

# 2 Measuring Government Output in the UK

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- 2.1** This chapter describes the methods used to measure government output in the United Kingdom, and particularly the direct measures of government output introduced with the *Blue Book 1998*. One of the main reasons for the move to direct measures was that the previous approach assumed no change in productivity in the government sector. In this chapter, we consider the issues that arise in measuring productivity before turning to an examination of the main element.
- 2.2** For the purpose of this review, the term ‘government’ should be read broadly, to cover all those agencies that provide public services. Thus, for example, the National Health Service (NHS) and local authority provision of social services are part of our purview. The precise boundaries of the government sector are important, but are not particularly germane to our report. At a number of points, it will, however, be important to distinguish between *individual* services (those consumed by individual households) and *collective* services provided to society as a whole.
- 2.3** Government output is generally non-market output in the sense that it is supplied free or at prices that are not economically significant. It is the absence of market transactions that underlies many of the problems in measuring output.
- 2.4** Government features as an identifiable component in two different measures of GDP. First, there is the final consumption expenditure of government, a component part of GDP (Expenditure). For 2003, the *Blue Book 2004* showed *individual* government final consumption expenditure of £141bn, and *collective* government final consumption expenditure of £89bn at current prices. Total GDP at current market prices in 2003 was £1,100bn.
- 2.5** Here our concern is primarily with a second measure: GDP at constant prices. This volume measure provides an indicator of the growth rate of the economy. Government output, at constant prices, enters this GDP measure. Its measurement affects, therefore, statements about the relative growth rates of the UK economy compared with those of other countries. When the European Union compares its growth performance with that of the United States, or different countries within the EU compare their growth rates with each other, account has to be taken of differences in the methods employed to measure government output.
- 2.6** Volume measures for the output of the main government functions are published annually in the Blue Book. The *Blue Book 2004* shows that, between 1995 and 2003, there was volume growth of 29 per cent for Health, 7 per cent for Education, and 6 per cent for Social Protection.

## Conventional Approach to Measuring Government Output

- 2.7** In many countries, and in the United Kingdom from the early 1960s to 1998, the output of the government sector has been measured by convention as of value equal to the total value of the inputs; by extension the volume of output has been measured by the volume of inputs. This convention regarding the volume of government output is referred to below as the (output=input) convention, and is contrasted with direct measures of government output. The inputs taken into account in recent years in the United Kingdom are the compensation of employees, the procurement cost of goods and services, and a charge for the consumption of fixed capital. In earlier years, and in other countries, including the United States, the inputs were limited to employment.
- 2.8** Wide use of the convention that (output=input) reflects the difficulties in making alternative estimates. Simply stated, there are two major problems: (a) in the case of collective services such as Defence or Public Administration, it is hard to identify the exact nature of the output, and (b) in the case of services supplied to individuals, such as Health or Education, it is hard to place a value on these services, as there is no market transaction.
- 2.9** The rationale for the convention adopted in the United Kingdom for many years was described by Rita Maurice in her 1968 edition of *National Accounts: Sources and Methods*:

‘There are inherent difficulties in measuring, at constant prices, the output of government services, the exact nature of which cannot be precisely determined. ... In general, the solution adopted has been to use changes in numbers employed as an indicator of changes in output. The implied assumption of no change in productivity is obviously not satisfactory since it takes no account of the use of more modern equipment, such as computers. The problem has been discussed at a number of international conferences without any generally acceptable solution being reached. In some countries the assumption has been made that productivity in the public services increases at the same rate as productivity in all other industries, or in all other services ... in the United Kingdom accounts the assumption of no change in productivity has been preferred’ (1968, pp 44–45).

- 2.10** The criticism that this (output=input) convention neglects increases in productivity is clearly well founded, and has been articulated many times by ONS: for example, in *Economic Trends*, February 1998. To the extent that productivity grows, the growth rate of government output is understated, and hence the overall growth rate of GDP is understated. Countries with larger public sectors, such as European economies, will on this account have lower relative growth rates, other things equal, than countries with smaller public sectors, such as the United States. Where, as in Germany, an assumed productivity growth factor has been added in estimating the contribution of government output to GDP, the growth rate will appear higher than in countries which assume that there is no productivity growth. International comparisons are thus affected.

