# 1 Introduction

## Terms of Reference

1.1 The terms of reference of the review set out by the National Statistician were:

'To advance methodologies for the measurement of government output, productivity and associated price indices in the context of the National Accounts, recognising:

a) the full scope of government outputs;

b) differences in the nature and quality of these outputs over time;

c) the relationship between government outputs and social outcomes;

d) the need for comparability with measures of private sector services' output and costs;

e) the existing work of the Office for National Statistics (ONS); and

f) the appropriate measurement of inputs, including quality and the distinction between resource and capital, so that, together with the measurement of output, light can be thrown on developments in government productivity.'

These terms of reference have set the framework for the review.

1.2 Our brief is to examine the measurement of government output within the context of the National Accounts. The end result should be reflected in the National Accounts or associated statistics. While we are mindful of the performance indicators used in Public Service Agreement (PSA) targets and other management agreements, and refer to these at a number of junctures (see below in this chapter), these are not our concern in this review. We are seeking aggregate indicators that can form part of the National Accounts, not complete tool kits for the management and audit of government activities.

1.3 Our review is concerned with government output. We are conscious that government services are an important, but not the only, way in which our society achieves its objectives in such fields as health, education, and social services. A major contribution is made by unpaid services that are not recorded in the National Accounts. These services, provided by individuals to their families and by voluntary organisations, are an essential feature of our lives. It is not within our terms of reference to consider an extension of the National Accounts to the unpaid economy, but we have drawn attention to its role at a number of places.

**1.4** In this review, we are concerned with the measurement of the volume of government output relative to the volume of government inputs, and with the implied measure of government productivity. These measures are important because the functioning of public services is a matter of widespread public interest. They are important because they throw light on the quality of the nation's public finances. The measures are significant at a macroeconomic level because government output represents a sizeable part of Gross Domestic Product (GDP). In broad terms, a 1 per cent per year faster growth rate of government output raises the overall GDP growth rate by some 0.2 per cent.

**1.5** The aim of the review is to establish the future strategic direction for work in this area. Our Interim Report, and the work of the ONS staff associated with the review, has already led to significant changes in methods and practice. We welcome these changes and hope that this Final Report will contribute to the further development of national accounts in the United Kingdom. Considerable interest has been expressed by statistical agencies, and statisticians, outside the United Kingdom, and we hope that the Report will help carry forward the agenda set in the United Nations 1993 *System of National Accounts* (SNA) and the 1995 *European System of Accounts* (ESA).

## Actions and Action Plans

**1.6** Our starting point has been the existing work of ONS, and our conclusions build on the substantial progress that has been made by ONS since it began in 1998 to measure government output directly. The field that we are reviewing is a dynamic one, and the report needs to be read bearing in mind that advances are continually being made in ONS practice. Members of the review team have, for instance, been involved in the development of improved measures of health output introduced by ONS in the *Blue Book 2004.*

**1.7** Progress towards improved measures of government inputs and outputs depends very much on cooperation between government departments, the Treasury, and ONS. To facilitate this, action plans were agreed with key service delivery departments (Department of Health, Department for Education and Skills, Department of Work and Pensions, Home Office, Office of the Deputy Prime Minister) and with those departments responsible for expenditure data (the Treasury and ONS). The Scottish Executive, Welsh Assembly Government and Northern Ireland Civil Service also each have action plans at various stages of development. We should like to stress the essential role played by this cooperation and urge that departments continue to accord priority to the provision of data on a reliable and timely basis. We hope that our reports will underscore the importance of this activity. Ownership of the process by all those involved is essential if reliable and timely figures are to be produced, and if new methods are to be developed.

**1.8** This report is about methodology. We have reached a number of conclusions, and these are collected in Chapter 12. The conclusions, if adopted by ONS, may lead to changes in measured government output and the implied indicators of government productivity. Indeed, the changes already introduced with respect to the measurement of health services output have affected the estimated growth rate of general government final consumption. But this report does not contain any new figures with regard to government output or productivity. The publication of national accounts statistics is the responsibility of ONS, and any new figures will be published by ONS.

## Contents of Report

**1.9** The first part of the report (Chapters 1-7) deals with the subject in general. Chapter 2 describes the subject matter of the review, outlining the main steps in the development of the ONS approach to measuring government output. This approach has been much influenced by international guidelines, and these are considered in Chapter 3. Chapter 4 provides a methodological framework, setting out the principles we believe should form the basis for measuring government output, inputs and productivity. The implications for national accounts measurement in the UK context are the subject of Chapter 5, which deals with inputs, and Chapter 6, which deals with outputs. The process of implementation is the subject of Chapter 7. The second part of the report considers separately four major spending functions: Health, Education, Public Order and Safety, and Social Protection. These are four of the ten broad functions identified in the 'Classification of the functions of government', or COFOG. The ten functions are

1) General Public Services
2) Defence
3) Public Order and Safety
4) Economic Affairs
5) Environmental Protection
6) Housing and Community Amenities
7) Health
8) Recreation, Culture and Religion
9) Education
10) Social Protection.

