Producer Price Index for Computer Services

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Australian Bureau of Statistics

1 Introduction

The Australian Bureau of Statistics (ABS) is undertaking a long-term development program to progressively extend the scope of the producer price indexes into the services sector of the economy.

On 18 April 2000, the ABS launched a new quarterly publication, **Producer Price Indexes for Selected Service Industries, Australia (Cat. no. 6423.0)**. This publication presented quarterly price index numbers for most industries within the transport and storage, and property and business services sectors from September quarter 1998 to March quarter 2000. More recently, the ABS has combined all producer price indexes into a single publication: **Producer Price Indexes, Australia (Cat. no. 6427.0);** of which a complete section is devoted to service industries.

The Computer Services price index has been compiled on a quarterly basis since the September quarter 1998.

2 Nature of the Industry in Australia

2.1 Industry definition and relation to CPC

The service industries price index development work is taking place within the classification framework provided by the Australian and New Zealand Standard Industrial Classification (ANZSIC). Under ANZSIC, businesses involved in the computer services industry are classified to Group 783 (Computer Services). This group comprises four classes: 7831 Data Processing Services; 7832 Information Storage and Retrieval Services; 7833 Computer Maintenance Services; and 7834 Computer Consultancy Services.

The main activities for the above listed classes are as follows:

Data Processing Services:

- data entry service;
- data processing service;
- tabulating service.

Information Storage and Retrieval Services:

- information storage and retrieval service (other than library).

Computer Maintenance Services:

- computer maintenance service;
- computer peripheral repair service;
- computer repair service.

Computer Consultancy Services:

- computer consultancy service;
- computer programming service;

The equivalent industries under the CPC are listed below:

8314 Computer consultancy services, with sub industries:
83141 Hardware consultancy services
83142 Software consultancy services
83149 Other computer consultancy services

8315 Computer facilities management services, with sub industries:
83150 Computer facilities management services

8316 Systems maintenance services
83160 Systems maintenance services

859 Other support services
85960 Data processing services

8713 Computer hardware servicing, repair and maintenance
87130 Computer hardware servicing, repair and maintenance

2.2 Size and type of businesses

Information below relates to ABS service industry survey results for Computing Services 1998-99, which was released in ABS catalogue 8669.0 on 28 August 2000. The Australian Computer Services industry is a growth industry in terms of business numbers and income generated. There has been a 52% increase in the number of businesses in this industry from June 1996 to June 1999. Industry income generated over this period has increased by 30%. The Computer Services industry was dominated by small businesses during 1998-99, with 98% of businesses having fewer than 20 persons employed. These small businesses accounted for 48% of industry employment and 28% of industry income. Large businesses account for less than 1% in terms of business numbers, but generate 59% of industry income and account for 39% of industry employment. In terms of expenditure items, labour costs was the highest contributor representing 42% of total expenses.

The provision of computer services accounted for 87% of industry income, of which the main components were the provision of bundled computer services (32%) , non-bundled customised software services and solutions (25%) and computer processing services (11%). A high proportion (81%) of the income generated from the provision of non-bundled customised software services and solutions related to business applications and systems. Customised software services and solutions cover the following activities: digital/multi-media applications; communications; business applications and systems and internet applications. This activity was carried out by 46% of all businesses in the industry. A high proportion of industry income was generated by businesses operating in two Australian states, these being, New South Wales (49%) and Victoria (29%). (ABS catalogue no. 8669.0)

Based on 96/97 IO weights, Computer Services contribute a weight of 13% to the Property and Business Services Division (which accounts for 7% of GDP).

The Computer Services price index is structured as follows:

ANZSIC description	% contribution to Computer Services price index
Computer Services	
Data Processing Services (7831)	7.5
Information Storage & Retrieval Services (7832)	2.7
Computer Maintenance Services (7833)	3.5
Computer Consultancy Services (7834)	86.3

2.3 Industry control and trends

There is no government control within the computer services industry. Prices transacted are generally determined through negotiation between service provider and client. In most instances, contract pricing forms the basis of pricing arrangements.

The Federal Government of Australia established the Office for Government Online (OGO). This organisation's main focus is: to provide strategic advice to the government on its information economy and information technology priorities; to raise awareness within the Australian business and general community; and facilitate investment in the information industries. The purpose of OGO was to enable government agencies to maximise their performance through identification, development and promotion of key information management strategies, technologies, tools and infrastructure.

