5* | 1 |
| Mining & quarrying (inc oil & gas extraction) | *3* | 5 | *8* | 5 | *6* | 0 |
| Manufacturing | *18* | 23 | *38* | 23 | *27* | 0 |
| Electricity, gas & water supply | *2* | 2 | *3* | 5 | *6* | 3 |
| Construction | *5* | 1 | *2* | 3 | *4* | 2 |
| Distribution, hotels & catering; repairs | *16* | 4 | *7* | 6 | *7* | 2 |
| Transport, storage & communication | *8* | 5 | *8* | 12 | *14* | 7 |
| Business services & finance | *24* | 8 | *13* | 17 | *20* | 9 |
| Government & other services | *23* | 9 | *15* | 10 | *12* | 1 |
| **Total** | ***100*** | **60** | ***100*** | **85** | ***100*** | **25** |
| *Memo: services* | *71* | *26* | *43* | *45* | *53* | *19* |

*Source: Office for National Statistics (2004)*

*1 Divisions are two-digit SIC*
*2 2000 weights*

## The producer requirement for industry detail

5.12 We argue that the dominant requirement for industry detail should be the producer requirement, i.e. that from within the ONS. The dimensions discussed in the previous chapter can be stated in the following general terms:

- output indicators require the **deflation** of turnover data to give volume measures of activity. This involves a decision about the appropriate level of dis-aggregation at which to deflate that is usually related to the homogeneity (see below) of industrial activity in terms of both prices and values;
- the annual benchmarking of GDP uses **supply-use** balancing which demands industry/product detail. The whole motivation for supply-use is that aggregate figures are more robustly measured via this process of matching (and, in the future, matching at constant prices); and
- industrial stratification of surveys offers **statistical efficiencies**.

5.13 The first two arguments define a role for industrial detail, but do not specify the appropriate level of detail that is required. The basic proposition of the processes is that the greater the industry detail the more accurate the aggregate measure will be. However, set against this is a widening of standard errors as information becomes more detailed (for example, as one moves from three- to four-digit SIC) given fixed sample size. There is likely to be an optimum level of detail that balances standard errors against theoretical benefit for a given sample size.

[4] *That said, as an international classification, it will not fit countries exactly.*

**Deflation**

5.14 The basic deflation technique for short-term output measures is that industry estimates of turnover are deflated with indices built up from products. The argument for the relevant level of detail is usually stated in terms of homogeneity. Industrial output should be grouped and deflated according to homogenous groups, where price and quantity behaviour are distinct; and price changes should be incorporated with a weight that reflects a relevant and up-to-date measure of consumption or production of that product. Just as the weight should be updated frequently, it should be incorporated at a detailed level so that distinct changing patterns in behaviour can be reflected as accurately and as soon as possible.

5.15 In practice, this argument depends on the accuracy of both price and volume measures at various levels of dis-aggregation. There is no particular reason to expect the four-digit level to be the appropriate level (leaving aside the fact that operating at this level subjects the deflation process to bias towards the manufacturing sector). Deflation should take place at the level at which the industry/product estimates are regarded as accurate enough to enjoy the theoretical benefits of detailed deflation. In terms of industry estimates, there are already signs that the detail used at present is inappropriate: the sample size of the monthly production inquiry does not provide adequate estimates for a number of four-digit industry headings.

5.16 As reported in the previous chapter, the present balance between goods and corporate service price measures is rather distorted: while there are around 1000 individual PPIs, there are only 32 CSPIs. While this comparison is only indicative and a number of other factors have a bearing on this difference, in practice, the appropriate level of deflation is likely to be somewhere between the two.

**Supply-use balancing**

5.17 The level of detail for supply-use balancing and the categories within that detail depend on a number of considerations:

- the industry and product categories need to be distinct so that supply, use, input and output can be clearly and consistently identified and appropriately measured (products are discussed in more detail below);
- from the basic 'structural' perspective, categories might reflect industries' relative importance in the economy in terms of value added;[5]
- from the broader producer perspective, some categories need to be identified as inputs to other processes (e.g. for environmental accounts);
- from the user perspective, the categories need to be detailed enough to carry out the likely analyses of interest; and
- under modernisation, the ability to deflate these categories is also relevant.

**Statistical efficiencies**

5.18 It is clear that stratification of business surveys by industry at some level will lead to efficiencies in sample size, given the fact that industrial classification groups together businesses performing similar activities, and that this will reduce variability within strata. However, it is not clear that an optimum stratification, drawn purely on statistical criteria, would lead to the current stratification at four-digit SIC level.

[5] *Such a standard does not of course go as far as saying that representation should be exactly in line with contributions to GDP.*

## Product detail

5.19 As discussed, the non-availability of product detail for the service sector is a significant barrier to the balanced measurement of economic activity. On the other hand, the present arrangements for the manufacturing sector can also be questioned on the grounds of excessive detail and frequency.

**Producer demand**

5.20 Product sales estimates are required to identify aggregate product deflators for deflation procedures and to allocate industry output to products. In terms of timeliness, both of these requirements are for annual figures at a frequency that is, at most, annual. In terms of detail, supply-use processes do not require the highest level of detail collected by PRODCOM. As discussed above, deflation processes for manufacturing involve aggregation of product information at a very detailed level. However, given PRODCOM sales data can have very high standard errors at the detailed level, the efficiency of operating at this level of detail and hence the associated requirement for product information at this detailed level may also be questioned.

**User demand**

5.21 Outside the EU demand itself, the major demand for extensive detail and a quarterly frequency may be industry itself.[6] The consultation on our First Report suggested some users would not wish to see any reductions in the detail or frequency of PRODCOM data, and some would like more detail more frequently.

5.22 In sum, there is an undeniable demand for product information across the economy. However, we suggest that requirements should first be considered as part of a review of industry and product detail (see below) and that the ONS should look to sample issues after this review has taken place (see Chapter 6).

## PROPOSED WAY FORWARD

5.23 Overall, from the producer perspective, there is an undeniable demand for some degree of industrial classification of core business surveys. At present, the stratification that is close to four-digit SIC industry gives prominence to user demands (in particular those due to the EU). This in turn can be used to underpin deflation and supply-use requirements in a convenient manner. The disadvantages are that the demand for such detail has implications for the overall sample size, and in a manner that skews the detail towards the manufacturing sector.[7]

5.24 We consider that these disadvantages outweigh the practical advantages of this basic approach. We argue that a producer-led approach, at the same time going back to first principles, offers plausible, efficient and statistically-valid compromises in the level of detail relative to the present arrangement.

5.25 We propose that the ONS should review the level of industry and product detail required to produce National Accounts estimates taking into account the issues discussed in the previous section. The questions the review should consider will be wide-ranging, looking at all the demands for industry and product detail.

[6] *The full extent of this demand is unclear. The publications are only available through the ONS website, and, at present, no statistics are available on usage.*

[7] *Although SIC 2007, when implemented, will restore a better, if not ideal, balance.*

**'Wavy-line'** 5.26 The review should also draw on advice from a small number of experts from the relevant government departments. The answers to these questions should in turn inform the relevant degree of industrial stratification. Such a stratification will still be based on the SIC, but will move away from operating at one specific level of the classification. Instead the stratification should be based on a 'wavy line' interpretation of the classification, so that strata do not correspond to one specific level, but to a combination of different levels that satisfy the considerations set out above.

5.27 As noted, an important consideration when looking at the relevant level of detail is the likely standard errors for dis-aggregated components. Such standard errors however depend on overall sample sizes. The next Chapter proposes expansion of the ABI in order to provide NUTS 1 data of reasonable quality, which will improve accuracy of industrial and national data too.

5.28 Aspects of these issues are already being addressed as part of the National Accounts modernisation programme. In particular, discussions are looking at the relevant industry and product detail. In this way, Tuke and Aldin (2004) looks to quarterly supply-use balancing at a potentially "higher level of aggregation" than annual estimates (p. 47).

5.29 While it is not possible to predict the conclusions of a producer-based review; it is likely that a revised approach to industry detail at the national level will involve:

- a combination of levels of the SIC classification (known as wavy-line stratification);
- significantly less detail for the manufacturing industry; and
- more detail for the service sector.

**Regular process** 5.30 A one-off review will aid a more appropriate structural balance to official statistics. However, it is equally important that the future industrial structure evolves with future structural change in the economy. The wavy line should therefore be re-visited at regular and fairly frequent intervals.

**Estimation** 5.31 The introduction of such an approach has implications for meeting more detailed user requirements, including providing the EU with estimates at the four-digit level of SIC. However, as discussed earlier, it does not necessarily follow that stratifying for a given variable will result in reliable estimates for that variable. We therefore propose that wider requirements, in the absence of suitable or sufficient observations, may be met through the use of alternative estimation techniques that use auxiliary population data held on business registers. Such techniques are already adopted by the ONS in a number of areas and are discussed in more detail in Chapter 6 in the context of their wider relevance to both to regional and industrial users.

5.32 The following recommendations therefore replace Recommendations 30 and 31 (concerning industries) and part of Recommendation 29 (concerning products) from our First Report:

5.33 Recommendation 47: The ONS should review the relevant level of industrial stratification for its main business surveys. The stratification technique should move away from being based on one specific level of the Standard Industrial Classification (SIC) to a 'wavy-line' approach based primarily on producer rather than user demands. Alternative estimation techniques should be introduced to meet some of the more detailed user requirements (see Recommendation 50). [Replaces 30]

5.34 Recommendation 48: The ONS should examine its own 'producer' demand for industry and product detail to feed into the review of industrial stratification (Recommendation 47). This review should address:

- how the economic structure of the UK can be best captured?
- at what level of detail should turnover be deflated for timely GDP measures?
- how many supply-use industry/product groupings are relevant?
- what should these categories be?
- should the supply-use framework be operated so that products are defined the same as industries?
- bearing in mind deflation and supply-use requirements, at what level of detail should product data be gathered? and
- any likely additional requirements due to modernization.

The review should be updated at regular intervals in order to adapt as the structure of the economy continues to change. [Replaces 31]

## Bringing together the sub-macro data requirement

5.35 The discussion above constitutes an application of our more general proposition that producer considerations should play a more central role than user demands in the development and resourcing of economic statistics systems. We argue that the requirement for industry data should be assessed primarily in its role as the key input to National Accounts estimates. In terms of our hierarchy of considerations for the provision of statistics for economic policy (Chapter 2), the requirement for industry data is a statistical process requirement to meet a core demand of economic policymaking. Accurate National Accounts data are undoubtedly a core requirement for economic policymaking, as are the main component breakdowns of each of the three measures.