The more detailed two digit classification is given in Table B2 in Appendix B.

**1.10** In the remaining part of this chapter, we provide an introduction to the role of national accounts. National accounts play an important role in economic analysis and in public debate about economic issues, but their functions and limits are not always appreciated.

## The Functions and Limits of National Accounts

**1.11** The national accounts consist of a coherent, consistent set of macroeconomic accounts and tables designed for a variety of analytical and policy purposes.' (SNA, 1993, paragraph 1.68). The national accounts of the United Kingdom are published annually as *United Kingdom National Accounts*, known as the *Blue Book*. Quarterly estimates of the main components of the National Accounts are also published. The accounts record in an integrated way economic activity, including aggregate measures of income, output and expenditure.

**1.12** Several purposes are served by measures of national income. The introduction of official national accounts in the United Kingdom during the Second World War may indeed be seen as emanating from two related, but different, streams of economic thought. The first, and the most pressing at that time in terms of policy needs, was the development of economic management at the macroeconomic level. It was no accident that Keynes was a strong advocate of national accounts and set in train their development by Meade and Stone. This first use sees national accounts as 'summary indicators of economic activities taking place within the economy as a whole' (SNA, 1993, paragraph 1.70). The second is the expression of the level of national welfare in terms of national income, stemming from the earlier, welfare economic tradition symbolised by Pigou, developed by Hicks, Samuelson and others, and implemented by Bowley and Clark. This second use sees 'measures of aggregate production or consumption as indicators of welfare' (SNA, 1993, paragraph 1.70). In what follows, we consider in turn these two influential strands, considering how changes in the method of estimating government output would affect the uses of national accounts.

### Macroeconomic management

**1.13** National accounts provide data on the major economic flows necessary for aggregate economic management. As it was put by Christopher Allsopp in his *Review of Statistics for Economic Policymaking*, 'the demands of monetary and fiscal policy establish a clear need for high-frequency, macroeconomic data' (paragraph 2.9). These data are used to estimate causal relationships at the macroeconomic level, and they furnish the input into macroeconomic models used to make forecasts and aid the formation of economic policy.

**1.14** In simplified terms, the central issue of macroeconomic management may be seen in terms of balancing aggregate supply with aggregate demand. Considerable attention is paid by the Monetary Policy Committee of the Bank of England (MPC) and by the Treasury to the 'output gap' between potential supply and demand in the economy. Our particular concern here is with how the measurement of government output affects this gap.

**1.15** In presenting the February 2004 *Inflation Report*, the Governor of the Bank of England, Mervyn King, said 'in assessing inflationary pressures, the official GDP data may not be the best guide to the balance between demand and supply in the economy as a whole. GDP includes an estimate of the output of the public sector. That is extremely difficult to measure in sectors such as health and education'. We fully share the view that there is no single number that will serve all purposes, and that different aggregates are relevant to answering different questions. As it was put by Sir John Hicks, 'there may be more than one *Money Value of the Social Income*, each corresponding to a different purpose of calculation' (1940, p 106).

**1.16** From the standpoint of macroeconomic policy, it may therefore be that the appropriate aggregate measures are those for the private economy, excluding government from both the supply and demand side of the equation. The main concern is then to make an appropriate subtraction from potential supply of that part of resources absorbed by the public sector. To continue the quotation from Mr King, 'what matters is not the value of the services provided by the public sector but the opportunity cost of the resources that would otherwise be employed in the private sector'. This 'resource cost' measure can be estimated by adding the public sector's procurement to a hypothetical quantity of goods and services that would have been produced by the public sector workforce if it had been employed in the private sector (as calculated by the Bank of England in the May 2004 *Inflation Report*).

**1.17** If government outputs are separable in this way from private supply and demand, then this allows considerable simplification. Any recommendations that we make concerning the direct measurement of government output should not affect the macroeconomic policy stance. At the same time, if our investigation suggests that changes need to be made to the construction of the nominal spending figures or of the associated input price indicators, or both, then this will have implications for macroeconomic management. If we were to discover that the measure of spending on inputs is overstated, or the price index is too low, then the government would be making less demand on resources than at present indicated by the National Accounts. The converse would be true if we were to discover that the measure of spending is too low, or the price index is too high. The estimate of spare capacity by the MPC would then be affected. One evident conclusion is that users of the National Accounts need to be aware of the different elements that, in principle (not necessarily in detail), enter the different macroeconomic variables.