OGO and the consultancy industry have noticed an emerging trend towards the bundling of hardware and software consultancy services into single outsourced contracts. Computer consultancy services include all activities that are associated with PCs, mainframes and networks and their associated systems. Specific activities include software system development; software and hardware upgrades; hardware installation; maintenance (within warranty terms); on-line help; hardware

system architecture design; network installation; systems re-engineering; workflow design; systems integration; and all software/hardware interface implementation.

3 Current pricing methodology employed

The pricing basis utilised for computer services is a combination of model pricing, competitive contract pricing and labour charge out rates. All pricing basis are nominated by the respective businesses and specifications are indicative of the significant revenue-earner activities for that business through a personal interview. As most contracts are on-going (2-3 years), changes to terms and conditions may arise requiring quality adjustment such as splicing in the new contract basis or estimating a movement to compensate for the changes. Below are some actual examples of businesses pricing together with a brief description of how well the ABS pricing methods have worked for different activities.

3.1 Data Processing Services

This is quite straight forward with model pricing, 'price per record or entry' and 'number of keystrokes' for a particular job being the pricing basis. As long as the variables/job requirements are defined, the pricing cycle is generally smooth.

Example 1. BUREAU SERVICES MODEL: Business record creation, competitive contract price for:

Creation of 10,000 business records incorporating name, address and telephone numbers

Example 2. Please provide price for the following services:

Seniors card processing, with names, addresses, birthday : Rate per 1000 keystrokes

3.2 Information Storage & Retrieval Services

The pricing of physical storage & retrieval services are simpler compared to the electronic equivalents largely because of the very fast pace of technological improvements impacting on the cost of on-line services. Information technology and clients' needs are constantly evolving making consistent pricing over time problematic.

Physical

Examples of pricing are: Storage of computer tape (price per calendar month) for one tape and 2000 tapes (i.e. large a small quantities covered); and

Price per case per week for storage of a small cartridge case for medium sized clients in temperature-controlled secured warehouse.

Electronic

Since the inception of the Information Storage & Retrieval Services index in 1997, we have lost a few respondents due to difficulty in pricing a defined service each quarter. Most of the pricing basis are coded services provided readily by the businesses where we track a particular client's contract. In addition, to help boost our sample, the ABS has included our own contract to the Reuters on-line business news databases as a means of measuring price changes.

Example 1. Price for access to mainframe system for retrieval (MIPS per unit) for Client A.

Example 2. Price of access to XXX system - per transaction.

3.3 Computer Maintenance Services

Competitive contract prices and mainly hourly labour charge out rates for computer maintenance services of defined equipment e.g. PC, Lap Top, Printer or Network are priced. The call-out rates are incremental with the first hour generally being lower-priced. The main distinction of prices relates to whether the maintenance work is carried out in-house at the business or off-site at the customer's premises. This output price proxy pricing basis is not ideal, but is used in the absence of other more workable pricing arrangements.

Examples of pricing are:

Competitive contract price for a call out fee of a repair technician to repair on customer premises ($/hour)

Laser printer maintenance at workshop per hour price

3.4 Computer Consultancy Services

The pricing of consultancy services are tiered by degree of complexity of the information technology solutions to be put in place as varying requirements for skilled resources, supporting hardware or software and time taken all have to be costed. Most consultancies are not predominantly either software or hardware consultancies but a combined total IT package targeted at different-sized businesses and addressing particular client's needs depending on which industry the business is in. The very fast pace of technological improvements and the constant

evolving of business needs mean changes to terms and conditions of existing contracts necessitate vigilant monitoring to account for data quality issues.

Examples of specifications used in the ABS Computer Consultancy Services index are:

(i) Price for computer consultancy work falling into Tier 3 (as defined by the business), price per job;

(ii) A six month Federal government contract requiring a project manager and two systems analyst programmers (price per contract).

(iii) The ABS also price hypothetical projects (a form of model-pricing) nominated for a certain time frame with the supporting input of different staff levels. Here, the hourly charge-out rates for each staff level is used for index construction. For example:

Competitive contract price for a six month Strategic Information Technology project requiring:

A). Executive top Level for the project
B). Principal consultant for the project
C). Manager for the project
D). Associates for the project
E). Business analyst for the project

4. Limitations/concerns about data

4.1 Pricing to constant quality output

Whilst there are some difficulties in terms of identifying repeat services of the same quality, and concerns whether discounts are effectively captured, the current pricing methodology employed for: 7831 Data Processing Services; 7832 Information Storage and Retrieval Services and; 7833 Computer Maintenance Services, is considered to be fairly robust. That is, we believe the constructed price indexes to be a good measure of price change for constant quality output.