- 2.11** It does not follow that abandoning the (output=input) convention will raise measured growth. It is possible that the productivity indicator for government output is constant or declining. There is no necessary reason to expect productivity to increase. Many public services, like social services, involve an essential human input. In the caring and teaching professions, there may be limits to which labour productivity can be increased. As W J Baumol noted years ago, ‘there are a number of services in which the labour is an end in itself, in which quality is judged directly in terms of the amount of labour’ (1967, p 416). As labour becomes more expensive, there is only very limited scope for substitution. The social worker may be aided by capital, such as use of a car rather than public transport, allowing more clients to be visited in a day. Computerisation may allow care workers to be allocated more efficiently. But there are distinct limits to the extent to which labour can be replaced in services such as teaching and healthcare. Moreover, the labour saving depends on increases in other inputs, and does not necessarily raise overall productivity measured, taking account of total factor inputs.
- 2.12** It is useful here to distinguish between the technical frontier, or ‘best practice’, and actual performance. At any point in time, output per unit of input may be improved, for example by reallocation of administrative staff to service provision. Gains may be achieved by improved organisation or personnel practices. There may be significant savings, or increased output, moving the operation closer to the production frontier. But the production frontier itself may be relatively static. The technical possibilities may not allow continuing long-run gains in productivity.
- 2.13** The expansion of public services may indeed be subject to diminishing returns. Historically, initial reductions in neo-natal mortality may have been relatively easy to achieve, but driving down rates today below their current level may involve much more expensive interventions. When schools have halved their truancy rate, they may find it increasingly difficult to achieve further reductions. When re-offending has been reduced by 5 per cent, the next 5 per cent may mean working with more difficult cases. Diminishing returns do not, of course, mean that the expansion is unjustified. The value of the additional output may still exceed the cost of the inputs.
- 2.14** Again, a distinction has to be made between best practice and actual performance. In the case of health care, for example, patients may be treated in decreasing order of ability to benefit from the treatment. In such a situation, expansion of treatment means that there is a declining benefit per patient. But if the present service does not fully match treatment and benefit, then the additional patients will have a benefit closer to the average of those already treated. In the extreme case where patients were chosen at random from those presenting, there would be no decline. We are not suggesting that this is the case, but the point remains that diminishing returns could in part be offset by gains from improving the coverage of patients most able to benefit.
- 2.15** It is important to recognise that there are lags between inputs and outputs, and that a marked increase in public spending, such as that which has taken place in recent years, may only show up in improved output indicators at a later date. This applies particularly to government output such as in Education and Health. In this situation, measures of productivity, however well based, have to be interpreted carefully.

- 2.16** A move from the (output=input) convention to direct measurement of government output should therefore be carefully interpreted. It is a definite advance in the sense that government output is no longer simply assumed to equal measured inputs, but the move should not be seen as solving at a stroke the complex problem of measuring government performance. The statistic obtained by dividing output by input may no longer be equal to 1 by definition, but no single number, however carefully constructed, can fully capture the performance of complex public services with multiple objectives.

### Developments over Time in ONS (and CSO) Practice

- 2.17** ONS has consistently taken the view that the output of the public sector should be included in GDP, rejecting any suggestion that it should be treated as a purely intermediate output. This is a view that we fully share, not least because it is adopted by the United Nations *System of National Accounts* (SNA) and by the *European System of Accounts* (ESA 95), which is based on the SNA 1993. (The international guidelines are discussed in Chapter 3.)
- 2.18** The SNA has, however, evolved in its approach to measurement of government output. The new approach, introduced in the United Kingdom with the *Blue Book 1998*, with its emphasis on actual personal consumption, opened the way to the direct measurement of the output of the government sector. ONS was in the vanguard of national statistical offices in initiating a project to introduce new measures of output for public sector non-market production. The project was described by Henry Neuburger and David Caplan in *Economic Trends*, February 1998, and its progress can be traced in a series of articles: David Caplan, *Economic Trends*, October 1998, Michael Baxter, *Economic Trends*, September 2000, Alwyn Pritchard, *Economic Trends*, May 2001, Timi Ashaye, *Economic Trends*, November 2001, Alwyn Pritchard, *Economic Trends*, May 2002, and Alwyn Pritchard, *Economic Trends*, July 2003.
- 2.19** Since 1998, ONS has moved increasingly towards the replacement of the (output=input) approach by direct measures of the volume of government output. The major progress made to date is summarised in Table 2.1. Successively, different sectors have been converted to a direct measure of output, beginning with Health, Education and the Administration of Social Security. The direct estimates now cover some two-thirds of general government final consumption, which is an impressive achievement.

