# NEW DATA AND THE MEASUREMENT OF OUTPUT FOR THE SERVICE SECTOR IN THE UNITED KINGDOM

BY KEN MANSELL

*Ex-Central Statistical Office, United Kingdom*

Despite the growing importance of the service sector in the economies of most countries, the range of statistical information available falls well short of requirements. This paper outlines international developments in this area and describes what has been done in the United Kingdom to fill some of the gaps, essentially for the national accounts, including collection of monthly or quarterly turnover and price data, and also the derivation of quarterly estimates of current price GDP by industry. The paper also looks briefly at certain aspects relating to the use of the new data.

The growth in the importance of the services sector in economic activity in most industrialised countries has increased the range of statistical information now collected in this area. Increasing demand from businesses has also been an important factor in the development of these statistics. Nonetheless, the range of data available still falls well short of requirements in scope, frequency and quality. This is true of both annual and short-period information.

This paper begins by taking a look at recent developments, internationally, in the field of service sector statistics. It then considers how service sector statistics are evolving in the U.K. with particular reference to data required for national accounts, and including reflections on some initial work on the collection of price information. There follows some brief discussion of the various approaches to the measurement of the movement in constant price value added, together with a description of some recent work in the U.K. on deriving an equivalent quarterly current price series. Finally, a short section considers possible future developments in the U.K., particularly with respect to prices.

## INTERNATIONAL DEVELOPMENTS

The range of statistical information available on the services sector varies enormously. Some countries—for example U.S. and Canada—have compiled a monthly index of services, analogous to the index of production. In other countries, quarterly or annual data, at current prices or constant prices, are available in varying degrees of detail. In the U.K., a fairly comprehensive range of quarterly information is available about the services sector, covering turnover or other output indicators, and also capital expenditure, stocks and some data on prices, all largely for use in compiling the national accounts. In addition information is also available on employment and earnings.

In the mid–1980s the OECD published information from member countries on how value added at constant prices was measured on an annual basis. This is being updated, and a new publication is scheduled. The publication will show the measurement approach used in each of the OECD countries, for a detailed range of service industries, for example, double deflation, single deflation (output or input) or volume series, together with a description of the indices used. The publication represents a useful catalogue of current practices, and is of particular value where countries, embarking on new developments, may wish to draw on the experience of other countries.

At the same time OECD is also developing proposals for a short-period (probably monthly rather than quarterly) index of services. The main purpose of this is to supplement the information from the index of production to provide a fuller picture of movements in activity over the economy. In essence, the proposal is close to that of a monthly series for GDP, short only of agriculture and construction. There are also plans for the development of price information for the services sector.

These developments and others have highlighted the importance of establishing the precise reasons for collecting monthly data and how they might be used. As mentioned above, a prime requirement, either through monthly GDP or for improved timeliness and quality of quarterly estimates, would be to provide information for economic policy purposes. There are other potential needs, for example for the service industries themselves, with interest here embracing both current and constant price data and possibly commodity detail. OECD has been collecting information on the availability, in member countries, of short-term service indicators, and has sought views on countries' strategies for the collection of service sector statistics.

As an important contribution to the debate on short period service statistics, OECD commissioned a paper on how a monthly index of services might be compiled, looking in particular at the use of quantity or deflated value data, and at key related issues such as determining units of output, allowance for quality and the nature of price series. The need for a reasonably definitive set of guidelines on the measurement of service sector output is very important.

A range of key developments for service sector statistics has also been taking place within Eurostat. The proposals were initially mainly concerned with annual data in current prices deemed to be required to monitor the effects of the Single Market and also by traders. Some of the work has involved countries piloting surveys for particular industries, for example the audio-visual and hotels and travel agents' sectors. One key aim has been to establish a programme of work for the collection of a range of variables, covering economic activity and structure, in a phased cycle of statistical inquiries. More recent attention has been on short-term statistics, particularly distributive trades, while initial thoughts centred on using the OECD proposals for monthly data for GDP and other uses. A major part of Eurostat's work has involved the preparation of methodological manuals which seek to describe conceptual and definitional issues related to the collection of service sector statistics.

Other international developments have involved combined ECE/Eurostat/OECD initiatives. These have embraced the transition countries of Central Europe and the States of the former Soviet Union. A session at the 1994 IARIW Conference was devoted to estimation of economic growth in transition countries. Both Eurostat and OECD have continued to develop their assistance to the transition countries over a wide range of economic statistics. However, a solution to one of the main problems remains elusive, that is, how to deal with high rates of inflation in estimates at both current and constant price.