**1.18** To a first approximation, a degree of separability between public output and the private economy may be a reasonable assumption in terms of short-run macro-management. Even, however, in the short term, the output of the government sector may complement private sector production.

**1.19** Taking a longer term view, there are very likely to be feedback effects from public to private output. If, for example, smaller class sizes are leading to better-educated school children, then there will eventually be a better-educated labour force, representing an increase in effective labour supply. Improved medical care may have a more immediate impact through reduced sickness absence. Moreover, it would be a mistake to see the public sector just as a consumer of resources, rather than as a key producer in the economy. Some of the output, such as health care or education, may substitute for market sector production of the same services. In other cases, public sector output complements private sector production. Overall, it seems clear that the outcomes from government services are an important element determining the well-functioning and growth prospects of the UK economy.

### Assessing overall economic performance and welfare

**1.20** The second major use of national accounts is as an indicator of the contribution of economic activity to increasing welfare. 'Certain key aggregates of the System, such as GDP and GDP per head of population, ... are widely used by analysts, politicians, the press, the business community and the public at large as summary, global indicators of economic activity and welfare' (SNA 1993, paragraph 1.68).

**1.21** In this respect, both public and private economic activities play their role. The contribution of private goods and services is perhaps more evident. Market prices 'represent the relative value to the individual of different goods and services, on the usual assumption that the price paid for each commodity is proportional to its marginal significance. Thus an increase in the domestic product at market prices, other things being equal, can be regarded as indicating *prima facie* an increase in the 'economic welfare' of the community.' (Maurice, 1968, pp 14). SNA 1993 makes the same point under the heading 'Changes in welfare' (1993, paragraph 1.76), the title of which reminds us of the large welfare economic literature of the 1940s and 1950s (for example, Samuelson, 1950) on the conditions under which we can identify an increase in real income.

**1.22** A substantial part of public output takes the form of services provided to individuals: for example, a GP consultation. There may be no market price, but the service adds to individual welfare in the same way as a consultation with a vet, which is paid for as a market service, adds to the pet owner's satisfaction. Other public sector output takes the form of a collective good, where benefits are consumed jointly, and non-excludably, by the whole population. In the case of a pure public good, there is again a marginal value to each consumer; and, as was explained by Samuelson in his pure theory of public expenditure (1954), we have to add these marginal valuations to arrive at the total value of the activity. (With public goods, we add demand curves vertically for a given quantity; whereas with private goods we add the demands at a given price.) It should be noted that we are concerned in both cases with the *marginal* benefit, not with the total benefit. In the case of private goods, we are taking the price as an indicator of the willingness of the consumer to pay for the marginal unit; we are not taking into account the consumer surplus associated with intra-marginal units. In the same way, with public goods, we are adding the marginal valuations, not the total consumer surplus.

**1.23** In considering the welfare interpretation, there are two possible misunderstandings. The first is that national income provides a total measure of welfare. This is not the case, as is clearly stated in SNA 1993, 'the consumption of goods and services, both individually and collectively, is one of the most important factors influencing the welfare of a community, but it is only one of several factors. There are also others, such as epidemics, natural disasters or wars, that can have major negative effects on welfare, while others, such as scientific discoveries, inventions or simply good weather, may have significant positive impacts. These factors obviously do not enter into the measurement of GDP, which refers only to the flow of goods and services produced within a given period.' (SNA 1993, paragraph 1.69). The calculation is therefore different from extended measures of 'net economic welfare' devised by James Tobin and others. National income is an indicator of the *contribution* to welfare of a specified set of economic activities.

**1.24** Secondly, welfare is only one of the considerations entering into policy judgements. Governments have multiple goals. They are concerned with distribution as well as with totals. They are concerned with rights and procedural justice, as well as with outcomes. Equity and fairness have value for governments, but are not captured in the National Accounts. For these reasons alone, there is no reason to expect government policy to be directed solely at maximising national output; nor, conversely, should the output measure be determined solely by the policy objectives.

### Relation with government performance targets

**1.25** In its work on the measurement of government output, ONS has made quite clear that there is a difference between National Accounts estimates of output, on the one hand, and performance measures for the management of public services on the other hand. Neuburger and Caplan (1998) recognised that performance measures and output indicators will use much of the same data, but spelled out the differences in the requirements. In the case of performance indicators, they argued, the need was for precise, transparent and simple measures, not subject to manipulation, but there was no requirement for stability over time, and they could be selective in their coverage. In contrast, the output measures for national accounts purposes need to be as comprehensive as possible and to be consistent over time. Moreover, while simplicity and transparency of compilation would be desirable, national accountants typically expect to have to make complex adjustments to raw data.