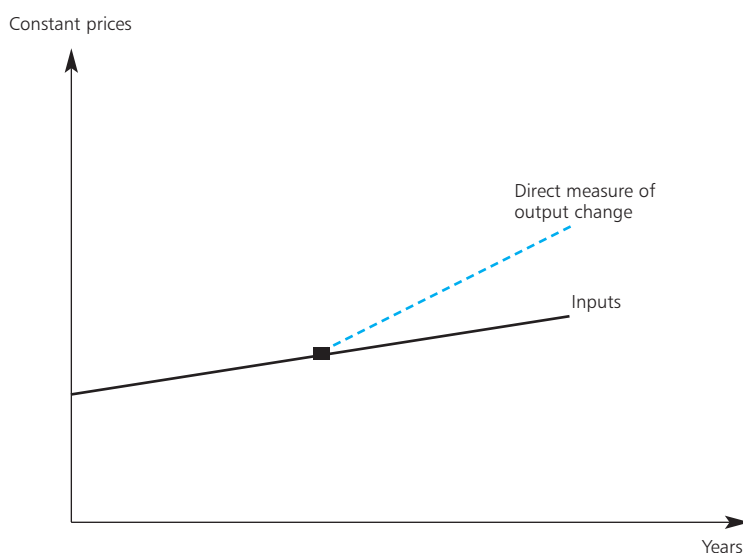
Table 2.1 Post-1998 developments in ONS measurement of government output

Function	Per cent government spending in 2000	Date introduced	Main components	Devolved administrations	Reference
Health	30.3	Introduced in the <i>Blue Book 1998</i> , with data from 1986, method updated 2004	Hospital cost weighted activity index, Family Health Services (number of GP consultations, etc)	Separate data for England, Wales, Scotland and Northern Ireland	<i>Economic Trends</i> , October 1998
Education	17.1	Introduced in the <i>Blue Book 1998</i> , with data from 1986	Pupil numbers – Quality adjustment of 0.25 per cent to primary and secondary schools	UK figure for pupil numbers in nurseries and primary and secondary schools	<i>Economic Trends</i> , October 1998
Administration of Social Security	2.7	Introduced in the <i>Blue Book 1998</i> , with data from 1986	Number of benefit claims for 12 largest benefits No allowance for collection of contributions	United Kingdom	<i>Economic Trends</i> , October 1998
Administration of Justice	3.0	Partially introduced in the <i>Blue Book 2000</i> , with full impact in the <i>Blue Book 2001</i> , with data back to 1994 Q1	Number of prisoners, legal aid cases, court cases, and probation cost-weighted activity index	Great Britain for prisons, otherwise England and Wales	<i>Economic Trends</i> , September 2000, for probation, November 2001
Fire	1.1	Introduced in <i>Blue Book 2001</i> , with data from 1994 Q1	Number of fires, fire prevention and special services	England, Wales and Northern Ireland	<i>Economic Trends</i> , November 2001
Personal Social Services	7.4	Introduced in <i>Blue Book 2001</i> , with data from 1994 Q1	Children and adults in care and provision of home helps	England	<i>Economic Trends</i> , November 2001
Police	5.8	Experimental	Cleared-up crimes of different types	England, Wales and Northern Ireland	<i>Economic Trends</i> , May 2002

Source: Office for National Statistics

**2.20** In these new estimates, ONS has taken the output, calculated on the basis of inputs, at a reference year, and the direct measures have been used in the form of changes since that date. It is important to understand what these measures do and do not do. The direct measures are of *changes* in output. They are not attaching a monetary value to the *level* of output recorded using the new indicator. The change is shown schematically in Figure 2.1. Starting from a particular base date, shown by the square, the direct output indicators, such as pupil numbers, are used to estimate the growth of output volume. They are not used to estimate the relation between inputs and outputs at the base date. Nor is any attempt made to calculate a current price measure that could be included in the measure of GDP at market prices.