5.36 Chapter 2 explained how our First Report could be interpreted as making the case that certain regional macroeconomic data should be part of this core. Our First Report also implied that the provision of 'sub-regional' NUTS 2 and NUTS 3 data, should be of a lower order of importance (Recommendation 13). In the same way, the discussion in this chapter argues that industry estimates outside the producer-driven requirement should be of a lower order of importance, though most would still be produced.

5.37 Taken together, the demands constitute a fuller sub-macro data requirement that can be expressed in terms of a hierarchy. It should be stressed that the intention is not to say that regional data is more or less *important* than producer-determined industry data, but to accept pragmatically that estimates for potentially several hundred industries cannot be expected to be as accurate as estimates for twelve regions and countries.

5.38 Recommendation 49: Official statistics should provide robust, accurate and timely estimates of national GDP and associated macroeconomic variables. Estimates should be made according to the following hierarchy:

- national GDP estimates, including broad output, expenditure and income categories;
- NUTS 1 regions;
- industries according to the producer-led demand, following the review in Recommendation 48; and
- NUTS 2 and 3 regions and any other industry structure.

# 6 Business survey infrastructure

6.1 This chapter integrates proposals for changes to business survey infrastructure aimed at fuller regional statistics alongside the discussion on responding to structural change. Our perspective on structural change primarily emphasises the need for the balanced application and measurement of economic activity through business surveys. In this way, the discussion corresponds with our proposals for developing regional statistics and measuring regional GVA from the production approach that will be reliant on business surveys. The specific extensions to samples envisaged to meet the regional data requirement will improve both key National Accounts aggregates and industrial data.

6.2 The discussion proceeds in two main sections, given the recommendations for industrial detail in the previous chapter:

- first, looking to an enhanced role for the business register;
- second, the potential extension of surveys is addressed, bringing to bear accuracy considerations and also the potential use of administrative data.

6.3 The discussion is largely conducted in terms of existing systems in the ONS, in part to ensure a continuity between the recommendations of the First and Final Reports. We are, however, aware that under the ONS modernisation programme substantial change is envisaged for the suite of ONS 'sources' across the business, household and other sectors. In particular, an extended role for the IDBR, integrated survey operations and the identification and exploitation of administrative sources are already regarded as key to meeting our recommendations. In this way, much of the material has benefited from discussion with the ONS, particularly those aspects of the modernisation programme that are looking to deal specifically with business sources.

## THE BUSINESS REGISTER

6.4 Business registers provide the foundation of the business survey structure. Accurate and up-to-date registers are not only essential for existing estimates of national and regional data, but developments to the ONS Inter-Department Business Register (IDBR) are likely to be an important component of all future sub-macro data estimation.[1]

6.5 As noted above, modernisation programme initiatives will focus on the business register. In general terms, the ONS envisages a more interactive relationship between the register and survey sources, which will keep the register more up-to-date and allow more appropriate samples and projection of sample results. Specific initiatives are looking to daily updating of the register from all administrative sources (at present, not all sources are used each day).

[1] *The IDBR was discussed in the First Report paragraphs (5.40-5.47).*

6.6 From the perspective of regional and structural issues, developments are likely to be two fronts:

- to aid estimation of regional data for contributing firms; and
- to aid estimation techniques at levels of detail where the quality of survey estimates would otherwise be inadequate.

**Coverage of register**

6.7 From the specific structural angle, a business register should be balanced and representative so long as all firms have an equal chance of being recorded on the register. The ONS Inter-Departmental Business Register (IDBR) is not a comprehensive register of all businesses in the country because it is limited to the scope of the administrative sources from which it is derived.[2] This may lead to structural bias if small businesses are concentrated in particular sectors.

6.8 Some respondents were concerned about the exclusion of the smallest businesses. While their activity may not be significant in terms of the movements of aggregate GDP, some thought that inclusion of these companies was necessary to understand fully the economy.

6.9 From the present perspective, the IDBR is a sensible use of existing administrative systems in order to identify individual businesses and to underpin population estimation procedures. Nevertheless, there are advocates for the creation of a single business register that covers all businesses and is used by all government departments. The undeniable attractions of such a facility should be examined from the cost-benefit perspective.

**Reporting and local units estimation**

6.10 The IDBR and Annual Register Inquiry (ARI) maintain the regional- or local-unit structure of any business that underpins existing estimates of regional data. Businesses respond to monthly and annual business surveys at the national level, and the local-unit breakdowns from the IDBR and ARI are then used to allocate national results to the various levels of the regional classification (via 'apportionment' models). A question arising in the First Report was whether this arrangement was adequate, or whether firms should be required to report more according to local units, rather than the national level 'reporting' units.[3] We also looked to a revisiting of the specific apportionment models in use.

6.11 We envisage a more central role for the IDBR alongside a more proactive approach to arrangements for business reporting. Such arrangements would build on and extend the ONS' existing work on the profiling of complex businesses. The basic aim in the context of regional estimates would be a dialogue between firms and the ONS, with the aim of achieving sensible reporting and apportionment arrangements. The system might require increased local-unit reporting according to the complexity and size of businesses, and at the same time enhanced facilities for apportionment techniques.

**Output estimation**

6.12 From the perspective of outputs from rather than inputs to the system, business register information is used to estimate 'domains' of interest where survey information is inadequate or non-existent. Given a move towards producer requirements for industry detail, these techniques are likely to gain in importance (most obviously in the context of estimating all four-digit industries).

[2] *It excludes small self-employed businesses without employees and is incomplete for businesses with a turnover below the VAT threshold.*

[3] *The regional dimension may be of no interest to large companies; in the case of multinationals, they may only be interested in national figures because of tax requirements.*

6.13 The ONS has argued that the administrative sources on which the IDBR is based on could be used more extensively and effectively to facilitate such estimation processes.

6.14 To summarise, these developments would require enhancements to the:

- timeliness and recording of businesses on the IDBR;
- business profiling and reporting arrangements;
- scope of the Annual Register Inquiry;
- feedback of survey data to the register;
- estimation techniques for business surveys, based on business register and administrative data.

**Users and the IDBR**

6.15 The IDBR is increasingly used outside the ONS as a sampling frame and as an analytical tool. As a consequence of both uses, there is a demand for the register to store more comprehensive information on businesses as a matter of routine.

6.16 From the sampling perspective, a particularly common complaint is that IDBR does not include businesses' telephone numbers. This means that the register is not useful for telephone inquiries, an increasingly common method of surveying businesses. In these circumstances surveyors have to turn to alternative sources that may not only be expensive but also less comprehensive and based on codings that are incompatible with official surveys. Poorer samples may hence be being drawn at higher cost.

6.17 From the analytical perspective, the business register is recognised as the tool for business demography, and is key for the increasing amount of linked-data research to investigate specific productivity issues. The changes recommended in this chapter will improve the quality especially for the small- and medium-sized enterprises.

6.18 The increased demand for this type of data leads to the desirability of wider access to the IDBR. Recommendation 41 of our First Report asked ONS to investigate meeting this demand, subject to appropriate safeguards on confidentiality.

6.19 Recommendation 50: As envisaged in the ONS' modernisation programme, the Inter-Departmental Business Register (IDBR), Annual Register Inquiry (ARI) and associated methodological techniques should be extended in order to play a more sophisticated central role in inputs and outputs of the business survey process to meet national and regional demands. The developments might involve widening the coverage of the IDBR, extension of the ARI, extended integration with other surveys, as well as development of new estimation and apportionment techniques. Developments should also support the more extensive range of analytical techniques and surveys undertaken across government, particularly telephone survey. [Replaces 7 and complements 8]

## IMPLICATION FOR KEY SURVEYS

**Sample aims**

6.20 Our broad argument is that the relevant surveys should be extended to provide national data and NUTS 1 regional data that are fit for user requirements (as described below). We propose that the accuracy of industry estimates should be primarily a matter of producer considerations. The accuracy of more detailed regional (i.e. NUTS 2 and 3) and industry data should not be a specific consideration of sample-size, although will be improved by extensions envisaged. As discussed in the previous section, domain estimation techniques should also be used to improve estimates at these more detailed disaggregations.

6.21 Recommendations 6 and 14 of the First Report looked to extensions for the ABI and monthly turnover surveys to provide both a benchmark and advance measure of regional GVA. At the same time Recommendation 10 looked to measures of price change at the regional level, with potential implications for price surveys. The specific discussion on the sectoral dimension in the previous two chapters also has implications for the same surveys.

## Surveys of Business Activity

**Annual Business Inquiry**

6.22 The Annual Business Inquiry (ABI) is central to meeting requirements for regional and national data. It not only underpins the production approach to regional GVA and the 'supply side' of supply-use balancing, but also provides estimates of expenditure components – households' final consumption expenditure (through retailers' turnover), stocks and business investment – for both regional measures and the 'demand side' of supply-use balancing.

6.23 The First Report envisaged an extension of the ABI in order to meet the requirement for robust annual regional NUTS 1 data. The same recommendation also advised a review of the industrial stratification. In the previous chapter we have looked more fully at how this review might take place.

6.24 The specific extension of the survey depends on accuracy considerations for regional data. Our First Report included an Annex (A2) provided by the ONS that examined extensions to the ABI in order to meet different accuracy requirements for regional data.

6.25 The First Option set out a technique to improve regional representation that kept to existing costs by making a reduction in industry detail. This implies an approach to industry information that is unlikely to be acceptable in the context of the producer-based approach envisaged in this report. The Second Option was to produce regional results at NUTS 1 level with the current UK level of precision. We argue now that this approach goes beyond the present user requirement, partly on the grounds of excessive resource and compliance costs. Our favoured approach is closest to the Third Option. We stress though that changes in the user requirement will mean changes to the requirement for precision.

6.26 The ONS' preliminary and indicative calculations suggested that Option Three would lead to a sample size increase of a factor of three, and increases in compliance costs by a factor of two and data collection costs by a factor of 2½.

6.27 There are two considerations that might offset the requirement for extensions. First, there may be some modest savings from revisiting the industrial stratification. Second, and more importantly, the ONS' preferred option would be to make sample changes alongside the introduction of administrative sources. Recommendation 40 of our First Report looked to the ONS' use of such techniques; they are discussed in more detail in the last section of this chapter.

6.28 From the national perspective, we have argued that the present ABI survey provides a seemingly appropriate coverage across the economy. However, we have not had time to evaluate the specific quality of these results, particularly according to industrial sectors. We suggest that any extensions to the ABI should also take into account wider producer perspectives on the quality of the data.

