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**THE DEVELOPMENT OF A CORPORATE SERVICES PRICE INDEX FOR
COMPUTER AND RELATED ACTIVITIES IN THE UK**

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DEVELOPMENT OF A CORPORATE SERVICES PRICE INDEX FOR COMPUTER AND RELATED ACTIVITIES IN THE UK

Summary

S1. The structure of the computer services industry as defined by the UK Standard Industrial Classification system (SIC(92)) is rather crude and does not relate well to the way in which the main UK trade association, the Computer Services and Software Association (CSSA), views the organisation of the industry.

S2. In practice the current price data collection under the UK CSPI system is a hybrid between SIC(92) and the CSSA's view of the industry structure, biased rather more towards SIC(92) as defined, since SIC(92) is the classification basis of the sampling frame (the ONS business register) for the CSPI and other inquiries, for instance, monthly turnover.

S3. The rather skeletal SIC(92) structure can be re-populated with the more meaningful activities as defined by the CSSA. This still leaves a number of problems, not least how to treat outsourcing and where should consultancy be allocated.

S4. A range of price collection mechanisms has been used in the current UK CSPI survey of computer services. All have advantages and disadvantages, either practical or theoretical. Model prices have been partially successful, but difficulties have arisen where services change or cease. Alternatives to model prices are being researched.

1. The UK Context

1. As a result of the growing importance of the service sector on the UK economy the Office for National Statistics (ONS) has initiated a program to extend its coverage of data collection in the services sector. One area where very little data had been collected until fairly recently is in the prices of corporate services provided, initially within the UK, but in the longer term to be extended to include the rest of the world.

2. Corporate Services Price Indices (CSPIs) show the price movements of the services provided by UK companies to UK business and government customers. These range from road haulage to computer consultancy and account for around 23% of GDP. There are currently 12 published CSPIs, which appear in the ONS publication '*MM22: Producer Price Indices*'.

3. Eventually, the indices will play a role similar to that of the Producer Price Indices as a key indicator of inflation, and to this end, launch of a press release, including the published headline CSPI , is planned for the year 2001/02. The headline index is set to have a high profile.

4. CSPIs also have a role as deflators of service sector output and 4 indices are currently used in calculating GDP(O). This use of CSPIs is planned to increase greatly. The ONS is currently investigating the possibility of producing an Index of Services (IoS), similar to the Index of Production. Good quality CSPIs will be needed for the deflation process to produce a constant price IoS.

5. The survey has been statutory since 1995, when Ministers approved plans for expansion of service sector statistics. Data are collected quarterly and currently include just over 6,000 individual price quotations, around 3,500 of which are provided directly by 850 contributors, most of whom supply data via an automatic Telephone Data Entry system.

2. The UK Industry Structure

Existing Structure

6. The development of price indices within the service sector is being carried out within the framework of the UK Standard Industrial Classification (1992), known as SIC(92). This classification is compatible with both the international ISIC and European Union NACE rev 3 classifications. Because the collection of statistics in the service sector has not taken place on the same scale as in the production sector, the classification of the service sector is not as well defined. This has led to a number of problems in several sectors, one of them being computer and related activities.

7. Computer and related activities are classified under division 72 of section K of the SIC(92), which comprises Real Estate, Renting and Business Activities.

8. Division 72 consists of the following 3 digit level breakdown. There is no further breakdown below this level.

72.1 - Hardware consultancy

This class includes:
- consultancy on type and configuration of hardware and associated software application: analysing the users' needs and problems and presenting the best solution

This class excludes:
- *hardware consultancy carried out by computer producing or selling units cf. 30.02, 51.64, 52.48/2*

72.2 - Software consultancy and supply

This class includes:
- analysis, design and programming of systems ready to use:
- analysis of the user's needs and problems, consultancy on the best solution
- development, production, supply and documentation of order-make software based on orders from specific users
- development, production, supply and documentation of ready-made (non-customised) software
- writing of programs following directives of user

This class excludes:
- *reproduction of non-customised software cf. 22.33*
- *software consultancy related to hardware consultancy cf. 72.10*