Figure 2.1 Schematic representation of ONS direct output



**2.21** The move to direct output measurement had a perceptible effect on the measured growth rate of the UK economy. Between 1995 and 2003, GDP at constant prices grew at a rate of  $2\frac{3}{4}$  per cent per annum, using the direct output indicators for government output currently employed. If the output had continued to be measured wholly by the inputs, the recorded growth rate would have been 3 per cent per annum. In relation to international comparisons, this difference is significant. GDP growth in the United States was  $3\frac{1}{4}$  per cent per annum over this period. The difference, for the United Kingdom, between the input method (used by the United States) and the direct output method used to date by the United Kingdom, accounts for nearly half the difference in the countries' published growth rates.

**2.22** The move away from the (output=input) convention has introduced a divergence in method between constant price and current price measures of GDP. This may be seen from the fact that the convention that the value of output was equal to the value of inputs meant that there was no net operating surplus or deficit to be attributed to the public sector output. If, as shown in Figure 2.1, output growth exceeds input growth, this creates an operating surplus; the same would arise if there were an assumed productivity growth (as in German estimates).

- 2.23** Although not explicitly recognised, the post-1998 approach of ONS has affinities with that used in the United Kingdom in the 1950s and early 1960s. As argued by the Central Statistical Office (CSO) (the predecessor of ONS) in 1956, ‘even a crude measure of [government] output is assumed to be preferable to an index based on total cost, at constant prices, of the factors of production ... the latter method is only used *faute de mieux*, eg in public administration, where it is difficult to conceive of any sensible measure of service rendered.’ (Central Statistical Office, 1956, pp 42 and 43). ‘Thus the administration of national insurance is represented by the numbers insured and the numbers in receipt of benefit; the hospital services by the number of patients and the number of hospital staff; courts of justice by the number of cases tried.’ (Central Statistical Office, 1956, p 42).
- 2.24** According to Maurice, writing in 1968, the direct indicators ‘proved unsatisfactory and have been abandoned’ (1968, p 87). The reasons she gives are ‘the difficulty of finding indicators’ and ‘the need to keep the output estimates consistent with the expenditure estimates’ (1968, p 87). According to Levitt and Joyce, the direct output measures used in the 1950s and early 1960s were ‘heavily criticised’ (1987, p 50) on the grounds of the arbitrary nature of the weights employed (for example, for teachers and pupils), the tenuous nature of the link with outputs, and the issue of quality change. They cite the example of the impact of government policies designed to reduce class sizes. Since the output indicator for Education gave half weight to pupils and half to teachers, output per teacher was assumed to be a declining function of the number of teachers; hence, a rise in the number of teachers increased output less than proportionately. It is not, however, evident that this is inferior to the assumption that labour productivity is independent of the number of pupils per teacher. Certainly, the estimates of Beales (1967) showed that between 1959 and 1963 the direct method led to estimates of output increase that were lower than those obtained using the (output=input) convention. For Education, the direct method yielded estimates of 13.5 per cent increase in output, compared with 19.4 per cent, and of 6.2 per cent for Health, compared with 9.2 per cent. (Figures cited by Levitt and Joyce, 1987, p 50) Beales noted that this would not always be the case.
- 2.25** From this earlier experience, we draw two main conclusions. The first is that the design of direct output measures needs considerable care. It is not necessarily the case that ‘even a crude measure of [government] output is ... preferable to an index based on total cost’. The fact that it is not easy to obtain direct indicators means that better measures are likely to require significant investment of resources. Direct measures of output need to be continuously monitored to ensure that they are capturing changes in quality. The second conclusion is that ONS has to steer a careful course with regard to changes in government policy, guaranteeing the independence of the approach to measuring government output while ensuring that its implementation reflects the realities of public spending and circumstances.