6.29 Ultimately, the benefits of these extensions and developments will not only be for regional data. National and industry benchmark data will be based on a larger sample and be of improved quality.

Monthly turnover inquiries

6.30 Recommendation 14 of our First Report concerning timely surveys was less detailed, simply looking to an advance annual measure of regional GVA. The standard for the accuracy of the measure, and hence requirements for survey extensions or alternative projection techniques, should simply be due to the basic requirement to provide a reasonable advance measure of the ABI-based figure. This would be an estimate for calendar years rather than quarters.[4]

6.31 Recommendation 51: The Annual Business Inquiry sample should be extended to provide NUTS 1 regional estimates at a level of accuracy broadly in line with Option Three of Annex A2 of our First Report. If necessary, the sample sizes of the Monthly Production Inquiry, Monthly Inquiry into the Distribution and Service Sectors and Retail Sales Inquiry should be extended to provide a reasonable advance annual measure (as described in Recommendation 14). All surveys should introduce wavy-line industry stratification as specified in Recommendation 47, and associated efficiency savings sought. At the same time, changes to samples should seek to integrate the use of administrative data. Any extensions should also consider how well the existing surveys are meeting present producer requirements. [Replaces 6]

## Non-ONS business survey sources

6.32 The discussion here, particularly in terms of inquiries for timely estimates, has emphasised almost exclusively the manufacturing and service sectors. Estimation of the timely measure of GDP requires estimates of activity in the other broad industry sectors of the economy. As noted in Chapter 4, a number of other government departments are involved in the measurement of this activity.

6.33 From the national perspective, a consequence of this arrangement is that surveys and methodology for measuring different sectors can differ. There is clearly a question mark over the desirability of such an arrangement. The main argument in favour of the de-centralised approach is that it takes advantage of the specific knowledge of statisticians closest to the sectors. However there may be a number of disadvantages:

- in the context of timely GDP estimation, the methodological approach is not coherent for all industrial sectors;
- resources allocation does not necessarily reflect the importance of the various sectors to the whole economy;
- statistical methodology expertise outside the ONS is more limited;
- process and survey improvements in the ONS are not likely to be replicable in departments; and
- the responsibility for quality assurance is less clear.

6.34 Recent problems with the measurement of construction output (discussed in more detail in Chapter 7) also have relevance. Revisions to the timely DTI estimate of construction output have led on more than one occasion to significant revisions to the headline measure of GDP. The Statistics Commission 'Review of Revisions' was set up partly in response to concerns about these revisions, and will be addressing the specific issues over the responsibility for estimating construction output.

[4] *If the measure was calculated from the survey approach, the infrastructure to meet the present requirement could be extended later in the event of the demand for a timely indicator of quarterly regional GVA become pressing. Furthermore, initiatives are already looking in this direction because of country demands.*

6.35 In practice, the de-centralised arrangement is a concern when relevant quality standards are threatened. We continue to adhere to the basic principle outlined in our First Report: the issue is critical if the sources are not meeting the standards required by the National Statistician given his responsibility for the quality of National Statistics.

6.36 On the other hand, the Annual Business Inquiry takes a large step away from this structure, with, as discussed in the First Report, coverage across all industries (with the exceptions of farming, banking and most public sector activities). The main consideration here is whether the inquiry should be extended to cover all sectors of the economy. This would lead to the most coherent approach to the measurement of economic activity.

6.37 From the regional perspective, the non-ONS business surveys will be required to provide regional breakdowns. The DTI response to our First Report set out the regional data that would inform their approach to regional construction data.

6.38 Recommendation 52: The ONS and relevant government departments should review whether the partly de-centralised survey arrangements for some National Accounts measures are satisfactory. Given the National Statistician's responsibility for National and Regional Accounts, our presumption would be for future inclusion in the appropriate ONS surveys if de-centralised sources are not able to meet the required quality standards. [Replaces 34]

## Surveys of Business Prices

6.39 The argument concerning the relevant level of industry and product detail leads to changes to the technique for the deflation of business activity. With 'wavy-line' stratification, there potentially will be implications for the detail of corporate services and goods price collection and calculation.

6.40 The discussion concerning accuracy at detailed levels may also have a bearing on the deflation technique. While there is a marked imbalance between the number of products for corporate services (5,000) and for goods (9,000), it is less clear which level of product detail is more appropriate. The use of very detailed product deflators and product sales weights may be inefficient if standard errors are high. We envisage these considerations advising the review of product detail under part of Recommendation 48. In the longer term, the goal may be a more harmonised survey of business prices.

6.41 Recommendation 10 of the First Report proposed a study of the regional variability of business prices. It is sensible that this work should be part of the wider review.

6.42 Recommendation 53: The ONS should review the relevant product detail for goods and services price measurement and sales estimation in the light of accuracy and efficiency considerations, and explore the scope for a more common approach to business price measurement. From a regional perspective, a study should assess whether the rates of change of corporate service and goods producer prices vary regionally, and if they do, to follow up with a feasibility study of whether price data currently provided centrally can be provided locally. [Replaces 10]

## The product survey

6.43 Product information is important to the deflation procedures just discussed as well as the supply-use processes discussed in Chapters 4 and 5. We regard the development of a product survey that goes beyond the manufacturing sector – ALLCOM, perhaps – as key to more balanced coverage of the economy as a whole.

6.44 However, we have also questioned whether the very detailed level of data collection and provision for the manufacturing sector is relevant in terms of producer-based requirements; and the review under Recommendation 48 will lead to a revised demand for the relevant level of detail. Our support is therefore for a product survey covering the whole economy according to this demand.[5]

6.45 Recommendation 54: The ONS should estimate product sales for all industries. The timeliness and detail of these estimates should be driven primarily by producer rather than user considerations. The survey should be conducted on an annual basis rather than a quarterly basis. [Replaces 29]

## MODERNISATION INITIATIVES

6.46 As has been emphasised at various points throughout this report, the ONS is currently involved in most significant institutional change through their modernisation programme. Inevitably, a substantial part of this programme is concerned with the sources infrastructure. From the perspective of business surveys, the potential scope of a specific 'Business Survey Integration Project' is being examined. The scoping study looks to a concern with the full range of issues impacting on business surveys and much of the material in this chapter has greatly benefited from a dialogue with statisticians working on this project. The overlap between this work and the specific recommendations arising from this Review is very significant. It is arguable that recommendations arising from the Allsopp Review must be critical to the deliberations of a fuller realisation of this project and in turn to the wider modernisation programme.

**Administrative data**

6.47 A specific issue of substantial importance to the ONS, will be an assessment of the relevant role for the administrative sources that are likely to be key to future developments:

- VAT;
- corporation tax; and
- income tax (for unincorporated businesses).

6.48 Our First Report stressed the potential importance of access to administrative data. Experience in other countries suggests that this approach can work and can significantly reduce the resource required both by statistical offices and by businesses. However, we do not have a grasp of how powerful access to sources not currently available to the ONS will be – either in the context of national or regional data. It is clearly essential that barriers to access be eliminated so that the ONS can assess the potential of such sources as soon as possible.[6] As noted above, survey changes aimed at enhanced regional data at reasonable cost and burden on respondents may be dependent on the use of tax data.

[5] *While such an initiative might appear to conflict, EU requirements could be met using estimation techniques and perhaps an occasional fuller survey.*

[6] *Gaining access to tax data is likely to require changes in legislation to ensure access and give reassurance on confidentiality, and investment in systems and methods to use the data in place of survey responses.*

**Methodological issues**

6.49 More generally, most 'sources' issues that we raised in our First Report are issues that the ONS will be looking to resolve as part of these modernisation initiatives. In particular, aspects of Recommendations 6 on the ABI and 7 on the ARI looked to a number of cross-cutting issues:

- whether business surveys should be extended to broad sectors not covered at present (such as financial services or government);
- whether samples should be drawn according to levels or growth; and
- the construction and publication of detailed standard errors as a matter of routine.

**Harmonisation of sources**

6.50 A further particularly important dimension is the harmonisation and consolidation of industry surveys and sources. A number of options are under consideration, and have also been noted in some of our recommendations, for example:

- the combination of the employment stage of the ABI with the ARI;
- collection of product information as part of other surveys, such as the ABI;
- extended use of simplified forms for some sampled units, particularly for the ABI; and
- the consolidation of annual and the various monthly inquires into a single business inquiry framework.

The last point may perhaps define a longer-term goal for the business survey process: an inquiry that provided all key accounting information for all industries, with relevantly sized annual and monthly dimensions with the aim of consistency of results according to each time dimension.

**Omnibus survey**

6.51 An initiative of potential importance is the development of an annual 'omnibus' survey that offered the ability to ask *ad hoc* questions to business. Such an initiative would facilitate:

- estimation procedures that rely on parameters and assumptions that do not fall out of the standard suite of surveys;
- meeting requirements arising from the EU for one-off studies (such as a recent survey on inter-enterprise relations);
- piloting larger initiatives; and
- measuring specific phenomena following from changing business practice.

6.52 In the light of these and other considerations, we therefore propose a very general recommendation that looks towards the fuller framework for business sources that the ONS has in mind.

6.53 Recommendation 55: The ONS should build on the current small-scale scoping study for business survey integration towards a fully coherent business survey system in the longer term. The ONS should assess:

- the relevant roles of survey and administrative data;
- the extension of surveys to broad industries not covered at present;
- the role for an omnibus survey of business activity;
- the combination and integration of surveys; and
- the resolution of detailed cross-cutting methodological issues. [Incorporates 33]

## Devolved Administrations

6.54 In the First Report we outlined the nature of the relationships between the statistical organisations in the devolved administrations and the ONS. In terms of the detailed technical discussion, we drew attention to where survey sources and methodologies differed.

6.55 In many cases, and particularly in the case of Northern Ireland, some differences arose from a desire to retain systems that were regarded as better facilitating estimation of regional data. Aspects of the infrastructure in the devolved administrations are therefore already more geared towards regional data estimation. Nevertheless, the modernisation programme, as well as developments in order to meet our recommendations, will constitute major changes for the UK statistical system that may have major implications for the measurement of country data.

6.56 Recommendation 56: While we are aware that there is a close relationship between statisticians in the ONS and in the devolved administrations, it is vital that initiatives developed both through modernisation and as a response to our Review take into account the views and priorities of statisticians in these institutions. Where feasible, the goal should be a central system that meets the requirements of all countries.