72.3 - Data processing

This class includes:
- processing of data employing either the customer's or a propriety program:
- complete processing of data
- data entry services
- management and operation on a continuing basis of data processing facilities belonging to others

72.4 - Data base activities

This class includes data base related activities:
- data base development: assembly of data from one or more sources
- data storage: preparation of a computer record for such information in a predetermined format
- data base availability: provision of data in a certain order or sequence, by on-line data retrieval or accessibility (computerised management) to everybody or to limited users, sorted on demand

72.5 - Maintenance and repair of office, accounting and computing machinery

72.6 - Other computer related activities

9. The main problem with the SIC classification is that it does not adequately reflect the division of activities or definitions used within the computer industry. As a result contributors to the CSPI have difficulty in complying with the request to supply pricing information in the format required.

10. ONS collects monthly turnover data in the service sector via the Monthly Turnover Inquiry (MTI). The MTI currently produces separate series for:

(a) 72.2 – software consultancy and supply and
(b) 72.5 – maintenance of office, accounting and computer machinery.

   The remaining 4 series, 72.1, 72.3, 72.4 and 72.6 are surveyed as a grouped series. The same series/groups of series are used in the construction of GDP(O), which requires CSPI indices at this level to deflate the MTI current price data to the current base year, 1995 prices.

Current CSPI Classifications

11. The services for which contributors are currently asked to submit prices are listed below, together with the 3 digit SIC heading into which they feed. However, a proportion of the activity could also be attributed to other headings within the classification. These are listed in brackets.

Software products: 72.2 (72.4)
- shrink wrapped software
- software applications
- software tools
- software maintenance

Processing services   72.3 (72.4)
On-line processing

Support services (software and hardware) 72.5 (72.1, 72.2, 72.4)
Disaster recovery

Outsourcing contracts   72.6 (72.5)
Education and training

Changes Under Consideration

12. As these groupings do not easily fit into the SIC 3 digit level breakdown, further work needs to be done if credible and useful indices are to be produced at this level. As a starting point it would make sense to use the activities and definitions recognised by the computer industry and used by the Computer Services and Software Association (CSSA) in the UK, in their own survey of activity, for the collection of price information. These could then be allocated to the closest appropriate SIC sub-group. This is not an easy exercise as some definitions could be fitted into more than one category, others do not appear to fit at all. There are unfortunately, a large number of queries to be resolved if the SIC definitions are to be adhered to.

CSSA Defined Activities

13. The SIC 3 digit level indices would then consist of the following CSSA defined activities:

(i)   72.1 Hardware consultancy

a) Systems integration – integration of different computer software products and hardware to form a complete system. Undertaken by a prime contractor with the requisite skills and financial responsibility.

b) Consultancy – provision of expert advice on the use of information technology specific to clients' needs.

(ii)   72.2 Software consultancy and supply

a) Software products:
-   Application enabling software – provision of software packages which assist in the development of applications; e.g. computer-aided systems engineering database management.
-   Application software packages – providing pre-written business solutions
-   System software - provision, modification and installation of operating systems software.
-   OEM software – provision of software to another IT supplier for incorporation into a systems integration, turnkey or FM contract.
-   Custom software development – a design and programming service to provide tailored software solutions.
b) Consultancy – provision of expert advice on the use of information technology specific to clients needs.
c) Software maintenance – maintenance of systems or applications software.

(iii)   72.3 Data processing

a) Processing services - providing computer-processing services on which companies may rent time or have their work carried out on a regular or irregular basis. These services may allow for terminal links.

(iv)   72.4 Database activities

a) Information services – providing information enquiry, database inquiry, information retrieval and delivery services. Also, the increasing use of internet-related services.

(v)   72.5 Maintenance and repair of office, accounting and computing machinery

a) Hardware maintenance – the upkeep of IT hardware (both vendor supplied and third party), including repair, diagnosis and preventive maintenance both on-site and off-site.
b) Facilities management – managing and operating an organisation's computers and/or networks by an external source at agreed service levels.