## Technological and Institutional Change in the Public Sector

- 2.26** There is a strong case for devoting significant resources at this time to improving the measurement of public sector output on account of its increased saliency in policy-making and public debate. Interest in the measurement of government output has become much more intense in recent years as a result of a number of developments in the public sector, reflecting changed government priorities, the concerns of citizens and voters, institutional change, and the new possibilities opened by technological developments. As it was put by the National Statistician when he announced the review, ‘the amount of resources allocated to public services has increased. Delivery and management mechanisms have developed and are more complex. There is an increasing emphasis on the quality of service for the customer. As a result there are greater demands on, and expectations of, measures of government output’.
- 2.27** The public sector is changing rapidly. Functions have been transferred between government departments: for example, the transfer of the levying of National Insurance contributions, and the payment of Child Benefit, from the Department of Work and Pensions to the Inland Revenue. Under successive governments, there have been major policy initiatives directed at changing methods of working and these have often involved shifting institutional boundaries. New delivery mechanisms have been introduced, such as NHS Direct. Policy changes have involved transfers between functions, such as residential or domiciliary care, provided by personal social services, replacing hospital days. An increasing part of service provision may involve sourcing from the private sector.
- 2.28** Ideally, the measure of public sector output should be invariant with respect to changes in the organisation of delivery, but this may not be easy to achieve in statistical practice. Moreover, we have been impressed by the fact that the move to direct output measurement may have made this problem more difficult. With the (output=input) convention, institutional change may not affect the adding up of input outlays within a department, or may involve a relatively simple transfer of input spending. With direct output indicators, there is no guarantee that the effects on the separate output indicators within a department will cancel; where functions are transferred across departments, new output indicators may need to be constructed.
- 2.29** The public sector is also affected by rapid technological change. This may take the form of sector-specific change, as in medicine, or of the general impact of information and communications technology (ICT). Technological change is not confined to the public sector and its impact has been much discussed with regard to the private business economy. In this sense, we may be able to learn from the private sector experience. However, extensive debate in the United States has shown that the measurement of the output of the private service sector is itself a challenging problem. For many years, there was concern that computers were present everywhere except in the productivity statistics (a paradox enunciated by Robert Solow). The impact of technological change may appear only with a delay, and the benefits of ICT may appear in quality change that is not recorded.

## Measures of Government Output, Inputs and Productivity: The Key Elements

**2.30** The key ingredients, with the amounts in 1995 and 2003:

- **Expenditure at current prices on the inputs purchased by government** to produce its outputs, usually referred to as General Government Final Consumption Expenditure at Current Prices: £140bn in 1995 and £230bn in 2003, an increase of 64 per cent;
- Volume of government inputs, adjusted for the increases in the prices of inputs, **using appropriate price indices**: at 2001 prices, £166bn in 1995 and £214bn in 2003, an increase of 29 per cent. This implies that, on average, input prices had risen by some 35 per cent;
- **Volume of government output** at 2001 prices: £171bn in 1995 and £204bn in 2001, a rise of 19 per cent.

**2.31** On occasion, the first series is divided by the third to obtain the ‘implied deflator’ or cost per unit of government output. This deflator includes, however, both price and productivity elements. It is equal to the input price increase divided by the productivity increase. It seems to us preferable to separate the two elements, since they measure different phenomena with different policy implications.

**2.32** In the three definitions above, we have set in bold the key elements. Where output continues to be measured by inputs – the conventional method – only the first two elements are involved. This applies to Defence, General Public Services, Economic services, Environmental Protection, Recreation and Culture, Housing and Community Amenities. For the remainder of public spending, around two thirds, there is an independent measure of output, and hence productivity. (In the case of Police, the output measure is experimental and not yet included in the National Accounts.)

**2.33** The third element, as already explained, has no significance in terms of its level, but changes in this variable can be combined with changes in the second series to arrive at an implied estimate of the change in productivity. If the volume of output directly measured has risen faster than the volume of deflated inputs, then an increase in productivity is implied. At the same time, the accuracy of the productivity figure depends on the accuracy of the three constituent elements. The productivity increase will be **understated** if in the terminal year:

- The direct output measure is too low;
- The measure of expenditure on inputs is too high; or
- The price index for inputs is too low.