## Timing and Formal Relations

6.57 Lastly, there is the question of the precise relationship between the Allsopp Review and the ONS modernisation programme. While the matter is internal to the ONS, there may be implications that affect how Allsopp Review recommendations are met in terms of sequencing. In particular there is the issue of whether the ABI and other surveys should be extended to meet regional demands *prior* to fuller conclusions from the ONS modernisation programme, critically with regard to the relevance and power of administrative data.

6.58 As we have emphasised, it is clear that the recommendations arising from the Allsopp review are primarily concerned with sources infrastructure rather than wider processing infrastructure. In our view, it is far more important that issues raised are reflected in the sources aspect of the modernisation programme rather than the wider National Accounts process dimension, for these questions are further down the line.

6.59 In general terms, the ONS has argued that modernisation should take account of Allsopp needs, but that implementing Allsopp for business surveys requires major integration and redesign work that is not covered by the ONS modernisation and will require additional resources.

6.60 The combination of this survey redesign and integration work with the ONS modernisation programme will also require the ONS to make choices and compromises between generating benefits by migrating existing surveys to the new infrastructure, and first redesigning surveys to meet the Allsopp recommendations, with its added benefits but also greater costs and risks and a longer time frame. The costs, benefits and trade-offs will differ for each survey, and the ONS will need to assess them and identify the best way forward as the whole modernisation and redesign programme develops. The ONS must however ensure that these decisions, and the process of arriving at them, are transparent.

6.61 Such decisions, of course, go to the very core of the ONS business plan over the next few years. Chapter 11 discusses the timetable provided by the ONS in response to our First Report. We understand that this timetable assumes that migration of existing business surveys into a modernised statistical environment has been carried out as part of the modernisation programme.

6.62 Recommendation 57: The business survey aspects of the modernisation programme should take full account of our recommendations concerned with survey sources.

# 7 Measuring output

7.1 Much of the earliest information on economic developments comes from the output, or production, measure of GDP and its components. The data also provide information on the relative performance of different industrial sectors, which is used by business and policymakers as discussed in Chapter 3. In contrast to the regional case, there is a strong policy requirement for good frequent and timely data on UK macroeconomic developments, for both monetary and fiscal policy, though the policy need for sub-macro industry data is not so well-defined as that for regional data.

7.2 This chapter discusses the detailed and timely measurement of output in the light of the overall statistical issues and recommendations in Chapters 4 to 6. It considers principally the short-term output indicators and preliminary estimates that lead through to the annual baseline figures in the fully-balanced annual National Accounts. Some specific problems in measuring the output of the service sector, particularly that of government and financial services, are discussed in more detail, then a final section looks at sectors that are surveyed by bodies other than the ONS.

7.3 For short-term output indicators, the imbalance between manufacturing and services shows up in the use of separate surveys covering manufacturing, services and other components. Annual and quarterly estimates of service sector activity have been embedded in the National Accounts for some time, and the First Report noted that the experimental monthly Index of Services (IoS) represented a welcome expansion of the information available on services. But a sharp contrast remains between the amount of disaggregate information available in the Index of Production (IoP) and the rather less detailed IoS.

## Timely estimates of activity

**The preliminary estimate of GDP**

7.4 The preliminary estimate of quarterly GDP is published towards the end of the first month of the following quarter. It is mainly derived from the output, or production, measure of GDP, using a mixture of deflated turnover and volume indicators. The ONS believes the early output estimate is a better indicator of short-term change than the expenditure or income measures. Subsequent GDP estimates are improved by the use of additional information on output and by comparison with information on expenditure and income, which becomes more important over time. The preliminary GDP estimate is the most timely among European Union countries.

7.5 In 2002, the ONS published analysis suggesting that less than half of the preliminary GDP figure was based on hard information, with the remainder estimated.[1] There was a relatively high proportion of information available for production and distribution (which includes retail sales), but the (unpublished) estimates for construction, some financial services and government were based on quite small proportions of information. The measurement of construction is discussed in more detail at the end of this chapter.

[1] *Reed (2002).*

**Timely estimates and revisions**

7.6 For timely data in particular, it is important that users are aware of the likelihood of revisions, as more information becomes available and is incorporated into later estimates.[2] We believe there is considerable benefit from the availability of timely information on economic developments. Of course, there would be little use in publishing series that are subject to such substantial revision that users discounted initial estimates, but we do not believe this to be the case with the preliminary estimate of GDP, or with most of its main components.

7.7 The ONS has published a number of articles in recent years setting out the scale of revisions to the main components of the National Accounts.[3] And a *National Statistics Code of Practice* Protocol on Revisions was published earlier this year, which stressed the need for producers of statistics to have a published policy covering revisions and to explain the nature and extent of substantial revisions where they occur.[4] Moreover, First Releases for major economic statistics now include useful information on the magnitude of past revisions for the main series. This should enable users to make better-informed judgements about how much weight to put on the latest observations.

7.8 The depiction by some commentators of normal revisions to early estimates as 'errors' is inaccurate and unhelpful, insofar as it does nothing to further users' understanding of the nature of such statistics. It also distracts attention from the relatively few cases where errors have been found in *National Statistics*. When actual errors occur, it is important for the credibility of official statistics that they are investigated and steps taken to prevent reoccurrence. The Statistics Commission's Review of Revisions to Economic Statistics should be able to make an important contribution by setting out what can and cannot be expected of official statistics.

7.9 Recommendation 58: It is important that users of statistics have sufficient information to judge how much weight to place on particular estimates. This should include indications of the nature, frequency and size of likely revisions, and the extent to which the most timely indicators are based on actual data or on estimates made by the data providers. Equally, users must recognise that revisions are part of the normal statistical process and are a necessary consequence of publishing of timely estimates. In the majority of cases, these revisions should not be seen as 'errors'; such descriptions are inaccurate and can cast unwarranted doubt on the credibility of official statistics.

**Index of Services**

7.10 The experimental monthly Index of Services (IoS) was first published by the ONS in December 2000, following an Index of Distribution (IoD) that was first published a year earlier. Since its introduction, development has focused on improving both coverage and timeliness – both the IoD and the IoS are now published eight weeks after the end of the quarter.[5] The IoS and the service sector components of quarterly GDP(O) estimates use the same methodology and sources:

- *turnover* from the Monthly Inquiry into the Distribution and Service Sectors (MIDSS);
- *deflators* from Corporate Service Price Indices (CSPIs), the Retail Prices Index and Average Earnings Indices; and
- some *volume indicators*.

[2] *See Cook (2004) for a useful discussion of revisions and the provision of statistics.*
[3] *See, for instance, Akritidis (2002), Akritidis (2003), Richardson (2002) and Richardson (2003).*
[4] *Office for National Statistics (2004a).*
[5] *Recent progress in developing the Index of Services is summarised in Drew and Morgan (2003).*

7.11 Our First Report recommended that the ONS should set a target date for moving the IoS, and the associated Corporate Services Price Indices, from an 'experimental' series to a full *National Statistic* (Recommendation 32, discussed below). Over time, the ONS is reviewing each sector covered by the IoS to make the best use of available sources and improve the performance of the index. Some components are still estimated largely on a quarterly basis, and interpolated for the monthly estimates – in some cases this is because there is not a sufficiently long run of monthly data to estimate seasonal factors. In addition, there are two areas where the ONS believes significant further development would be needed before the IoS could become a full *National Statistic*: activity information from government departments and detailed information on the products of the service sector, discussed in Chapters 4 to 6 above. More general difficulties in estimating the output of the public and finance sectors are discussed later in this chapter.

7.12 The public sector accounts for around 20-25 per cent of the IoS. It is not covered by the MIDSS and the ONS relies on information supplied by government departments, which is not always available on a timely and a monthly basis. Moreover, some of the recently-developed indicators of government output are only available on an annual basis, some years in arrears. We believe the Atkinson Review, discussed below, provides a very good opportunity to consider how best to measure short-term movements in the output of the public services.

### Corporate Services Price Indices

7.13 Experimental Corporate Service Price Indices (CSPIs) were first introduced to support the development of the IoS, as a complement to manufacturing's Producer Price Indices (PPIs) and the consumer service prices already collected as part of the RPI. As discussed in Chapter 4, the ONS publishes CSPIs for 32 out of a potential 60 industry-level series, and 19 of these are used as deflators for the IoS.

7.14 A further issue is 'monthliness'. While the Index of Services is published monthly, CSPIs are only collected and published on a quarterly basis. This raises the question of whether a *quarterly* price series is sufficient for deflating a *monthly* activity index. Recent years have seen higher average increases in service prices than in goods prices, so price changes *are* likely to account for a significant part of changes in turnover. It is not clear what will be the effect on the quality of the monthly IoS from the unavailability of monthly price information.

7.15 Nevertheless, we believe the priority for development of the CSPIs should remain extending the coverage to more sectors and improving the information on existing sectors. As discussed in Chapter 4 above, this could include development of a new or existing survey to collect information on the products of the service sector, analogous to that already obtained from PRODCOM. Over the longer term, the ONS should investigate more fully the effect of using quarterly prices and monthly turnover, and identify those sectors where monthly price information would be of most benefit. And as the IoS is developed further, the ONS should keep under review whether a greater number of industry CSPI series might be required.

7.16 Our First Report recommended that the ONS should continue development of the IoS and CSPI and set a target date for moving away from the experimental status. We set out above some of the work that might be necessary for the IoS to become a *National Statistic*, and the ONS has responded to the recommendation with further information on possible timetables for development work on CSPIs.[6]

7.17 We continue to believe that the ONS should proceed as quickly as possible with development work on these important indices, and that users should feel confident that progress will be maintained. It is also important to recognise that moving out of experimental status should be seen as a milestone, as part of a longer-term plan of development, rather than as an ultimate aim in itself. The recommendation is amended to reflect this.

7.18 Recommendation 32: The coverage of the service sector in surveys of activity and prices should continue to be increased, building on the development of the experimental Corporate Services Price Indices and Index of Services, especially on improving the sectoral coverage. The ONS should accelerate this work and move towards the milestone of both the CSPI and the IoS losing their 'experimental' labels as early as possible, recognising also that further improvement will be necessary for some considerable time after that. The ONS should keep users informed of progress and should aim to demonstrate visible improvement by 2006, with continuing development thereafter.

**A monthly GDP estimate?**

7.19 Once the IoS is of sufficient quality to be designated a *National Statistic*, the ONS will have available the vast majority of the information required to produce a monthly estimate of Gross Value Added (GVA).[7] The monthly IoP and IoS together cover nearly 95 per cent of GVA: only missing agriculture (around 1 per cent of GVA) and construction (around 5 per cent of GVA). However, we do not believe an *official* monthly GDP estimate should be ventured until the monthly IoS has been improved sufficiently to meet the standards of a *National Statistic*.

