OUTPUT AT CONSTANT PRICES IN THE SERVICE SECTOR

Note by Derrick Stirling, United Kingdom
for the informal meeting in Paris, 1-5 October 1990

1 The purpose of this brief note is to update the description of the measurement of service sector output at constant prices in the United Kingdom given by David Flaxen in his note to the meeting of this group in Wiesbaden in October 1988.

The output measure of GDP

2 The United Kingdom is unusual in producing regularly a quarterly measure of gross domestic product at constant factor cost calculated from output indicators (GDP(O). Each industry in the United Kingdom Standard Industrial Classification revised 1980 (SIC(80)) is given a base year weight calculated from the industry's contribution to gross value added in the base year. Increases in the volume of gross output between the base and current years for each industry are weighted together to give an estimate of GDP at constant prices in index form for the current year.

3 This method clearly relies on the assumption that changes in real gross output are representative of changes in real value added - either the pattern of inputs and outputs in each industry does not change very much, or changes in one industry are compensated by off-setting changes in another. The index is considered to be a reliable and quickly produced measure of short-term changes, but cannot be expected to give reliable estimates of long-term changes. (The index is re-weighted regularly, but the existing index is chained on to this new base rather than recalculated to incorporate estimates of the effect of changing patterns of inputs).

4 The technical features of the index do not concern us in this note these are already described in published documents.[1] What I wish to raise are the particular features of the treatment of services in the index.

Services in GDP(O)

[1] United Kingdom National Accounts : Sources and Methods. 3rd edition. Central Statistical Office, Her Majesty's Stationery Office, 1985.

Services in GDP(O)

5 GDP(O) is concerned with the output, including intermediate output, of different industries, not with final expenditure. Services therefore feature much more than in say consumers' expenditure. For example, distribution is assessed separately. The 1985 weights for GDP(O) are as follows:-

Division	Industry	Weight (%)
0	Agriculture	2
1-5	Production and Construction	40
6	Distribution etc	13
7	Transport and Communications	7
8	Banking, business services etc	16
9	Other services	22
Other	Ownership of dwellings	6
	less financial services adjustment	(6)

Thus more than half of the measure is concerned with services

6 A great number of different indicators are used for services and a list of these is published in - "Industry statistics".[2] An example is given in Annex 1. The aim in the past has been to find a volume indicator if one exists. This, approach has been successful for groups such as transport and communication. For business services and many other services, however, no suitable volume indicator is available. In these cases, deflation of some suitable value indicator, usually turnover, has been used where one is available.

7 In both cases some units of output need to be defined: either to be totalled directly in the volume measure or to be priced and used as a deflator in constructing the volume measure from the value series.

8 When all else has failed inputs have been used to proxy outputs, for example through employment series. This is the conventional treatment of government services. Outside government this is the least satisfactory of measures, since it takes no account of productivity changes. An arbitrary annual increase in productivity is assumed in some areas of activity : though better than an implicit assumption of no increase in productivity, this approach remains very arbitrary.

9 Although the GDP(O) index is a time series of quarterly estimates the measurement of about a quarter of total

[2] Industry Statistics : Occasional Paper No 20 (2nd edition). Series and weights used in the output-based estimate of gross domestic product at constant factor cost (1980 = 100) Central Statistical Office, 1987.

economic activity is constrained to annual benchmark estimates which are thought to be of higher quality than the basic quarterly series. These benchmarks become available approximately between six to 30 months after the reference period, but typically after 18 months. A small part of the aggregate index is measured only by annual estimates. The following table summarizes the use of different types of indicator:

Indicator Type	Weight in GDP(O) (parts per thousand)		Percentage in service sector
	Overall	Services	
By periodicity			
Annual Benchmarks.	268	190	33
Unbenchmarked Quarter or Monthly Series.	732	388	67
By composition			
Interpolated Annual Indicators.	25	8	1
Consumers Expenditure Series.	85	85	15
Employment Indicators.	214	114	37
Turnover Indicators.	417	119	21
VAT Turnover Indicators.	47	47	8
Volume Indicators.	211	104	18
Total private sector Indicators.	713	398	69
Total public sector Indicators.	287	180	31
Total All Indicators.	1000	578	100

10 In the remainder of the note we mention the main areas of development in United Kingdom since 1985.

New surveys

11 Some areas of the service sector have been badly covered by existing statistical sources and, in the United Kingdom, new annual surveys were introduced during the period 1985 to 1987 to improve coverage, albeit on a very small scale. These new benchmark surveys cover professional and scientific services, including legal services. In addition, existing surveys into business, personal and miscellaneous services have been modestly expanded. Information is collected on turnover and capital expenditure. A list of the services covered is at Annex 2.