(vi)   72.6 Other computer related activities

a) Value-added network/network services - managed voice and data networks set up to provide extensive national coverage to which organisations may locally attach their computers and terminals. They also provide a range of additional services as part of the network systems.
b) Disaster recovery services - providing back-up hardware and software for use in emergencies.
c) Electronic business - provision of products and services to facilitate commercial transactions over networks; and web site development.
d) Contingency planning - planning action to be taken in the event of a disaster or emergency which threatens to disrupt or destroy the continuity of a normal business or service provided by the organisation.
e) Support services - (hardware, software and network) services outside of maintenance to support the preparation, usage and exploitation of IT – such as cabling, equipment relocation, inventory management, equipment sourcing and distribution.

14. Consultancy appears under both 72.1 and 72.2 although the CSSA classify both hardware and software consultancy as one category. The Australian Bureau of Statistics (ABS) also do the same as their research shows that over 80 per cent of business in consultancy services include both hardware and software consultancy. If the UK is to follow the same line then there is a need to decide whether it should go into 72.1 or 72.2 (probably 72.2). The SIC would need to be amended accordingly in due course.

15. Facilities management – managing and operating an organisation's computers and/or networks by an external source at agreed service levels, has been allocated under 72.5 but this may not be the correct classification.

16. The CSSA collect information on IT outsourcing and business process outsourcing as separate categories. Neither of these activities are listed under the present SIC definition and are not separate services as such, merely a number of services bundled together.

(a) As an outsourcing contract would probably cover several of the SIC 3 digit level headings, it would only be possible to use information collected on this basis in a top level index unless the contributor was able to give an approximate split of the individual activities included. This could place an unacceptable burden on the contributor, as each activity included in the contract would need to be monitored separately.

b) The ABS treats outsourcing contracts as a complex form of service bundling rather than as a separate service category. A contract is either split into the separate activities or the whole contract is allocated to the main activity covered.

c) The UK could follow the ABS line and allocate the whole of the contract to the largest (by value) activity covered e.g. software maintenance. However, due to the size of these large outsourcing contracts they would probably dominate the price for that particular service.

d) A solution to this problem would be to include outsourcing as a separate category in the next revision of the SIC but this is a long-term solution (2002 at least, but more likely to be 2007) and does not address the immediate problem.

e) Companies involved in outsourcing contracts tend to be large as they have the financial and staff resources to take on such work.

f) To resolve the problem in the short term perhaps some of the smaller companies who would not undertake outsourcing contracts could be included in the sample to provide price quotes for the individual services.

g) The problem of outsourcing, however, needs to be addressed as it is a growing market within the industry and cannot be ignored for too long. A further problem arises over monitoring such contracts, as they are usually of 5 to 10 years duration.

17. Value-added network/network services, systems integration and electronic business have been allocated to 72.6 although 72.2 may be a more suitable classification.

18. There are a number of categories covered by the CSSA survey, which do not necessarily fit into SIC(92) Div 72 and have therefore been omitted. These categories are:

- Education and training - provision of education, training and the development of training materials related to information systems and services (80.42/1 ?).
- Recruitment services - providing specialist recruitment service for the provision of computing and related staff (74.5 ?)
- Contract staff - provision of computer and related staff for short-term hire, to work at client's premises and elsewhere (74.5 ?)

- Telecoms services - installation and support of customers' voice and data telecommunications networks (64.2 ?)
- Operating profit – i.e. (pre-tax) profits before net interest received/payable and exceptional items. This has no relevance for CSPI.
- Value-added reselling - a VAR adding value to computer hardware and/or software before reselling to an end user. The value added can be applications software for a vertical or cross-industry market as well as professional services, software support and application upgrades.(72.6 ? manufacturing ? wholesaling ?)

19. Currently, the 2 digit level series for computer and related activities is used to deflate the turnover data for this sector in the calculation of GDP(O). However, the ultimate aim is to produce 3 digit level deflators which match with the Monthly Turnover Inquiry (MTI) survey outputs.

20.   Of the 3 computer and related activities series, which are required by GDP(O), the current sample provides:

a) 88 quotes for 72.2, by far the highest number,
b) 32 quotes for 72.5 and
c) 22 quotes for the combined series (72.1, 72.3, 72.4 and 72.6) per quarter.
   This imbalance in the spread of quotes among the SIC headings needs to be addressed. Selecting companies classified to SIC headings, which are not adequately represented, would partially redress the balance.