7.20 There would therefore be some additional information required over and above the IoP and the IoS, though this should be unlikely to have a large impact on the estimates (once issues with construction estimates, discussed below, have been resolved). The precise relation with the quarterly estimates, including timing issues, would also need careful consideration, particularly at the end of a quarter. At present the preliminary estimate of GDP for the quarter is published after three and a half weeks; this is in advance of the IoP and IoS for the third month of the quarter, which are published around five and eight weeks respectively after the end of the month. The ONS plans that a monthly GDP estimate will be published following completion of the National Accounts re-engineering project.[8]

7.21 These timing and sequencing issues would need to be addressed in advance of publishing a monthly GDP estimate, but are not compelling arguments against publishing such an estimate. The main factor leading us to conclude that there should be a monthly estimate of GVA is that, when so much of the necessary information will be published, if the ONS does not produce a monthly estimate, it seems inevitable that there will be other users and organisations ready to fill the gap.[9] But the information and expertise at its disposal means that the ONS would be better

---

[6] *All responses to the First Report are available on the internet at: www.hm-treasury.gov.uk/allsopp.*

[7] *Yeend and Pottier (1996) report the outcome of a research project originally carried out for the Central Statistical Office to develop a model-based system for interpolating monthly National Accounts. This project, of course, pre-dated the monthly IoS.*

[8] *See Tuke and Aldin (2004) for more detail of the re-engineering project and the framework that will be put in place.*

[9] *The National Institute of Economic and Social Research already publishes its own estimates of monthly GDP.*

placed to compile monthly estimates of GVA and this would avoid the potential confusion from any proliferation of alternative estimates.

7.22 Recommendation 59: The ONS should publish a monthly estimate of Gross Value Added (GVA) once the IoS has been designated a *National Statistic*. This would bring together the information in the IoP and IoS, together with whatever is available for the industrial sectors not covered by these two indices. This indicator would be benchmarked onto quarterly and annual National Accounts data, and probably published as soon as both the IoP and the IoS were available. The timing relative to the third month of the quarter and the preliminary estimate of quarterly GDP would need to be considered carefully, in consultation with key users. We would, however, not wish to see any delay to the preliminary estimate of quarterly GDP.

## Measurement issues

**How difficult is it to measure services?**

7.23 For some parts of the service sector there are particular difficulties in measuring output. Problems appear to arise in public and financial sectors, both discussed in more detail below, principally because of the lack of price information. But it is less clear why there should be inherent difficulties for other parts of the service sector: turnover data should be available for most service industries, so the question then becomes one of how to estimate volume changes.

7.24 It is not obvious that developing volume indicators or price deflators should necessarily be more difficult for services than for manufacturing. Consumers and businesses expect information to assess the quality of what they are buying, whether that is a good or a service. For many parts of the service sector, there seems little reason to believe that estimation of a volume measure should be inherently more difficult than for manufactured goods. Indeed, the following section discusses new techniques that have been developed because of the difficulty of estimating the price/volume split of some *manufactured* goods.

7.25 Apart from the lack of product detail on the service sector, discussed above and in earlier chapters, we believe that any apparent difficulty in measuring private non-financial services, seems largely to reflect the under-development of this area of the statistical infrastructure, rather than innate difficulties in measuring activity. Given sufficient priority and commitment, further progress should be achievable. But maintaining a continuing improvement in this area, as required by Recommendation 32, is likely to require a sustained commitment of resources.

7.26 Recommendation 60: Given its importance for the UK economy, we believe improving the measurement of the service sector should be a high priority for ONS development work. We believe that significant improvements in data provision on private non-financial services should be readily attainable with sufficient resources, including money, people, methodological support and compliance costs.

**Adjusting for changes in quality**

7.27 Chapter 4 discussed the crucial role of chained volume estimates and price deflation in the National Accounts; similar issues affect shorter-term estimates too. A frequent challenge encountered when using price deflators is to adjust for changes in quality, whether dealing with goods or services. For some standard products, such as a pint of milk, this is not difficult. But other goods and services need careful consideration, for example personal computers (PCs):

- suppliers introduce new or upgraded models very frequently;
- the price of an 'entry level' PC might not have changed by much over the past two or even five years, but today's models have vastly superior capabilities; and

- a PC bought two years ago has very low resale value now, yet provides the same level of services as it did when new.[10]

7.28 Where new or altered models are introduced, the statistician's problem is to assess what element of a new product's price reflects changes in specification, with the remainder being taken as a change in price. Where there is a sufficient period of overlapping models, this can be done by splicing together a series of price *changes* for the old and new models so that a comparison on the price *levels* of old and new is avoided. But this is not always possible in markets with frequent changes in product characteristics, so a way of estimating the cost of the quality change is needed.

7.29 Even when it is possible to estimate the cost of upgrading a product, for instance adding more memory to a computer, this may not be the same as the actual change in price of mass-produced models: often an arbitrary assumption is required that the cost to the manufacturer is a certain percentage of the cost of upgrading an individual product. A more sophisticated approach is the use of hedonic indicators,[11] which estimate the price of individual characteristics from a large sample of products with varying specifications. Hedonic indicators are already used in price indices in the United States, Canada, France, Germany, Sweden and Finland, and are under development in a number of other countries too.[12]

7.30 Hedonic techniques are now used to adjust for quality changes of computing equipment in the PPI and Consumer Prices Index (CPI), and for PCs in the Retail Prices Index (RPI). Plans are being implemented to extend their use to digital cameras in the CPI and RPI. Other areas being investigated include laptop computers and digital camcorders; over the longer term, the ONS believes similar methods could be applied to other goods or even services.

7.31 These sorts of issues are not new ones, but rather they have become more prominent with the rapid pace of innovation in some industries. Techniques such as hedonic regression are most appropriate for products where the major characteristics are easily measurable. Thus far, they have been applied more frequently to goods than to services. Indeed, no allowance is presently made for quality change in the IoS. We welcome the development of better methods for capturing the impact of quality change and the ONS' ongoing programme to broaden the application of such techniques.

**Government output**

7.32 The First Report noted the difficulty of measuring government output, not least because of the absence of market prices for much of the sector's output. Some years ago, estimates of real government output were derived using a conventional but arbitrary assumption of constant labour productivity. This meant that real output moved in line with the numbers of public employees – inputs were being used as a proxy for output. Some improvement came in the late 1990s with the introduction of a number of output indicators, such as number of operations performed or numbers of pupil hours taught at school.[13]

[10] *Geske, Ramey and Shapiro (2003) compare the new and used prices of a large number of PCs and conclude that the majority of loss in value of used computers comes from lower replacement cost, with obsolescence the second most important factor.*

[11] *Ball and Allen (2003) give details of the techniques.*

[12] Ibid.

[13] *Pritchard (2003) sets out the ONS' current approach.*

7.33 However, the use of output indicators does not avoid questions of how to adjust for changes in quality. A commonly-cited example is the effect of employing more teachers and reducing class sizes. At one extreme, the old assumption of constant labour productivity would mean that the output of the education sector rises proportionately to the increase in the number of teachers. At the other extreme, an approach based purely on the hours of teaching received by pupils would not record any increase in output, but instead a reduction in labour productivity (and the higher wage bill would be reflected in an increase in the government deflator). In practice, the most appropriate treatment would probably lie somewhere between these two, but this would be dependent on some way of capturing the quality improvement.

7.34 Thus, assessment of current trends in government output and expenditure volumes depends crucially on the view taken of how much of the higher spending reflects higher output and how much increased price. This is a difficult judgement to make on the information currently available. Indeed, the move to using more direct measures has, if anything, complicated matters at a time when spending on public services has been increasing.

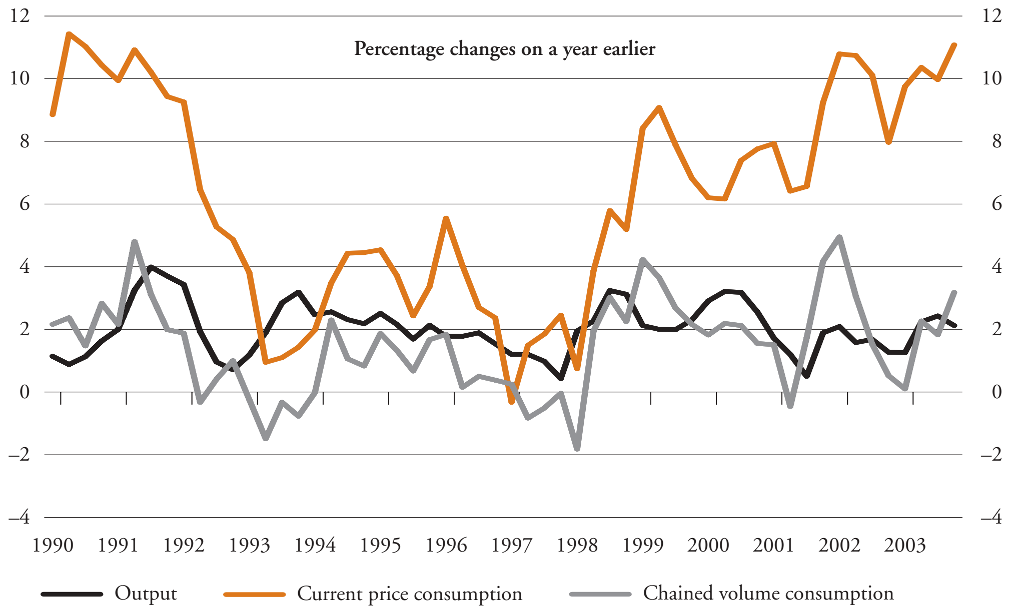
7.35 Chart 7.1 shows the recent behaviour of some measures of government output and spending: the 'Government and other services' chained volume output series from the production measure of GDP; chained volume government consumption from the expenditure measure of GDP; and the associated current price measure of government consumption. The difference between the chained volume and current price expenditure measures indicates the growth of the implied government consumption deflator.[14]

7.36 The rapid growth of *nominal* government consumption during the past four years has not been accompanied by a similar increase in estimated chained volume growth, for either government output or government consumption. On the face of it, this suggests that almost all of the higher spending growth has been absorbed by higher prices. We find this rather implausible and we do not believe the recent very rapid growth in the government consumption deflator is a reliable indicator, for assessing either inflationary pressure or public sector performance.[15]

[14] *Although there is not a deflator associated with government consumption, the chained volume measures of output and consumption have grown at a broadly similar rate in recent years.*

[15] *While we believe that in most cases it is better to be approximately right than precisely wrong, for some purposes, such as monetary policy, there are advantages from the transparency of a simple, if arbitrary, assumption rather than more sophisticated but opaque arrangements.*

**Chart 7.1: Growth in government output and consumption**




*Source: ONS*

7.37 The simple assumption of constant productivity created problems for assessing the efficiency of public services, but less so for monetary policy purposes. Here, the number of employees may not be an unreasonable proxy for the effect of the public sector on short-term inflationary pressures, provided that the constant productivity assumption is reflected in estimates of both demand *and* supply. However, there are also some problems with measures of public sector employment.