12 There exists already a huge amount of administrative information on turnover - that available from the Value Added Tax system. Firms supply monthly, quarterly or, in the case of a few small firms, annually information on turnover to the VAT authorities and this is classified, in the United Kingdom, by "VAT Trade Code" (VTC), which is a useful industrial indicator even though based on a superseded SIC. (The next revision of the SIC which will be based on the revised NACE, however, is likely to be closer to the existing VAT trade code than is the present 1980 version. It is also expected that the VAT Trade Code will be brought in line with the revised SIC at that time.)

13 This VAT information is already used for 5 per cent of the quarterly estimates of GDP(O) (rather less for the annual estimates; see Annex 3). If the quality of the VAT-based turnover could be improved it would be useful immediately for another 5 per cent. The data difficulties relate to the fact that the VAT information is collected for taxation purposes and there is no reason from the tax authorities' point of view for effort to be put into obtaining accurate statistical data for the many cases where the tax position is not in doubt. Some cleaning of the data is undertaken by the CSO, using the tax : turnover ratio for the VTC.

14 In addition to the data quality problem there are a number of estimation problems. First the firms supplying quarterly data are, for administrative purposes to even out the flow of documents to be processed, divided into three groups known as quarterly "staggers". Each "stagger" reports quarterly data ending on a different month of the calendar quarter. Combining the data to produce estimates appropriate to calendar quarters, therefore, involves a degree of approximation.

15 Secondly, for each reporting group (ie monthly or quarterly stagger) and given a reporting period, only the accumulated value of turnover is reported to the CSO in each of eight successive months. In order to gross up at each stage, knowledge would usually be required about the set of responding firms (eg the proportion of total turnover in some previous period). The only extra information available to the CSO, however, is the number of responding firms. Instead we use the historical pattern of response in terms of proportion of total turnover to derive grossed up estimates. Of course, this can be affected by many factors such as tax administration action (to chase up slow tax returns), seasonally or the economic cycle.

16 The other major difficulty, of course, is in coping with changes to the administrative system. There can be changes in collection arrangements, tax rates, liability to tax (coverage) and so on.

The latest developments

The latest developments

17 In 1989, an official review was held "to examine the present inter-departmental arrangements for the production of Government economic statistics and to make recommendations for achieving cost-effective improvements where necessary" in the light of concern about the quality of those statistics. The report[3] of that review, made 36 recommendations, a number of which concerned service sector statistics.

18 In response to the report, some organisational changes were made in the collection and processing of data, including a greater degree of centralisation. In addition, a programme of improvement was launched.

19 For services this programme includes in the first phase the introduction in 1991 of a quarterly inquiry, collecting turnover, and covering those areas for which currently employment data are used as a proxy for output. A list of the activities which it is proposed to cover the new inquiry is given in Annex 2. Around 20 thousand legal units are expected to be sampled. The exact distribution has yet to be determined but is expected to be broadly proportional to that used for the annual inquiry.

20 At the same time, there has been a change in emphasis more generally away from the use of small quarterly inquiries benchmarked by large annual inquiries towards larger quarterly inquiries. This trend will also affect GDP(O) although it is already recognised as the best estimate of short-term movements in the economy. The quality of quarterly indicators used for GDP(O) which are constrained to annual benchmarks is being reviewed and proposals for improvement will be made where appropriate.

21 The second phase of the exercise will look at the use of data from VAT sources and review the balance of advantage in continuing to place reliance on this administrative source.

The choice of deflators

22 To make use of these surveys in constructing a constant price measure of GDP, the turnover information neees to be deflated. Here there are two fundamentally different approaches. The first, and most direct, approach is to define the unit of output which is produced by the act of service. If prices are available for the different units of output which are produced by an activity, they can be weighted together by their associated turnover figures to produce an overall price deflator. This approach is being

[3] Government Economic Statistics: A scrutiny report Her Majesty's Stationery Office (ISBN 0 11 430035 6)

used for the advertising industry where average advertising media rates are available from the Advertising Association on a monthly basis for TV commercials and on an annual basis for newspaper and other media. The different media rates are weighted together by the corresponding annual expenditure figures.