3. Pricing Methodologies

21. Prices are currently collected using a number of methods depending on the industry sector. These include model pricing, contract prices, fee determinants and actual transactions. A brief description of each method together with the pros and cons of their uses are given below.

A. Model pricing

22. Using this approach the contributor is asked to specify and provide a price for a typical contract. The contract may be either notional or an actual assignment recently undertaken. The contributor will then be asked to re-price the contract at quarterly intervals using prices, which would be charged at that point in time.

Advantages

23. This could be quite an easy method for smaller contributors to use. Any price changes could be easily identified and monitored.

Disadvantages

24. Due to the rapid changes within computer services, it may be difficult to develop price specifications. Any model pricing models would need to be regularly reviewed and updated to take into account recent developments within the industry. Also, it would be time consuming and costly for many contributors to provide accurate information on this basis, especially if inadequate records are held. The contributor would also need to ensure that any quality changes were accurately reflected.

B. Contract prices

25. This approach involves monitoring the periodic payments of an actual continuing contract. This method of collecting prices is used in the CSPI where clearly defined contracts can be identified e.g. disaster recovery work, some software maintenance and software and hardware support services.

Advantages

26. The main advantages of this method are that the information should be readily available from company records and therefore supplying quarterly updates should not impose too much of a burden on the contributor. Also, it is a fairly simple system to operate. Any quality changes are recorded when contracts are renewed.

Disadvantages

27. It is difficult to distinguish between volume changes and pure price changes. Also, monitoring price changes when a contract passes to a different company becomes difficult.

C. Fee determinants

28. This method involves measuring the determinants of price: salary, mark-up and productivity. This option is the least favoured of all the options currently available and its use as a method of collecting service price data has not been fully explored. However, it is the method used in Canada to compile indices for 'professional computer services' even though they are unable to identify quality changes from productivity.

Advantages

29. Information on occupational per diem rates and total fee income should be readily available from company records and should not place too much of a burden on contributors to supply such information.

Disadvantages

30. As there is no clearly defined employment structure in the computer services industry it is difficult to measure changes in the skills mix of staff. The Canadians have overcome this problem by using a fixed group of staff grades to ensure consistency. Further information would be required if quality and productivity changes are to be assessed.

D. Actual transactions

31. For this method the price per transaction is monitored for specific services.

Advantages

32. For some sectors, such as data processing, the actual price per transaction is readily available from company records and can be easily supplied. Comparing movements in transaction charges over time can identify increased productivity and quality adjustments.

Disadvantages

33. This method can only be used for a certain type of services and is therefore limited in its application.

34. Although there are different methods available for the collection of pricing information on computer and related services the situation is not entirely satisfactory and it is therefore necessary to review the procedures and substitute more appropriate methods which, hopefully, will provide better quality data.

4. Specific Pricing Difficulties

35. Business carried out in the computer services industry tend to be based on contracts, either fixed fee or per diem (a daily rate charged for each programmer/consultant carrying out the work). Initially, the most appropriate pricing methods to use seemed to be actual transaction pricing or model pricing.

36. Actual transaction pricing is used for 72.4, information retrieval and also for 72.3, data processing activities. This method is simple to operate and seems to work well as the contributor has the information readily available. Any quality or productivity changes are reflected in the data supplied. Model pricing could be used in these sectors depending on the circumstances but so far has not been tried.

37. For 72.2, software consultancy and supply, and 72.5, maintenance of office, accountancy and computer machinery, data are collected using the model pricing method. In the short term this method has provided satisfactory results but problems arise when the particular service is no longer available or has been replaced by an enhanced service.

38. In theory the model pricing method should reflect changes arising from current market forces, inflation, improved quality of the service provided and productivity. However, the accuracy of this information, if at all supplied, depends very much on the integrity of the contributor. As the specified model is not an actual ongoing contract the onus is on the contributor to devote time to estimating what the price would be if it were a real job, taking all the above factors into account.