7.38 Nevertheless, a more sophisticated measure of government output is clearly required for assessing the performance of public services. The National Statistician announced on 4 December 2003 that Sir Tony Atkinson would be leading a review of the future development of measures of government output and productivity.[16] Sir Tony has been asked to produce a preliminary report by July 2004 and a final report by January 2005.

7.39 Accordingly, we do not propose any detailed recommendation, but welcome the announcement of the Atkinson Review and wish that review team success in this difficult area. As well as the more sophisticated requirements for measuring public sector productivity, we hope that the Review will consider how best to estimate short-term movements in the output of public services and the associated assessment of inflationary pressure.

[16] *Further details and the full terms of reference are given in the ONS Press Notice issued on 4 December 2003.*

**Financial services**

7.40 The measurement of financial services also presents difficulties because of the absence of price information. Banks are paid for services provided to customers in a number of ways: as well as direct charges and fees, indirect payment includes factors such as higher interest payments on debt and lower interest payments on credit balances. There is no simple measure equivalent to the turnover of a retailer or a legal practice. Box 7.1 describes how this is dealt with in the National Accounts, broadly by including net interest receipts in the GVA of the sector – not an ideal way but it is agreed internationally.

**Box 7.1: Financial Intermediation Services Indirectly Measured (FISIM)**

**The output of banking and financial services is estimated according to internationally-agreed methodology.[1] As well as the usual charges and fees, the impact of indirect net receipts such as those through interest differentials between saving and loan rates is captured through an adjustment called 'Financial Intermediation Services Indirectly Measured' (FISIM).**

**This is required because interest payments and receipts are counted as transfers between agents in the National Accounts and therefore do not normally affect estimated output. But the standard National Accounting definitions would significantly understate the operating surplus of financial service companies, because their interest receipts and payments would be treated as allocating income rather than generating it.**

**The net interest receipts in FISIM are treated as contributing towards the value added of the financial sector, but there is no corresponding deduction from the value added of other industries, to reflect their intermediate consumption of financial services. Thus, FISIM needs to be deducted separately when aggregating the value added of all industries to estimate total GVA.**

**In principle, FISIM should be allocated as intermediate consumption of other industrial sectors, but there are not data available to guide such an allocation. It should be noted, however, that deducting total FISIM from GVA leads to some understatement of GVA, because some of FISIM is final consumption of the overseas and household sectors rather than intermediate consumption of companies.**

[1] *See Lynch (1998) for a fuller description and examples.*

7.41 Within the IoS, a number of indicators are used for the financial services sector, including banking employees (ONS), outstanding loans (Bank of England and Financial Services Authority) and administrative costs of life assurance and pension funds (ONS). Where deflation is necessary, it is based on a general inflation measure such as RPIY (RPI excluding mortgage interest payments and indirect taxes), the GDP deflator or the household consumption deflator. The National Accounts additionally use information on chargeable services and interest flows to calculate the FISIM adjustment.

7.42 The Bank of England and the Financial Services Authority collect information from banks, building societies and other financial companies as part of their supervisory functions. The Bank of England also compiles and publishes a range of monetary and financial statistics, including domestic banking statistics, monetary statistics, external finance statistics, and international banking statistics. Responses to our First Report did not suggest that users have encountered significant difficulties with these data. Collection by the regulators does not appear to pose a problem here and does not appear to conflict with the needs of the National Accounts. Accordingly, this seems an efficient means of meeting the needs of the financial regulators as well as economic statistics.

## Non-ONS surveys

7.43 In addition to government and financial services, discussed above, there are a number of other industries that are surveyed by bodies other than the ONS. These include agriculture (DEFRA), construction and energy (both DTI). Recommendation 34 of our First Report invited views from data providers and users on the quality of data for sectors where the ONS is not the main provider. Most responses to our First Report did not comment on non-ONS data, although there was some concern expressed over agriculture and construction data. Chapter 6 discusses our broad approach to non-ONS surveys, in the context of the ONS' overall responsibility for most aggregate economic data.

**Construction**

7.44 Of the two sectors mentioned in responses to our First Report, we have looked at estimates of construction output in more detail, because of its greater size and specifically because of recent experience. The estimate of GDP growth for 2003 Q2 published in August 2003 was 0.3 per cent; the following month this was revised up to 0.6 per cent, with an increase in the estimated output of construction being the major factor behind such a large revision.

7.45 The output of the construction sector accounts for around 5 per cent of GVA, but it is prone to relatively sharp cyclical fluctuations, so that its impact on GDP growth could be more than proportionate to its relative size. The construction sector is also atypical in that it has a relatively high proportion of self-employment and small businesses, combined with a small number of very large businesses. These very large firms often have a different range of work, for instance large public infrastructure projects, and are subject to different influences than the smaller businesses.

7.46 The annual National Accounts presented in the *Blue Book* use information on construction output from the ABI. But shorter-term estimates come from the Department of Trade and Industry (DTI), which has policy responsibility for the construction sector. In the first month of each quarter, the DTI estimates construction output from a combination of estimates from two models.[17] This feeds into the preliminary estimate of GDP. In the second month of the quarter, revised estimates based on partial survey responses are available and feed into that month's GDP estimates. More information becomes available for the following month's estimates.

7.47 The DTI and ONS have published the findings of the first phase of a review of the early estimates of construction output in 2003.[18] The review notes that the estimated contribution of construction to GDP growth in 2003 Q1 was revised *down* by 0.3 percentage points for the estimate published in June, although the effect on GDP on that occasion was offset by upwards revisions elsewhere. The revision to the 2003 Q2 estimate of construction reflected a bounceback that was larger than the DTI had expected. In both cases, the early survey returns (available in the second month after the end of the quarter) pointed the direction of change, but were largely discounted.

[17] *These are a DTI model, which uses recent trends in construction activity and new orders data, and a new model developed by Experian, which uses recent data and the results of their own activity survey.*

[18] *Department of Trade and Industry and Office for National Statistics (2004).*

7.48 The DTI and ONS review concludes that the largest ever construction-related GDP revisions in 2003 Q1 and Q2 were largely due to the unforeseen fall in construction output in Q1. For the next phase, it recommends:

- work continues on developing the models and understanding how early survey data relate to the eventual full estimates;
- research to explain the fall in 2003 Q1; and
- further work to identify methods that might produce accurate early estimates of construction output, including the possibility of a small monthly survey.

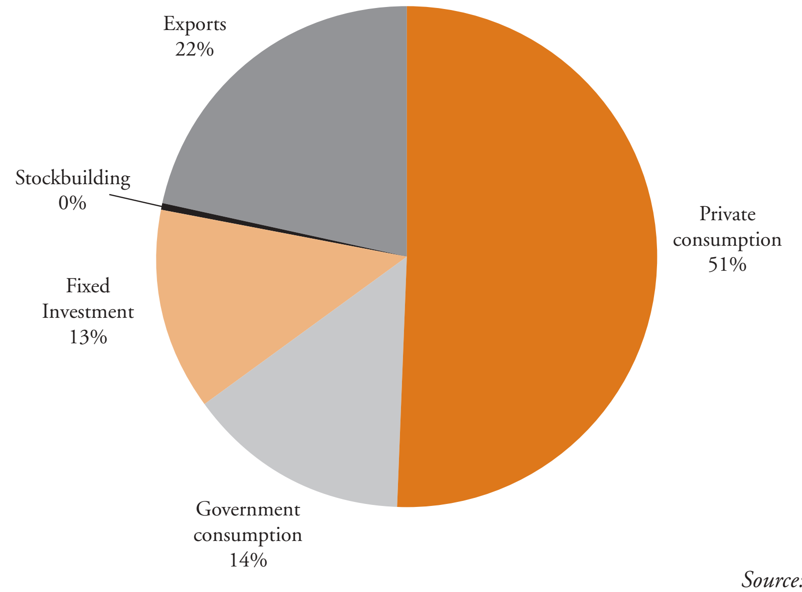
7.49 We welcome the review of construction statistics by the DTI and the ONS, and the further work recommended by the report on the first phase. The revisions to construction estimates in GDP for the first two quarters of 2003 cast significant doubt on whether the present methods are fit for National Accounts purposes, given the volatility of the construction sector. We hope that the estimates can be improved to reduce the risk of introducing volatility to National Accounts estimates. Recommendation 52, discussed in Chapter 6, suggests that the ONS should be ready to take action if data provided by other departments does not meet the standards required to feed into National and Regional Accounts.

# 8 Measuring expenditure

8.1 Demand in the economy is usually analysed and modelled through expenditure components: consumption, investment, government spending, and net trade. This chapter looks at the expenditure measure of GDP and its principal components.[1] To understand what is happening in the economy, and what is likely to happen in the future, we need to know how different components of demand are changing. Some further disaggregation of those components may also be required, if we are to understand their behaviour. And in some cases, this means there is also a need for good microeconomic data, for instance to analyse the links between household debt, assets and consumption. But these are largely beyond the feasible scope of our Report.

8.2 The composition of Total Final Expenditure (TFE) in 2000 (the base year for the current National Accounts) is shown in Chart 8.1.[2] Household consumption is by far the largest component, though government consumption, investment and exports are each significant.