Another international forum for service sector statistics, where very useful progress has been made, is the Voorburg group. The group has looked at a number of methodological issues, for example the measurement of output in a range of

service industries including distributive trades, banking, insurance and business services and non-market services. It has also considered model surveys for the collection of data in certain areas, complementing and augmenting the work undertaken by Eurostat. The group has also addressed issues of classification, particularly the central product classification, and international trade in services. Amongst recent developments have been consideration of the availability of employment statistics within services, and links between national statistical requirements and commercial accounting practices. A report on the work of the group is considered at the annual OECD meetings on service sector statistics.

The introduction of the new system of national accounts (SNA) will impact on the services sector in a number of key areas, particularly the estimation of imputed charges for financial intermediation and the treatment of insurance services. Much research into these areas has already been carried out. Any further work needs to be closely coordinated. One other SNA change, of importance for the services sector, is the improvement to the distinction between market and non-market activities, which determines the institutional sector classification.

In summary, therefore, countries and international organisations are moving increasingly to expand the range and frequency of service sector statistics. In doing this, it is important, not least because of the burden on respondents, that needs, including quality of data, are clearly established at the outset. Further, it is vital that work in international fora continues to be strongly coordinated to make best use of resources, and to avoid overlap. The need for definitive guidelines on concepts and definitions, on which much work has been done, is very important. It might be added that enhanced guidelines on statistical and operational aspects, including practical issues of data collection and estimation, would also be extremely beneficial.

DEVELOPMENTS IN THE U.K.

This section looks at developments in service sector statistics in the U.K. in the past few years. A particular feature of these statistics is that collection is predominantly for use within the national accounts—for economic policy purposes—rather than to meet external needs. Annual and quarterly data have for long been collected on capital expenditure and stockbuilding; turnover information has been collected annually. Recently there have been two major areas of advance for service sector statistics, first in relation to quarterly estimates of GDP, at constant prices, and secondly to annual input-output tables, at current prices. There has also been an improvement in the range of service sector price data collected.

In respect of the first development, it is worth just mentioning briefly how quarterly GDP figures are derived in the U.K. Estimates are compiled in three largely independent ways—based on output, expenditure and income data. However, given the relative accuracy of the three components, the quarterly *movement* in GDP is based almost entirely on the output measure. The theoretically correct approach to deriving movements in output-based GDP is by way of double deflation. This, however, requires an extensive amount of detailed and accurate value and price data on outputs and inputs. In practice, indicator series, in as great a

detail as possible, are used which are deemed to proxy the movement in net output. The series are combined using the level of net output in the base year. The indicators relate to gross output (volume or deflated value), or input (employment or materials or some combination).

Where employment is used, for other than the public sector, productivity adjustments are made. Such adjustments are inevitably somewhat arbitrary. However making no adjustment is tantamount to accepting the far less credible assumption of no productivity change. The adjustments used are based on estimates derived for those areas of the services sector where employment is *not* used for measuring output. Further, the industries where adjustments are made are split into three groups—of high, medium and low productivity—based, in large part, on the likely extent of technological input. For each of these groups a maximum level of adjustment is assumed. It is worth mentioning that productivity estimates—derived as the ratio of output to employment—can be studied to provide a rough check on the plausibility of the output series.

A major improvement to the compilation of output GDP in recent years has been to replace less reliable indicators (for example those based on productivity-adjusted employment) by deflated turnover. This has involved the establishment of a new set of quarterly inquiries collecting turnover data from a range of industries covering wholesaling, catering and activities within transport, professional, business, personal and miscellaneous services. The inquiries are spread across 15 ISIC 2-digit industry groups. In establishing these inquiries, there were useful initial discussions with businesses, essentially about data collection, but also indirectly to provide some idea of possible external needs. Together, these inquiries cover around 25 percent of GDP (or just over 40 percent of services alone). With retailing, which has long been covered, monthly, and a few other miscellaneous sources, quarterly turnover data are now available for around 30 percent of GDP (about one-half of services). In respect of market services, the coverage is around 60 percent. Most of the quarterly turnover information is or will be published.

Deflation of the turnover data from the new inquiries has been undertaken from a variety of sources, including the use of some specific service industry prices where collection has also recently begun. These new price inquiries have covered road haulage, contract cleaning, waste disposal, bus and coach hire, and private sector vocational education. The approach adopted has been based on the well-established producer price indices covering manufacturing industry. Where specific price indices are not available for the services sector use is made of information based on consumer or producer prices, or on wages and salaries or other input costs, with estimated productivity adjustments, as appropriate.