39. The information required is often not readily available from the company records and therefore, this method places a large burden on the contributor. A further problem is that the ONS has no control over the accuracy or quality of the data provided. This method has been tried in other service sectors and has been proved to be impractical. Alternative price collection methods are currently being investigated.

40. Although it may be desirable and cost effective to collect all price changes in one inquiry, experience has shown that this may not always be possible. Investigations into the feasibility of collecting productivity changes in a separate inquiry, possibly on an annual basis, are being carried out.

41. For the combined series of 72.1, 72.3, 72.4 and 72.6, prices for processing services (72.3) and information services data (72.4) are collected on either the actual unit transaction price of an existing contract or on a model unit transaction, if that is more convenient for the contributor. This method gives continuity of data collection for the duration of the contract. The data are of fairly good quality as the information is usually readily available from company records.

42. However, problems arise when the contract ends. If the contract is not renewed the data source is lost and needs to be replaced. If the contract is renewed but at a higher price, it has to be established whether the new price reflects genuine increases in the market place or a higher level of service than supplied under the old contract.

43. For the remainder of the group, the same method as 72.2 and 72.5 is used i.e. model pricing. Again, this method poses a number of problems as previously outlined.

44. If prices on outsourcing contracts are to be collected, for inclusion in the top-level index for computer and related activities, the current method of collection seems appropriate. This involves regular monitoring of the revenue received for the contract, currently on an annual basis, for the duration of the contract.

45. As this type of business is not listed as a separate activity in the SIC there are no companies classified to outsourcing on the Inter Departmental Business Register (IDBR). However, selecting companies to supply prices on outsourcing contracts is relatively easy as most of the larger companies undertake these contracts and should be able to supply the required information from their records.

46. The main problem with using a mix of price collection methods within one sector is that the current computer system does not allow for more than one method to be used. This problem is to be resolved when the new computer system is developed.

5. Experimental Indices/Charts

47. An overall computer services index has been compiled from the existing data collected in the UK. The attached tables and charts compare this index with a composite index constructed from the elements of corporate services prices that are regularly published by ONS. Where growth was relatively strong in the composite index in the latter half of 1996 and 1997, the reverse was true in computing where the index remained flat. More recently the growth in computer services has resumed and is outstripping the growth in the composite.

6. Discussion Topics

48. Possible topics for discussion and problems to be solved.

a) How should outsourcing contracts be treated? As this is an expanding area of the sector, should they form a separate category? If not, the alternatives would be to classify the whole contract to the largest area of business (by value?) as defined by the contributor, or divide up the contract into the separate areas of business, again the contributor would have to give estimates.

b) How can quality changes and productivity be monitored effectively? Is it even possible? As this sector is constantly changing with the development of new technology it is difficult to identify a service that stays static for long enough to collect a sensible run of pricing information.