23 A similar approach is being developed for part of the output of legal services by weighting together prices for part of solicitor's output such as probate work and conveyancing. This work is, as of yet, incomplete and it is clear that it is unlikely to be possible to extend the units of output approach to all legal services.

24 For several other activities, buses, road haulage, educational services and cleaning services, consideration is being given to mounting new enquiries to collect ouput price data.

25 For other activities a relevant component of the retail price index[4] or the consumers expenditure calculation may be considered an adequate output price measure. This approach, however, is rarely ideal. Hotels and restaurants etc, for example, form two and a half per cent of GDP(O) but a fair proportion of output here is for the business sector and the existing price indicators are not geared to business expenditure. This may not be critical in the very short term, but is likely to be more important in the longer term.

26 For upwards of a half of the new service sector proxies, the above direct approach is difficult or impossible to apply. This is because the units of ouput cannot be defined in any statistically satisfactory fashion. Typical examples are research and development services and management consultants. Here an alternative and somewhat less satisfactory approach has to be used.

27 The approach rests on the general assumption that the turnover of an activity represents income for a trader which is allocated primarily to labour and material inputs expenditure on inputs - fuel, materials, rental etc - represents quite a high proportion of total income for many service activities. The second allocation of income is to employee earnings or in, some cases, to self employment income. Income from employment, or self employment income, generally accounts for the bulk of the difference between outputs and inputs or gross margin of an activity. From VAT sources, data are available annually on both inputs and outputs of each service sector activity. It is thus straightforward to construct the appropriate weighting of the input price and earnings index series.

[4] A short guide to the Retail Prices Index, Department of Employment, Her Majesty's Stationery Office, 1987.

28 Earnings data are available from the New Earnings Survey of the Department of Employment. Input prices may be reasonably proxied from RPI and/or producer price (output) sources. This assumes that the effects of any variation in the mix of input commodities are of secondary importance to the overall deflator. The work is, however, still at a development stage.

Final observation

29 Leaving aside the thorny technical questions involved in considering banking and insurance, for business services - advertising, accounting, computing etc - and legal services, units of output should be clearly definable and, to some extent, measurable either in terms of volume or of price. If so, progress might be made. It would be interesting to hear what other countries have managed to achieve in these service industries.

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Example of detail of calculation of GDP(O) in the service sector

Annex I

Standard Industrial Classification Codes	Description	Annual Series used	Weight per 1,000	Quarterly Indicator (if different)
Group 834	House and estate agents	Numbers of particulars concerning transfer of property or land delivered to Inland Revenue	2.5	
Group 835	Legal services	Conveyancing:		
		Number of building society mortgage advances	2.1	
		Number of bank and local authority mortgage advances, including allowance for sales of dwellings by local authorities and new towns(1)	0.3	
		Magistrates courts proceedings	1.2	)
		Proceedings in first instance courts	0.4	)
		Crown court disposals	0.5	) Jointly
		Grants applied for by solicitors concerning non-contentious proceedings	0.6	) interpolated
		Employees in employment(2) with output per head adjustment(3)	0.8	)
			5.8	
Group 836	Accountants, auditors and tax exports	VAT turnover of accountants, deflated by index of average salaries of full-time male non-manual service sector employees	5.5	VAT turnover, deflated by Index of Average Earnings
Group 837	Professional and technical services, not elsewhere specified	Employees in employment(2) with output per head adjustment(3)	9.6	
Group 838	Advertising	Employees in employment(2) with output per head adjustment(3)	1.5	
All 8394	Computer services	Turnover derived from Computer Services Inquiry, deflated to 1980 prices	4.5	Employees in employment(2) allowing for observed past trend in output per head

(1) Local authority and new town data relate to England and Wales only.
(2) Great Britain. Part-time female employees counted as one-half.
(3) See introduction