**Chart 8.1: Composition of Total Final Expenditure, 2000**




*Source: ONS*

8.3 Chart 8.2 shows the contribution of these components to GDP growth in recent years.[3] While household consumption remains a significant influence, any component can have a major impact on *changes* in GDP. In the short term, the quarterly path of GDP is primarily determined by the growth of the production measure, discussed in earlier chapters. An alignment adjustment

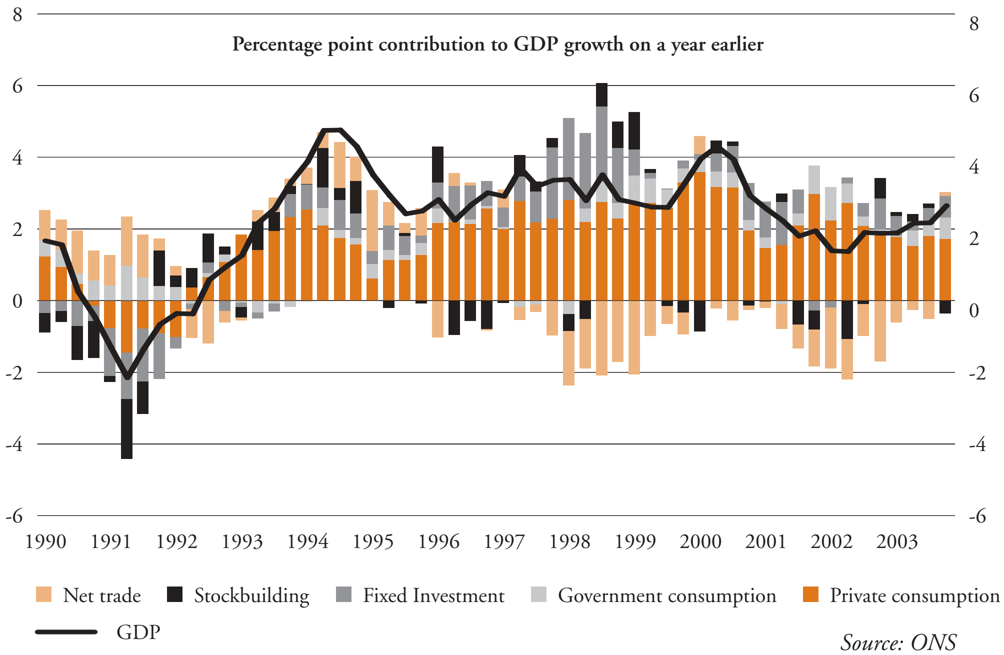
[1] *We do not consider explicitly the smaller components of GDP(E): consumption of non-profit making institutions serving households (NPISH), net acquisitions of valuables, or stockbuilding.*

[2] *TFE is shown rather than GDP (which is equal to TFE less imports) because including imports would result in a negative contribution from net trade.*

[3] *In order to capture all contributions, consumption includes both households and NPISH, and investment includes net acquisition of valuables.*

is added to stockbuilding to bring the expenditure measure into line. However, the ONS currently considers the expenditure side the more reliable for the deflation process that produces annual chained volume estimates.

**Chart 8.2: Contributions to GDP chained volume growth**




*Source: ONS*

**Consumer spending**

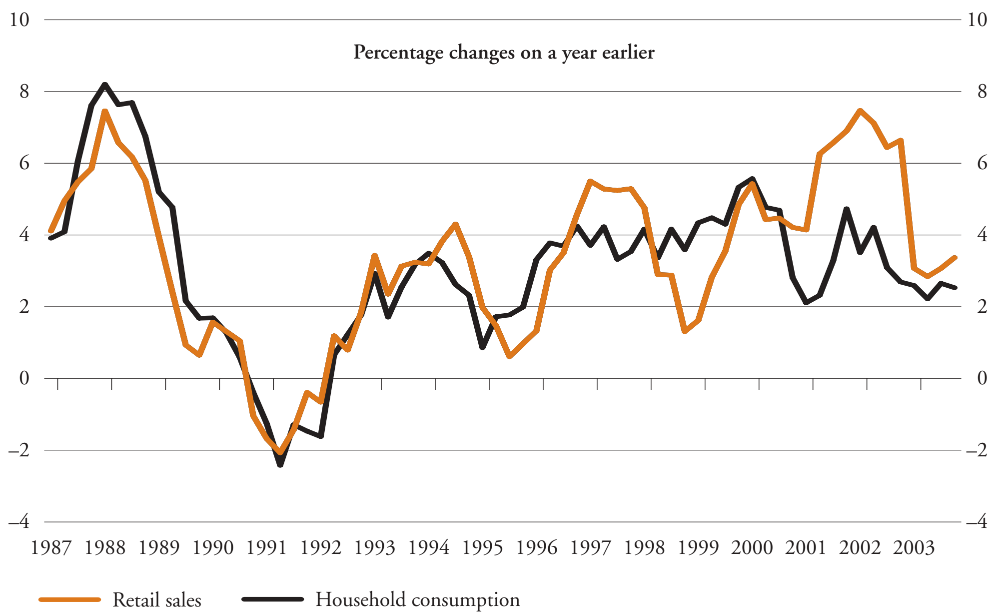
8.4 Household consumption accounts for around half of total final expenditure, so understanding its behaviour is crucial for understanding aggregate demand in the economy. Around half of consumer spending is on services, with housing, transport and restaurants and hotels being among the most significant components. Non-durable goods account for around a quarter, including food, drink, alcohol and tobacco. Households' spending on semi-durable and durable goods apart from housing is treated as consumption rather than investment; this category includes vehicles, furniture and electrical goods.

8.5 The primary sources for timely household consumption estimates are the monthly Retail Sales Inquiry (RSI) and the Expenditure and Food Survey (EFS).[4] Broadly speaking, goods are more likely to be measured through the RSI and services through the EFS. Purchases of motor vehicles are not included in retail sales, so information from vehicle registrations is used instead (but even this only covers new cars). To produce chained volume estimates, detailed information from the Retail Prices Index is used to compile deflators for a large part of consumer spending.

[4] *The results of the EFS are published annually, but the underlying data are used for quarterly estimates of consumption. In our First Report, paragraphs 5.76-78 discussed the EFS in more detail and Box 7.1 set out plans to incorporate the EFS and other household surveys into a Continuous Population Survey.*

8.6 The most timely indicator of consumer spending is the monthly Retail Sales Index, published with a lag of less than a month. But retail sales account for only around 30-40 per cent of total consumer spending and the two do not always move in a similar fashion.[5] Chart 8.3 compares annual growth rates of retail sales and consumer spending, showing a number of divergences since the mid-1990s. Information on retail sales is, of course, of great interest to the retail sector, but at times it has not been a reliable guide to the behaviour of total household consumption. As it is such a major influence on demand, a better monthly indicator of consumer spending would be potentially very useful for assessing current economic developments. What other information would be needed to build up a monthly estimate of consumer spending?

**Chart 8.3: Retail sales and household consumption**




*Source: ONS*

8.7 A lot of that part of consumer spending not covered by retail sales is included in the experimental Index of Services (IoS), discussed in Chapter 7. Further development of the IoS would mean that much of the information would be available to produce a monthly estimate of consumer spending. The IoS and RSI would not cover everything between them, with motor vehicles purchases a notable absentee (estimated for new cars using data from the Society of Motor Manufacturers and Traders). It may be possible to find alternative sources for any other significant exceptions.

8.8 Some additional adjustments to monthly data would be required, for instance to take account of both sales of goods and services to overseas tourists and to businesses.[6] At this stage, it is difficult to know just how practicable it would be to combine the available monthly information into a reasonable estimate of monthly consumption, or how that would compare with alternative approaches such as extending the Expenditure and Food Survey. These are issues that require further consideration and consultation with users.

[5] *Another difference is that retail sales data include sales to businesses and overseas tourists.*

[6] *A further complications is that the IoS and RSI are measuring turnover, which feeds into the production rather than the expenditure measure of GDP.*

8.9 Recommendation 61: Once consumer services are measured in the monthly Index of Services to the quality required of a National Statistic, the ONS should investigate what would be required to produce a timely monthly estimate of consumer spending.

**Investment**

8.10 Investment accounts for a much smaller percentage of GDP than consumption, but sharper cyclical fluctuations mean that it can often have a significant influence on demand. As well as a need for timely, short-term information, there is substantial policy interest in investment as a driver of productivity. Business investment accounts for around two thirds of the total and excludes housing investment, government investment and transfer costs of 'non-produced assets' such as land.

8.11 The main sources for short-term business investment estimates are the quarterly surveys of capital expenditure for production and non-production industries. These feed into both the GDP(E) estimates and the quarterly business investment First Release. Benchmark annual business investment data come from the ABI. Information on central government investment comes from HM Treasury, and for local government from the Office of the Deputy Prime Minister and devolved administrations; information on housing investment comes mainly from DTI inquiries. Chained volume estimates are calculated using information from Producer Price Indices and import prices. But there are significant challenges associated with the relatively limited product detail available and the deflation of large, one-off investment projects such as infrastructure and substantial building work.

8.12 In recent years, investment has been subject to larger revisions than the other components of GDP(E).[7] Chart 8.4 shows the estimates of constant price investment published between early 2001 and August 2003; later estimates have been excluded because they will include the effects of moving to annual chain-linking.[8] The chart shows that there have been substantial revisions to investment data, particularly from mid-2002. The estimated level of investment was revised down by as much as 1 per cent of GDP in mid-2002. But since then revisions to 2001 and 2002 figures have generally been upwards: the August 2003 estimate for investment in 2002 Q3 was around 1 per cent of GDP higher than the initial estimate published in late 2002.

8.13 It is not surprising that revisions to investment tend to be larger than those to consumption or government spending. Cyclical fluctuations in investment tend to be wider and its 'lumpy' nature makes it more difficult to capture accurately through surveys. For the most part, these revisions will not have had a pronounced effect on GDP estimates, which in the short term mostly reflect the growth of output.[9] But the composition of demand can be important for economic analyses and forecasts: for instance, the Monetary Policy Committee has been watching carefully for signs of consumption growth slowing or investment growth picking up.

8.14 We recognise, however, that capital spending is inherently difficult to estimate, for instance because expenditure by individual businesses can be very variable. Despite such inherent difficulties, we believe the ONS should pursue further the reasons for revisions to investment estimates and whether the likelihood of further significant revisions can be reduced.