7. Conclusions

48. In summary the UK's experience is that:

❑ The current version of the SIC does not accurately reflect the breakdown of services within the computer and related services sector. This is a problem which can only be resolved in the long term i.e. the next major revamp of the SIC will not take place until 2007.
❑ As technology is changing rapidly, the model pricing method of price collection has not proved to be totally satisfactory. Specifications need to be updated on a regular basis in order to reflect the services provided.
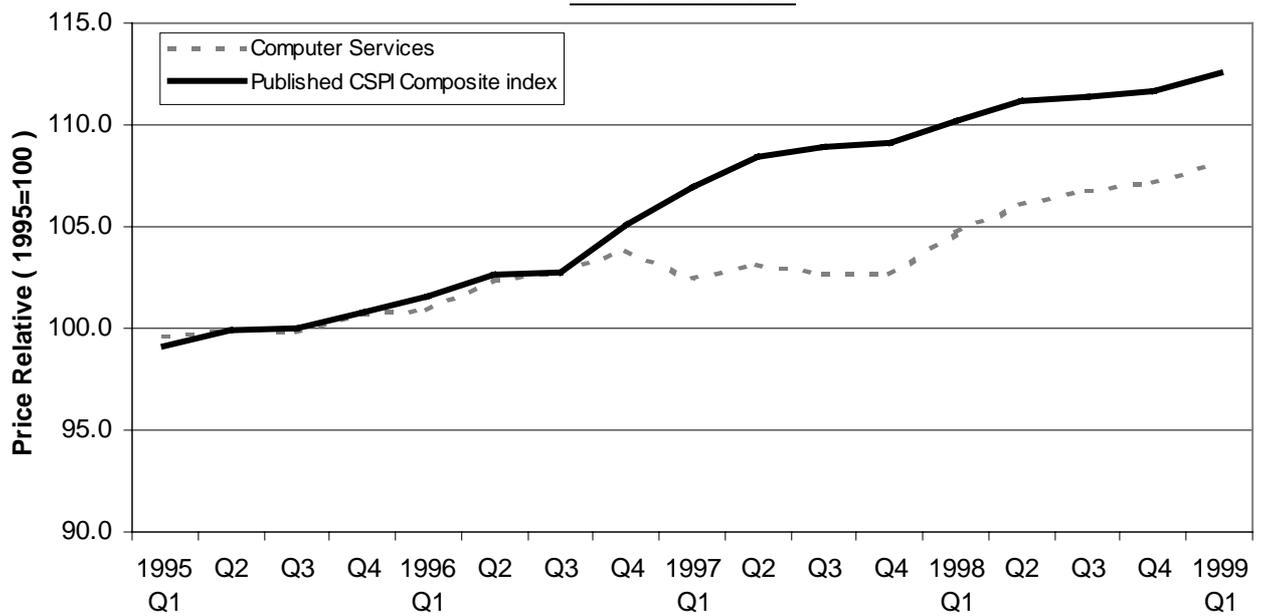
49. The likely way forward for the UK is to develop acceptable solutions to the above problems. In the short term, services recognised by the industry can be more closely aligned with the SIC(92) until such time as the SIC can be amended to reflect the industry. Pricing methods need to be reviewed in consultation with the industry. If possible, an alternative method to model pricing needs to be developed and tested.

COMPARISON OF QUARTERLY INDEX OF COMPUTER SERVICES AND PUBLISHED CSPI COMPOSITE INDEX		
	Computer Services	Published CSPI composite index
1995 Q1	99.6	99.2
Q2	99.9	99.9
Q3	99.8	100.0
Q4	100.7	100.8
1996 Q1	100.9	101.6
Q2	102.4	102.6
Q3	102.7	102.7
Q4	103.8	105.1
1997 Q1	102.5	107.0
Q2	103.1	108.4
Q3	102.6	108.9
Q4	102.6	109.2
1998 Q1	104.7	110.2
Q2	106.1	111.1
Q3	106.8	111.4
Q4	107.2	111.7
1999 Q1	108.1	112.5

PERCENTAGE CHANGE LATEST QUARTER ON PREVIOUS QUARTER		
	Computer Services	Published CSPI composite index
1996 Q1	0.2	0.8
Q2	1.5	1.0
Q3	0.3	0.1
Q4	1.1	2.3
1997 Q1	-1.3	1.8
Q2	0.6	1.4
Q3	-0.5	0.4
Q4	0.0	0.3
1998 Q1	2.0	1.0
Q2	1.3	0.8
Q3	0.7	0.2
Q4	0.4	0.3
1999 Q1	0.8	0.8

PERCENTAGE CHANGE LATEST QUARTER ON CORRESPONDING QUARTER PREVIOUS YEAR		
	Computer Services	Published CSPI composite index
1996 Q1	1.3	2.5
Q2	2.5	2.8
Q3	2.9	2.7
Q4	3.1	4.2
1997 Q1	1.6	5.3
Q2	0.7	5.7
Q3	-0.1	6.0
Q4	-1.2	3.9
1998 Q1	2.1	3.1
Q2	2.9	2.5
Q3	4.1	2.3
Q4	4.5	2.3
1999 Q1	3.2	2.1

COMPARISON OF QUARTERLY INDEX FOR COMPUTER SERVICES AND PUBLISHED CSPI COMPOSITE INDEX

PERCENTAGE CHANGE LATEST QUARTER, CORRESPONDING QUARTER OF THE PREVIOUS YEAR