ANNEX 2

New and expanded service sector enquiries in the UK

TABLE 1

Business Services

Industry	Annual Inquiry Existing Sample	Annual Inquiry 1985-7 Sample	Proposed Quarterly Inquiry
Advertising and Market Research.	)	870	x
Industrial and Commercial Valuers,	)		x
Auctioneers and Transfer Agents.	)	740	x
Chartered or Company Secretaries.	)	40	x[5]
Computer Services.	) 2890	1340	
Contract Cleaning.	)	810	x
Management Consultants.	)	910	x
Staff Bureau and Employment Agencies.	)	710	x
Duplicating, Calculating and Type-writing Agencies.	)	190	x
Other Business Services.	)	1320	x
Sub Total	2890	6930	
Accountancy Services.	0	1000	x
Legal Services	0	1300	x
Research and Development Services.	0	120	x
Surveying (Various Kinds).	0	590	x
Architects (Private Practice).	0	470	x
Draughtsmen (Private Practice).	0	340	x
Consultant Engineers.	0	1010	x
Other Professional and Scientific Services.	0	500	x
Research & analytical chemists, assayers, geologists, metallurgists etc	0	200	x
Plant hire (without operatives)	0	0	x
Leasing of Office machinery and furniture & industrial machinery	0	0	x
Sub Total	0	5530	

[5] Quarterly inquiry already exists

ANNEX 2

TABLE 2

Recreational and Cultural Services

Industry	Annual Inquiry Existing Sample	Annual Inquiry 1985-7 Sample	Proposed Quarterly Inquiry
Cinemas. Theatres, Radio and TV Services, Film and Recording Studios. Performers and Performing Groups. Radio and TV Relay Services.	470	560	
Dance Halls and Dancing Schools. Sport. Other Recreations. Betting and Gaming.	630	630	
Artists, Sculptors, Designers, Authors, Journalists (Freelance), Composers.	0	500	x
Sub Total	1100	1690	

TABLE 3

Personal and Miscellaneous Services

Industry	Annual Inquiry Existing Sample	Annual Inquiry 1985-7 Sample	Proposed Quarterly Inquiry
Laundrettes. Laundries. Hire of Towels, Linen, Industrical Clothing. Dry Cleaning, Job Dyeing, Carpet Beating. Photography and Photographic Processing.	450	450	
Men's Hairdressing.			x
Women's Hairdressing.			x
Repair of Boots and Shoes.	0	330	
Funeral Direction, Cemetries and Crematoria.			x
Other Services	1220	1220	
Sub Total	1670	2000	

ANNEX 2

TABLE 4

Other

Industry	Annual Inquiry Existing Sample	Annual Inquiry 1985-7 Sample	Proposed Quarterly Inquiry
Distribution			
- builders merchants	0	0	x
Transport and Communication			
- omnibus amd tramway services	0	0	x
- roadhaulage	0	0	x
- postal services and telecommunications			x[6]
Private Health			
- opticians	0	800	
- private hospitals etc	0	450	
Veterinary Services	0	0	x
Private Education			
- other private education establishments.	0	350	

[6] Extends coverage beyond British Telecom and the Post Office who provide data already.

Use of Value Added Tax figures in GDO(O)

(i) Currently used

Industry	Weight in GDP(O) (parts per thousand)
Taxis and private hire cars	1
Shipping agents and forwarding agents. Travel agents. Driving instruction. Other miscellaneous transport services and storage.	6
Car parks, toll roads and toll bridges.	1
Accountancy services.	5
Theatres, music halls and recording studies. Performers and performing groups. Radio and TV relay services.	10
Hotels and other residential establishments. Holiday camps, camping, caravan sites.	8*
Restaurants, cafes etc (on premise consumption only), canteens. Fish and Chip Shops etc., (on/off premise consumption only.	10*
Public houses.	5*
Clubs (excluding sports and gaming clubs).	3*
Launderettes. Laundries. Hire of towels, linen and industrial clothing. Dry cleaning, job dyeing, carpet beating etc.	3
Total	52

* VAT figures used for quarterly extrapolations only.

ANNEX 3

(ii) Possible future use

Industry	Weight in GDP(O) (parts per thousand)
Builders' Merchants.	1
Leasing industrial and office machinery.	1
Advertising and Market research.	1
Valuers, Auctioneers. Management consultants. Staff Bureaux. Other Business services.	up to 9
Contract cleaning.	2?
Educational services.	11
Medical services. Veterinary services.	5
Legal services.	6
R and D services.	5
Surveying. Architects. Draughtsmen. Consultant engineers. Research chemists. Other professional and scientific.	up to 10
Artists.	2?
Professional and scientific bodies. Welfare and charities. Trade Associations and Unions.	up to 15
Other Services.	?