The productivity increase will, on the other hand, be **overstated** if in the terminal year:

- The direct output measure is too high;
- The measure of expenditure on inputs is too low; or
- The price index for inputs is too high.

- 2.34** In the market sector of the economy, attention has focused on total factor productivity, taking account of all factor inputs into production. The total productivity gain is then that part of any output increase that cannot be attributed to the inputs into production. It has indeed been argued by D W Jorgenson and Z Griliches (1967) that, if real output and real factor input are fully and accurately accounted for, then the observed growth in productivity is negligible. Without taking a position on their empirical assertion, we fully accept the need for a comprehensive approach to input measurement, a point to which we return in Chapter 4.
- 2.35** Of particular relevance in this argument is the role of quality. Output may be increasing on account of improvements in the quality of inputs, such as better-trained workers, or more reliable equipment. These improvements in inputs need to be taken into account. But the same also applies to the quality of output. If quality improvements (deterioration) in the services delivered are not taken into account then the productivity is under-stated (over-stated).

### Inputs

- 2.36** The changes made to the output measurement methodology mean that we have tended to focus attention on the output side, but it is equally important to investigate the measures of inputs.
- 2.37** The input side is best considered in terms of the three disaggregated input categories given in the National Accounts figures: labour, procurement of goods and services, and capital consumption. In the case of Education, for example, the labour input consists of the wages and salaries paid to teachers, school secretaries, caretakers, and other employees, together with the costs of employing them, such as National Insurance and pension contributions. Goods and services would include expenditure on exercise books, pens, lighting, heating, supply teachers, transport services, and items such as data processing services. Capital consumption is the physical depreciation of the stock of fixed assets, where these would include, in the case of education, buildings, equipment, and computer hardware/software.
- 2.38** Labour is usually assumed to be the most important input for public services, and this is certainly the case for Prisons (58 per cent in 2003), Education (75 per cent), Police (73 per cent) and Fire (81 per cent). In the four other functions, labour is a smaller part of the total cost, reflecting changes in organisation noted above. In Personal Social Services, and the Administration of Social Security, the purchase of goods and services accounts for, respectively, 61 per cent and 65 per cent of current spending in 2003; in Courts the share of goods and services reached 64 per cent in 2003. In Health, labour input and the procurement of goods and services are not dissimilar in magnitude: 45 per cent and 52 per cent respectively in 2003. Capital consumption is 9 per cent in Prisons, 3 per cent in Education and in other areas 2.5 per cent or less.

## Data Sources

- 2.39** This section provides a brief summary of the existing process of data collection and analysis. (Further detail by service area is provided in Chapters 8 to 11.) Table 2.2 shows the sources of data for the existing output volume measures, used to compile total General Government Final Consumption as chained volume measures, as at the time of the publication of the 2004 National Accounts. Where output volumes are measured directly (parts of Public Order and Safety, Health, Education and Social Protection), the coverage of the indicators in terms of countries of the United Kingdom varies, as is shown in the table.
- 2.40** The table includes direct measures of output volume (shown in **Bold**) and deflated input measures, used in implied productivity calculations, where there is a separate direct output measure, or as measures of output volume (in this case shown in *italics*), where there is not. The measures for Police, although only experimental, are shown as direct measures.
- 2.41** The outsider might imagine that the data collection process would be a relatively simple matter for the government sector: that it would be straightforward to arrive at the National Accounts totals using information held in departmental accounts, simply adding in information from the Devolved Administrations, and converting to a calendar year basis. In fact, there is at present a long and complex chain of communication. It involves central government departments, the Treasury, local authority data supplied via the Office of the Deputy Prime Minister (ODPM), and the Devolved Administrations.
- 2.42** A key element is the classification of government expenditure. There is collaboration between ONS and the Treasury on economic categories which is communicated to departments, and this will be further improved when the Treasury supply data consistent with the new Classification of the Functions of Government (COFOG) breakdown in 2004/05. However, because of processing at each stage of the data supply chain, there are still issues in communicating to departments how their figures have been included in the National Accounts, and of the need to reconcile the classifications used by departments and those required by the National Accounts. This is taken up again in Chapter 5.
- 2.43** In the case of local government expenditure data, the data supplied for local authorities in different countries of the United Kingdom differ in their suitability for purpose. English, Welsh, Scottish and Northern Irish local authorities supply budget and outturn information using different economic categories and with different breakdowns of public services. Consolidation of these data from different sources is dependent on a number of assumptions.