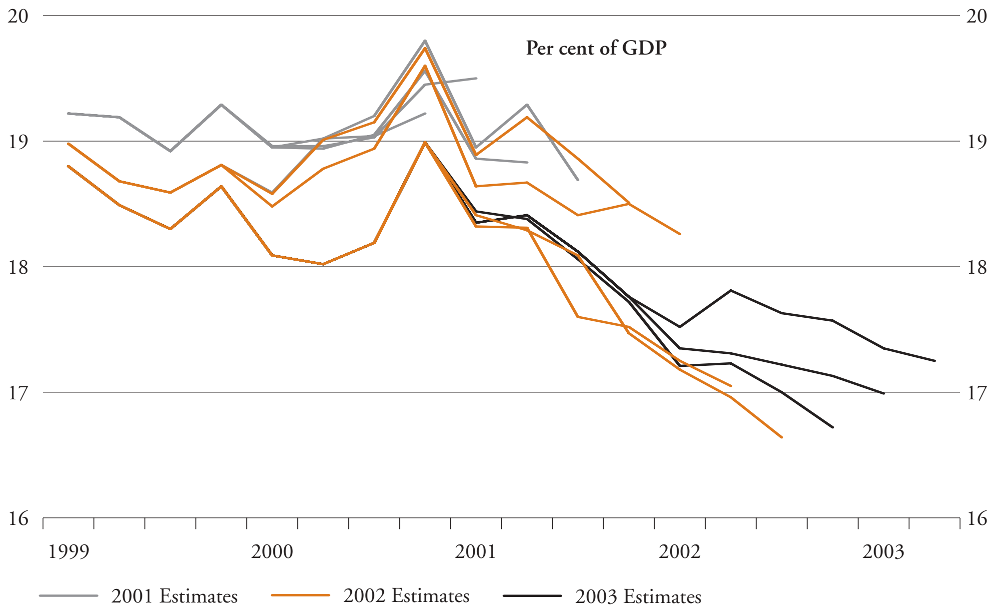
---

[7] *Akritidis (2003) details revisions to GDP growth and expenditure components for data from 1993 to 2000. Note that this therefore excludes the period shown in Chart 8.4.*

[8] *Tuke and Beadle (2003) sets out estimates of the effect of annual chain-linking on the growth of GDP and its components.*

[9] *Adjustments to expenditure components may be made as part of the supply-use 'balancing' process described in Chapter 4 above; an alignment adjustment is included in stockbuilding to keep expenditure and output estimates of GDP in line.*

Chart 8.4: Successive estimates of investment




*Source: ONS*

8.15 Reliable estimates of investment, and its composition, are important for measuring the capital stock too. As described in Chapter 10, most estimates of the capital stock are built up from investment data. Recent problems with the ONS capital stock data highlighted the importance of the assumptions on asset lives and depreciation. These might be helped by finer amount of asset detail than the current, rather broad categories.

8.16 Recommendation 62: The ONS should investigate why revisions to investment tend to be larger than those to other expenditure components and what can be done to reduce the likelihood and magnitude of such revisions. It should also consider, in consultation with users, how a finer disaggregation by product might be produced to enable better capital stock measurement and deflation.

**Government consumption**

8.17 The conceptual basis for government consumption is that the Government is assumed to purchase the non-marketed output of the government sector. In other words, the services that the Government provides must first be bought – and they are bought from the Government. As there is no price for such a transaction, government consumption is measured through the costs of providing those services: compensation of employees and purchases of goods and services. Figures for central government current price consumption are obtained from HM Treasury; for local government from the Office of the Deputy Prime Minister and devolved administrations, though interpolation of some annual data is necessary.

8.18 Estimates of chained volume government consumption face the same difficulties as government output, discussed in Chapter 7. The ONS must judge the volume of services being purchased by government – through inputs, through output measures or by deflating current price spending. Although the ONS has made some progress in this area in recent years, these issues are now being taken forward by the review of measures of government output and productivity headed by Sir Tony Atkinson, also discussed in Chapter 7.

**Exports and imports**

8.19 Exports and imports are the components of expenditure where the distinction between goods and services is most stark. There are separate sources for trade in goods and services, and a marked contrast between the large amount of monthly information available on trade in goods and publication of only the broad aggregates for trade in services. Table 8.1 shows the relative size of imports and exports of good and services. In comparison, manufacturing (which is a narrower category than goods) accounted for over 80 per cent of exports in 1950.

### Table 8.1 Trade in goods and services, 2002

| | £ bn |
|---|---|
| **Exports** | |
| Goods | 186.3 |
| Services | 86.5 |
| **Total exports of goods and services** | **272.7** |
| **Exports** | |
| Goods | 232.7 |
| Services | 71.3 |
| **Total imports of goods and services** | **304.0** |
| **Balance of trade in goods and services** | **–31.3** |

*Source: ONS*

**Trade in goods**

8.20 Monthly information on current price trade in goods within the European Union is collected by HM Customs and Excise using an EU-wide system called Intrastat, which is based on the administration of VAT. For trade outside of the EU, estimates are based on information from customs declarations.[10] Chained volume estimates are mostly obtained by deflation using price indices – either specifically-collected export or import prices or (where that is unavailable) using information from the relevant Producer Price Indices, adjusted for factors such as exchange rate movements. At present around 90 per cent of goods exports are deflated by directly-collected export price indices. Import price indices are used to deflate around 75 per cent of goods imports, and the ONS aims to extend their use further.

8.21 Despite considerable action by HM Customs and Excise to reduce the burdens on business, Intrastat remains a very large survey: for instance its compliance cost exceeded the whole of the ONS compliance budget in 2001; and information is collected on goods to a very fine level of detail. However, we recognise that there are EU regulations governing this area, which may severely constrain any room for manoeuvre. Moreover, many businesses and trade organisations have a legitimate interest in these data, which also provide some regional statistics. And it has been suggested that the link to the VAT system might mean information is collected more efficiently than otherwise.

8.22 Nevertheless we note that Intrastat is a considerable outlier in comparison with the coverage, detail and compliance cost of other surveys undertaken by the Government Statistical Service. Could some of these resources be used better elsewhere? Within the timescale for this Report we have not been able to examine the constraints on Intrastat or the extent to which the information required could be obtained more efficiently. We believe this should be investigated.

[10] *Customs declarations are no longer required on trade within the European Union, hence the need for an alternative system.*

8.23 Recommendation 63: The Intrastat survey appears disproportionately costly and detailed compared with other business surveys undertaken by the Government Statistical Service. HM Customs and Excise should examine the constraints on Intrastat, whether the required information could be collected more efficiently, and whether this represents a sensible allocation of public funding.

8.24 The estimates of trade in goods were subject to substantial revision last year to reflect adjustments for the impact of VAT missing trader intra-Community (MTIC) fraud.[11] The adjustments increased the estimated level of imports from 1999, adding £11 billion in 2002, and reduced the estimated level of GDP by between 0.2 and 0.4 per cent. We do not discuss this issue further here, other than to re-iterate that it is the nature of statistics that such revisions can happen and, as discussed in Chapter 7, they should not be regarded as 'errors'. Instead, they highlight the potential effects of illegal activity, which for obvious reasons is very difficult to estimate and to incorporate into economic statistics.

### Trade in services

8.25 In contrast to our views on output, it can be argued that measuring international trade in services *does* present a rather greater challenge than trade in goods. Statistics for trade in goods have traditionally been based on capturing the movements of goods across borders, and hence the reason that data are collected by HM Customs and Excise rather than the ONS. Trade in services is measured by a number of different surveys and sources. The International Trade in Services Inquiry (ITIS) was introduced in 1996, replacing a number of partial surveys. It is an annual and quarterly survey that covers trade in private sector services apart from

- travel and transport, covered by the International Passenger Survey and information from operators such as the Chamber of Shipping and the Road Haulage Association;
- banking and some financial institutions, collected by the Bank of England and Lloyds of London;
- higher education, where data come from the Higher Education Statistics Agency;
- film and television, covered by the Film and Television Inquiry;
- most legal services, supplied by the Law Society.

8.26 Chart 8.5 shows the main components of trade in services.[12] Some of the most important categories are among those not covered, or only partially covered, by the ITIS survey, in particular transport, travel, insurance and financial services. In 2003 the ONS estimated that results from the ITIS inquiry made up around 41 per cent of service exports and 23 per cent of service imports.[13] In the time available, we have not been able to look in any detail at the different ways in which these data are collected, or compare the methods used. Nevertheless, imports and exports of services are among the areas of the National Accounts that are subject to most substantial revision,[14] suggesting that there could be benefit from further investigation.[15]

[11] *Ruffles* et al *(2003) set out details of the nature of the fraud and its effects on Balance of Payments and the National Accounts.*

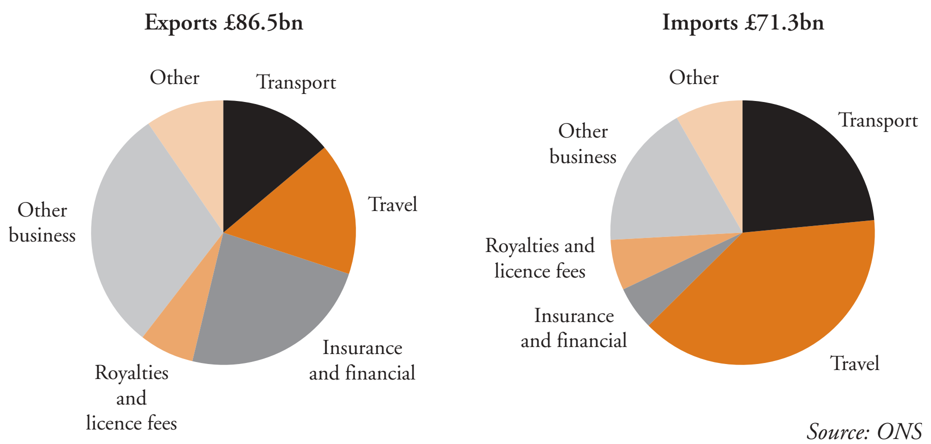
[12] *The 'other' category includes communications; construction; personal, cultural and recreational; and government.*

[13] *Figures from Office for National Statistics (2003f).*

[14] *See Akritidis (2003).*

[15] *The ONS started a Quality Review of Balance of Payments and Trade Statistics in 2002, but it has not yet reported.*

### Chart 8.5: Trade in services, 2000




*Source: ONS*

8.27 Services imports and exports are derived from a range of monthly and quarterly sources. In the monthly trade statistics First Release, the ONS cautions that some estimates have been derived from recent trends and estimates are less reliable than those for trade in goods. Moreover, monthly volume estimates are only given for trade in goods. There is no data collection for prices of specific exports or imports of services. For the purposes of the National Accounts, quarterly exports and imports of services are deflated using a range of proxy price indices, including freight rates and tonnage for sea transport; passenger mileage rates for air transport; components of the RPI; average earnings indices and exchange rates.

8.28 Recommendation 64: The ONS should examine the relative strengths and weaknesses of the surveys used to compile estimates of trade in services, what measures could be taken to improve monthly and quarterly estimates, and whether deflation techniques should be improved to enable separate monthly volume indices for trade in services to be produced.