It may be of interest to report briefly some of the features of the work on collecting price information, mentioned above. One important step was to define a framework in which each industry can be sensibly divided. In the case of private education colleges, it was considered that the type of subject offered was appropriate, so the sample was broken into such categories as business and administration, language, domestic and beauty, and creative art and design. For road haulage, international, long distance domestic and short-haul distributions were considered appropriate. For the bus and coach hire inquiry a classification by type of hire (for example short distance, long distance) was used.

A second aspect was to define the items for which prices are to be collected. The determining characteristics are very different in each industry. In the cases of the service sector industries already covered, the following seem to be crucial:

education—type and length of course;

road haulage—load and length of journey;

contract cleaning—sector of customer, geographical location, size and
   complexity of building;

waste disposal—toxicity and volume of waste and location of dump;

bus and coach hire—type of hire, type of vehicle and length of journey.

It is obviously important to obtain as much insight into each industry as possible before starting to collect prices, through visits to trade associations and contacts with contributors. The experience of this initial exercise indicated that, with proper specification of questions, and the cooperation of contributors, there is no reason why prices for some services cannot be collected just as accurately as for manufactured products.

The second main development for service statistics has been in the context of the compilation of annual current price input-output tables. Such tables are now being used to provide the detailed reconciliation of the expenditure, output and income components of GDP. The tables include, within the 123 industry groups analysed, about 30 service sector industries. Two of the key variables now derived for these industries are gross output and net output. Much of the information used to produce these estimates comes from CSO annual inquiries where, while gross output has generally been collected, information on inputs has been obtained only infrequently. The collection of information on total purchases may be put on an annual basis, with a breakdown of purchases probably being obtained every two years. This will improve considerably the annual estimates of value added within the service sector industries.


PROJECTION OF NET OUTPUT

Mention was made earlier of the use of "indicators" to compile quarterly estimates of output-based GDP. This section looks briefly at the range of indicators which might be used and mentions their main advantages and disadvantages.

The indicator approach is an approximation to theoretically correct double deflation. The latter is commonly identified as deflation of current price outputs and inputs. However, it is also used to refer to the projection, of outputs and inputs, at base year prices by current period quantity data. To do either requires a substantial amount of reliable data on values, prices and quantities of both inputs and outputs. The collection of such data on a quarterly basis presents a formidable burden and is seldom attempted. The need for reliable data is all the more strong when value added is the small difference between large figures of output and input.

In the absence of the theoretically correct way of compiling estimates of net output, a range of indicator series may be used to proxy movements in net output. The use of such proxies is well discussed in the literature and will be covered only briefly here.

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(i) *Gross output* In practice, the most common indicator used. Either a quantity series or a value series deflated by an output price index (or some other appropriate price series). Of main benefit where net/gross ratios are stable or close to unity.

(ii) *Input (materials)* May be preferable to gross output, for example, for capital goods or construction industries where outputs are complex or non-standard. Again quantity or deflated value may be used.

(iii) *Employment* Numbers or, better, hours worked. Ideally, some allowance should be made for productivity.

(iv) *Employment and material inputs* This is a combination of (ii) and (iii). Material inputs may be regarded as a proxy for hours worked, if the latter are not available. Weighting may be based on the likely relative size of the components or possibly their accuracy.

(v) *Employment and capital consumption* Capital consumption may be seen as a rough proxy for productivity. Weighting possibly in proportion to wages and salaries, and profits.

(vi) *Deflation of current price value added* Deflation usually based on gross output prices.

In using these indicators to compile movements in economic activity two issues might be mentioned. First, in practice, much information is likely to be available at current prices, but limited data only on prices and quantities. Given this, it is generally better to base estimates on deflated values (in as much detail as possible) than on projection of quantity data. There are two reasons for this. First, price relatives change less than quantity relatives. In theory, quantities can span a range from zero to infinity; prices and also values move in a much narrower range. Secondly, allowance for quality change is more manageable through price series than quantity series. The second issue is that, ideally, quarterly estimates based on indicators should be calibrated, say annually, to estimates based on double deflation. In the U.K., for *overall* GDP this is less important since the alternative measures based on expenditure and income are available as a check on the estimated output measure. Further, the input–output tables provide a reconciliation of the current price data. On an annual basis, even before this reconciliation, the congruence of the U.K.'s three measures of constant price GDP is generally good. Where such checks are not available, and certainly for individual industry series, calibration is essential to avoid possible distortion in the long-run series resulting from the use of indicators rather than double deflation.