- 2.44** The spending figures need to be deflated to arrive at volume measures of inputs. For those functions where output is measured directly, we show in Table 2.2 the deflators that were employed to arrive at the input volumes, and hence the implied productivity estimates for the article published in *Economic Trends* in 2003. For example, the deflated labour input into Health was obtained by dividing the spending on pay by the Pay Cost Index from the Department of Health. It should be noted that this is a different process from assembling staff numbers, with different staff weighted according to their cost. Ideally, the two approaches would yield the same estimate of inputs, but in practice this is not guaranteed.
- 2.45** Again, the first impression from Table 2.2 is of complexity. The table contains 45 non-blank cells. At the same time, many of the cells employ the same deflator. A small number of aggregate deflators were used repeatedly across different services: for example, the average earnings index for the public sector, and a composite price index of the products purchased by Other Central Government. Moreover, we need to be sure the indices capture in all cases (i) shifts between categories of employee, (ii) additional costs such as National Insurance contributions, (iii) earnings increases in excess of pay settlements, (iv) shifts of activity between functions, and (v) changes in the definition of the status of bodies such as NHS Trusts.
- 2.46** Due to the small expenditure on capital consumption for each function, specific deflators were unavailable. So a generic capital consumption implied deflator for central and local government was used.

### Resource Costs of Statistics

- 2.47** Looking back, it seems clear to us that the original move to introduce direct output measures increased the demands on ONS and on departmental resources to an extent not fully appreciated at the time. As brought out well in the *Allsopp Review of Statistics for Economic Policymaking*, good data require resources. The areas within the purview of this review are ones where there is a particular premium on good data. We very much welcome the indications already given by the National Statistician regarding the allocation of staff to this area of work.

Table 2.2 Sources of data for output and input volume measures

	Local government	Central government
01 General Public Services	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by local authorities via ODPM.</i>	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied via the Treasury.</i>
02 Defence	Not applicable	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by MoD via the Treasury.</i>
03 Public Order and Safety	<p><b>Police – output volume measures are volumes of police activity, crime-related incidents, patrols, traffic incidents etc.</b> Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by English Local Authorities via ODPM. Coverage is of UK.</p> <p><b>Prisons – not applicable</b></p> <p><b>Probation – not applicable</b></p> <p><b>Courts – output volume measures for magistrates courts are measured directly using caseloads of courts weighted average hours or average costs.</b> Data are supplied by Local Authorities via ODPM. Coverage is of England and Wales.</p>	<p><b>Police – output volume measures are volumes of police activity, crime-related incidents, patrols, traffic incidents etc.</b> Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by the Home Office via the Treasury.</p> <p><b>Prisons – output volume measures are measured directly using total numbers of prisoners.</b> Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by the Home Office. Coverage is of England, Wales and Scotland.</p> <p><b>Probation – output volume measures are measured directly using workload hours of various areas of competence.</b> Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by the Home Office. Coverage is of England.</p> <p><b>Courts – output volume measures for crown and county courts are measured directly using caseloads of courts weighted average hours or average costs.</b> Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by Dept of Constitutional Affairs. Coverage is of England, Scotland and Wales.</p>