However significant problems in this regard exist for 7834 Computer Consultancy Services, which contributes 86% of the weight to the Computer Services index. Whilst the pricing specifications may be an effective measure of the price business are receiving for their service outputs, the quality of the actual service provided is not assessed. Where this service involves the production of customised software or integrated software / hardware solutions, which is the majority of activity, there is a clear problem. There is no doubt that the quality of these service outputs has been continually improving over time, due to improved knowledge / productivity of IT professionals, and substantial improvements in other IT products used as inputs in providing the service (e.g. computer hardware, software applications for debugging code in creating new software, etc.).

Measuring constant quality price indexes for software, where software is broken into the 3 categories of: pre-packaged or off the shelf software; customised software development and; own account software development, is a major challenge for statistical agencies. The Australian national accounts estimates capital expenditure on software to be approximately 1.3% of GDP. The portion of this which is inscope for 7834 Computer Consultancy Services would mostly relate to customised software development (as this is generally provided as a service to business, whereas own account software is generally developed by the business itself), which is estimated to comprise approximately 30% of total software expenditure.

The ABS is currently undertaking a large scale project to develop a constant quality price index for software. At present, detailed consultations are taking place with industry, in an attempt to understand the various elements of software and define the domain of price indexes for national accounting and other purposes. One particular avenue being pursued is the possible application of 'software function point' analysis as a measure of constant quality output.

Function point (FP) analysis is a structured technique of breaking software systems into small standard functional components, so they can be better understood, analysed and compared. Function points are a unit measure for the size of software output for each standard functional component, which can be used to measure productivity, unit cost (e.g. hours/FP, $/FP) and quality of software projects. Function point analysis originated from private research organisations, being commissioned by companies to analyse software projects, establish function point counts on elements of the software and to benchmark those counts and the cost of the project to other comparable software projects on their and other researchers databases.

If the ABS is successful in establishing a constant quality software price index, then consideration would be given to either using it to adjust the Computer Consultancy Services index in some way, or to be used as a specific (appropriately weighted) component of the index (i.e. in conjunction with the current specifications).

5. Pricing Trends

Elements of the aggregate Computer Services price index have moved quite differently since index construction began in September quarter 1998. The Data Processing Services index has tended to move in line with wage rates, with productivity and competition having a moderating influence. A similar situation applies for Computer Maintenance Services, although price increases have been more subdued in this industry. For Information Storage and Retrieval Services, prices for physical storage have been impacted by market competition, with the relative ease of entry for new players pushing prices down. Prices for on-line or electronic storage and retrieval services are subject to efficiency gains from improved and faster software plus price pressures from new entrants to the market place. These influences have resulted in this index falling by approximately 8% over the last 4 years.

The price for Computer Consultancy Services have been trending up since the inception of the index due to a general shortage of skilled IT/Computer personnel to meet market demand. This was particularly evident in 1999 with a large increase in demand associated with Y2k compliance. However, since early 2001 the index has levelled off, reflecting the slowing in demand for IT services experienced by most countries' economies over the last 18 months.

Computer Service Price Index series

Quarter	Computer Services (ANZSIC 783)	Data Processing Services (7831)	Information Storage & Retrieval Services (7832)	Computer Maintenance Services (7833)	Computer Consultancy Services (7834)
Sep Q 98	97.1	99.7	98.3	99.2	96.4
Dec Q 98	97.8	99.1	100.0	99.8	97.3
Mar Q 99	99.1	99.0	100.4	100.5	98.9
Jun Q 99	106.1	102.3	101.3	100.6	107.5
Sep Q 99	106.4	103.8	101.0	100.5	107.7
Dec Q 99	108.2	104.9	100.4	100.7	109.9
Mar Q 00	108.6	105.2	100.0	100.7	110.4
Jun Q 00	108.7	107.1	95.1	100.7	110.5
Sep Q 00	109.2	107.1	94.2	101.0	111.1
Dec Q 00	110.6	107.1	94.1	102.5	112.8
Mar Q 01	112.2	108.7	94.3	102.5	114.7
Jun Q 01	112.7	108.7	94.1	102.5	115.4
Sep Q 01	112.3	108.7	94.1	102.5	114.8
Dec Q 01	112.6	109.2	94.3	103.2	115.0
Mar Q 02	112.9	109.0	94.5	103.4	115.4
Jun Q 02	112.6	109.2	92.6	103.9	115.1

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