**1.26** The difference between national income measurement and performance measures is related to the distinction between outputs and outcomes. Examination of the Public Service Agreement (PSA) targets of UK government departments shows that a number are concerned with total outcomes. (Our quotations are all from 2004 PSAs.) In the case of Department of Health, for instance, PSA target 1 is to reduce substantially the mortality rates from the major killer diseases. This is a total outcome target. The same applies to PSA target 9 (reducing the under-18 conception rate) and PSA target 11 (reducing health inequalities). As we have already noted, national income measures the contribution of activities to outcomes, and these may be only part of the story. To give a specific example, the health status of the nation is affected by a range of factors – dietary and exercise habits, incidence of smoking and excessive alcohol consumption, as well as by the activities of the NHS. We would not want to conclude that the output of the NHS was worsening just because the other factors were showing an adverse trend.

**1.27** The construction of national accounts may make use of similar data sources, but the two activities are different. National accounts provide indicators of broad trends; to try to use them as microeconomic measures of public sector performance misunderstands their nature and limitations. National accounts are not a substitute for performance indicators, and there are risks in attempting to use them for such a purpose. At the same time, national accounts measures need to be coherent with the evidence from performance studies. The reasons for any differences should be understood, especially when the direction of change is different. Circumstances where national accounts measures would provide perverse incentives in respect of the good management of the public resources concerned need, at the least, close scrutiny.

### The limits of national accounts: conventions and margins of error

**1.28** National accounts have become so much part of the economic life of the country that their limits are often overlooked. First, we should stress that the definition of national income is a matter of agreed conventions. As described in the CSO *National Income Statistics: Sources and Methods*, 'the meaning to be attached to the aggregate of national income, product or expenditure is essentially arbitrary and limited. The comprehensiveness of the aggregates is limited by convenience and convention; the valuations placed on goods and services ... do not provide precise measures of changes either in welfare or in productivity.' (Maurice, 1968, p 15). This does not mean that they are worthless. The quotation continues to say that 'the significance of the broad trends shown by the aggregates is often unmistakable'. (Maurice, 1968, p 15).

**1.29** This means that the findings of national accounts have to be interpreted in the light of these conventions. Particular care is needed at a time of change, as is well illustrated by the measurement of government output. At the present, the United Kingdom has introduced direct output measurement for the government sector for a wide range of spending functions; other countries have introduced it less extensively or not at all. As a consequence, measures of real growth rates are not comparable.

**1.30** Secondly, national income is an *indicator*, not a precise addition over all the possible constituent parts. The origin of early academic estimates of national income (such as those of Bowley) in the tables of incomes assembled by the Inland Revenue may lead people to suppose that ONS is actually measuring the total of national income in the same way as individuals measure what has flowed into their bank accounts. Even at that time, with a narrow definition of personal income, such aggregates were estimates, extrapolating from a limited base of data.

**1.31** This brings us to a third point: that the National Accounts variables are *measured with error*. When ONS publishes a figure stating that the government output at 2001 prices was £203,674 million in 2003, this is an estimate surrounded by a considerable margin of error. This should be obvious, but the fact is often overlooked and needs to be stated explicitly. Moreover, national accounts are a system, but different components are measured with differing degrees of accuracy. In order to complete the system, elements have to be included which are less reliable than others. The reader may well ask whether the figure just cited for government output is as reliable as the private sector element of constant price GDP.

**1.32** The significance of errors of measurement depends on the purpose for which the accounts are to be used. In the present context, focus on the growth of constant price output means that an unknown but fixed bias in the estimate would not matter. If the input into the direct output measure were to be always understated by the same percentage, then we would not need to know the percentage, since we are using only the changes over time.

## Conclusions

**1.33** The main points to be taken away from this introductory chapter are:

a) This report is about methodology and does not contain any new figures with regard to government output or productivity; the aim of the review is to establish the future strategic direction for work in this area.

b) The construction of government output measures for national accounts purposes depends very much on cooperation from the relevant government departments, including the Devolved Administrations.

c) National accounts serve several purposes, and no one single number will serve all purposes; different aggregates are relevant to answering different questions.

d) National income is an indicator of the contribution to welfare of specified economic activities; it is not a measure of total economic welfare; aggregate welfare is not the only objective of government policy.

e) National accounts estimates for the government sector are related to, but different from, microeconomic measures of public sector performance, and have different purposes; to try to use them in the same way as public sector performance targets misunderstands their nature and limitations.

f) National accounts are built on a series of agreed conventions; they are subject to margins of error that vary across different parts of the national accounts; the significance of these errors depends on the purpose for which the figures are used.