/continued overleaf

Table 2.2 continued

	Local government	Central government
	Fire – output volume measures for the fire service are measured directly using number of fires attended and numbers of other services. Input volume measures are deflated UK expenditure figures for pay, net procurement and capital consumption. Data are supplied by ODPM. Coverage is UK, but N. Ireland not included in some indicators.	Fire – not applicable.
04 Economic Affairs	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</i> Data are supplied by Local Authorities via ODPM.	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</i> Data are supplied from DTI via the Treasury.
05 Environmental Protection	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</i> Data are supplied by Local Authorities via ODPM.	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</i> Data are supplied from DEFRA etc via the Treasury.
06 Housing and Community Amenities	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</i> Data are supplied by Local Authorities via ODPM.	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</i> Data are supplied by the Treasury.
07 Health	Output volume measures are measured directly using: a) treatment numbers and reference costs data from DH. Coverage is England and Wales. b) In addition, further indicator series are used for dental and ophthalmic services with UK coverage. Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.	Output volume measures are measured directly using: a) treatment numbers and reference costs data from DH. Coverage is England and Wales. b) In addition, further indicator series are used for dental and ophthalmic services with UK coverage. Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.
08 Recreation, Culture and Religion	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</i> Data are supplied by Local Authorities via ODPM.	<i>Output volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</i> Data are supplied from DCMS etc via the Treasury.
09 Education	Output volume measures are measured directly using pupil numbers in pre-primary, primary and secondary schools obtained from DfES. Also some indicators of numbers of health workers being trained. The coverage is whole UK. Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.	Output volume measures are measured directly using pupil numbers in pre-primary, primary and secondary schools obtained from DfES. Also some indicators of numbers of health workers being trained. The coverage is whole UK. Input volume measures are deflated UK expenditure figures for pay, net procurement and capital consumption.

Table 2.2 continued

	Local government	Central government	
10 Social Protection	<p><b>Personal Social Services: Output volume measures are measured directly using:</b></p> <p>a) numbers of adults in care and home help contact hours obtained from DH  b) numbers of children in care from DfES.</p> <p>The coverage is England only. Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption.</p> <p><b>Administration of Social Security: Output volume measures are measured directly for Administration of Social Security using numbers of housing benefit cases.</b></p> <p>Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by DWP. The coverage is England, Wales and Scotland.</p>	<p><b>Social Security: Output volume measures are measured directly for administration of social security using numbers of new benefit claims.</b> Input volume measures are deflated UK expenditure figures for pay, procurement of goods and services and capital consumption. Data are supplied by DWP. The coverage is England, Wales and Scotland.</p>	
DCMS	Department for Culture, Media and Sport	DEFRA	Department for Environment, Food and Rural Affairs
DfES	Department for Education and Skills	DH	Department of Health
DTI	Department of Trade and Industry	DWP	Department for Work and Pensions
MoD	Ministry of Defence	ODPM	Office of the Deputy Prime Minister

## Conclusions

### 2.48 In conclusion:

- a) Since 1998, ONS has moved progressively towards the replacement of the (output=input) approach by direct measures of the volume of government output. This is an important development. The direct estimates now cover some two-thirds of General Government Final Consumption, which is an impressive achievement.
- b) From the earlier experience in the 1950s and 1960s of the use of the direct measurement approach, we can see that the design of direct output measures needs considerable care and the investment of significant resources. Direct measures of output should be continuously monitored to ensure that they are capturing changes in quality. ONS has to steer a careful course with regard to changes in government policy, guaranteeing the independence of the approach to measuring government output while ensuring that its implementation reflects the realities and circumstances of public spending.
- c) Institutional change in the public sector poses problems for output measurement, and these may be more severe for the direct approach than for the (output=input) convention. Effects of technological change, both specific and general, may not be easily captured, an issue that affects private as well as public services.

- d) The implied measure of productivity for the government sector is obtained from three elements: spending, input price index and direct output measurement. The reliability of all three of these different elements needs to be assessed. While the introduction of direct output measures has received most attention, we attach considerable importance to the measurement and deflation of inputs. In the measurement of productivity, adjustment for quality is important for both inputs and outputs.
- e) The process by which the underlying data are assembled, requiring collaboration between ONS, the Treasury and other government departments, is a highly complex one that warrants closer investigation.
- f) If the government wishes to have reliable estimates of government output and productivity, then the statistical resources have to be supplied, both in ONS and in public service departments. And we welcome the indications already given by the National Statistician regarding the allocation of staff to this area of work.