## CURRENT PRICE GDP, BY INDUSTRY

Discussion above of output estimates for the services in support of quarterly GDP in the U.K. has so far related solely to constant price series. A recent development has seen the derivation of quarterly estimates of *current* price gross output and value added, by industry, for the whole economy. The estimates are consistent with the already available constant price data, in the sense that either they use current price information which is deflated to provide the constant price estimates, or they reflate the constant price figures by appropriate price estimates.

Such an analysis has always been possible for production, where constant price estimates are mostly deflated values. For the services industries, however, retailing apart, there was comparatively little information available on values or prices. It has been the developments on the collection of turnover and price information, mentioned earlier, which have made possible the establishment of meaningful quarterly estimates of current price gross output and value added for the services sector.

In respect of *services* industries the approach is to use quarterly value data wherever possible as a basis for the gross and net output estimates. Where such data are not available, the estimates underlying the constant price series are inflated by appropriate price indices (or some estimated measure of inflation). Within services, direct estimates (turnover or income) account for over 80 percent of total services (market and non-market). The quarterly estimates are 'benchmarked' to the annual current price estimates compiled as part of the input–output tables.

The economy-wide information compiled will enable the establishment of supply/demand balances, at current prices (as well as the existing constant prices). These will provide for the component series used in the expenditure measure of GDP, particularly private consumption and fixed investment, an additional source of data to that from surveys. It will also provide provisional estimates of gross and net output for the latest year in advance of the compilation of input–output tables. For example, while an input–output table has been prepared for 1993, the new methodology has produced current price estimates of gross and net output for 1994. For all industries, but for the services sector in particular, the work yields a fully integrated set of value, volume and (implied) price estimates, for a detailed range of activities. The quality of the figures will be increasingly enhanced, in particular as more data are collected on service sector prices.


## CURRENT AND FUTURE DEVELOPMENTS

A major initiative will be the use of turnover and price data from monthly inquiries. From July 1995 around one-half of the quarterly turnover inquiries were converted to a monthly frequency. The monthly inquiries cover much of wholesaling and the motor trades; hotels and catering; computer services; and a number of business and miscellaneous service industries. On prices, collection of a wider range of information for the service sector has also started. This will build on the initial work covering five service sector industries described earlier. Subject to the availability of resources, collection will be progressively extended, with the bulk of the sector covered by end 1998. Frequency of collection for each industry will in general be aligned with that of the turnover inquiry. An eventual aim is the establishment of a comprehensive price index for services. Various criteria have been adopted in determining priority, such as size of industry, its conceptual complexity and whether other countries have been able to collect data successfully. Data collection is now in progress for accountancy, consulting engineers, sewerage, couriers, and security services. Research is underway for legal services, sea and coastal transport, rail freight, the hire of construction equipment, and advertising.

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These developments serve two main purposes. First and foremost is that the new data on both turnover and prices, which will complement what is already available for the monthly index of production, will improve the quality of the early quarterly GDP estimates, produced $3\frac{1}{2}$ weeks after the end of the quarter. Then, a second obvious development will be derivation of a monthly index of output for the whole of the service sector. Given that the new monthly turnover inquiries do not, initially at least, cover the whole of the services sector, it will be necessary to establish a monthly output profile for those areas not being surveyed. The extension of all this work to derive a monthly GDP (by including agriculture and construction—together nearly 10 percent of value added in the U.K.) will also be addressed.

The new monthly data for the services sector will also be of benefit to traders and the business world generally. Consultations will continue to be held with industry in framing collection arrangements and coverage, particularly in respect of price data where it will be essential to establish units of output for which price information will be sought. It is hoped to draw on other countries' experience in this work, too.

There are two other important developments in prospect. First is the derivation of annual *constant* price input–output tables. These will provide the framework for establishing the reconciliation of the constant price estimates, as is done now for the current price figures. This will be a major task, though. For services it will require an increased range and detail of value and price data to enable satisfactory volume figures to be derived. In particular, information will be needed on the commodity composition of outputs and inputs. The second development relates to trade-in services. Here, the new price data will improve deflation within both output and expenditure GDP. In addition, plans are in hand for collection of information on trade in services in the light of the revised IMF Balance of Payments manual.

SUMMARY

As in most other countries, development of service sector statistics in the U.K. has been a protracted process. However, major changes in recent years, or planned for the future, see the availability for the U.K. of an additional and extensive range of monthly or quarterly turnover and price data. Work is in hand to see how best to meet, satisfactorily, needs for economic policy and also non-Government and international requirements. Elsewhere, other countries will also be enhancing the amount of information available for the services sector, through developments such as those in Eurostat and to meet other specific needs, for example for national accounts purposes.