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SESSION 2: PRODUCER PRICE INDEX FOR SERVICES

PRODUCER PRICE INDEX FOR MAINTENANCE AND REPAIR OF OFFICE AND COMPUTING MACHINERY IN SWEDEN

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1. Introduction

In 2001, Statistics Sweden began developing the design for a price index for the maintenance and repair of computers and other computer equipment. The work was carried out in cooperation with industry organisation and large enterprises in the industry. The collection of prices began the following year. The price measurement methods now in use and the related challenges are briefly described here.

2. Industry output

CPA 72.50 consists of the maintenance and repair of office and computing machinery. The largest source of income for computer services enterprises is the maintenance and repair of computers, printers and servers.

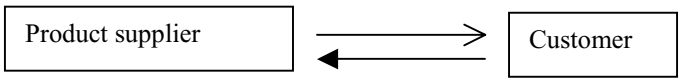
Maintenance services refers to the servicing of computers, etc. during the time period specified in the service agreement. Repair services, however, refers to the repair of machinery with problems after the period covered by guarantee is finished.

Service agreements for maintenance services for enterprises are often between one and three years long, and machinery is repaired and services carried out whenever needed during this time. The period covered by guarantee for private customers is often one year. Thereafter, a price is paid per repair.

The installation of machinery is booked in advance. The price for the installation of computers depends on the number of computers and which programmes are included.

The following are three options of service agreements on the purchase of computers, etc.:

Alternative 1

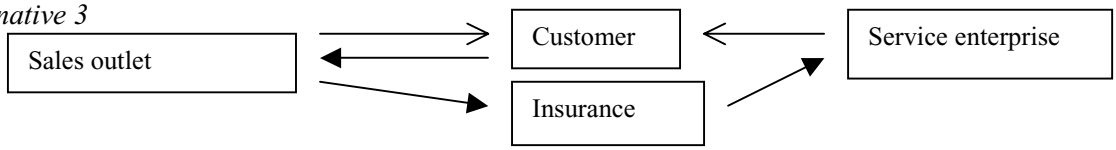


The customer writes an agreement directly with the product supplier. The services are carried out by the product supplier.

Alternative 2

The customer writes an agreement with the product supplier. The services are carried out by a service enterprise which is paid by the product supplier.

Alternative 3



The sales outlet gives the customer a guarantee and writes an insurance agreement with an insurance company. The services are carried out by a service enterprise paid by the insurance company.

3. Index Methodology

Prices are collected for maintenance, repair and installation of computers, printers and server machines. Model Pricing is used for all these services.

An example for price models:

Ex 1: Give the average price during the current quarter for the *service* of a commonly occurring *desktop computer*, 3-year contract. Problem reported weekdays 8-16, service within 4 hours. Large customer.

Ex 2: Give the average price during the current quarter for the *repair* of a commonly occurring *printer* (n.b. not colour laser printer). Large customer.

Ex 3: Give the average price during the current quarter for the *installation* of a commonly occurring *desktop computer* per computer (first computer), standard applications (given on the respondent's questionnaire form). Large customer.

Ex 4: Give the average price during the current quarter for the *installation* of a commonly occurring *server*, 10 users. Large customer.

The enterprise itself chooses an appropriate model of computer, printer and server for price measurement. If the question does not directly apply to the enterprise's activities, the enterprise can choose the service which is closest.

Problems of quality adjustments arising when the computer, printer or server model is changed, are discussed later in the section "Price Measurement Challenges".

The price index for maintenance and repair services are calculated in two stages:

1. The first stage is to calculate the *index for the respective enterprise,* ${}^{F}I$. A geometric average has been chosen because of its ability to handle disparate price levels.

$$ {}^{F}I = \frac{\left(\prod_{i=1}^{n} p_{1,i}\right)^{1/n}}{\left(\prod_{i=1}^{n} p_{0,i}\right)^{1/n}} = \sqrt[n]{\prod_{i=1}^{n} \frac{p_{1,i}}{p_{0,i}}} $$

Where, $p_{1,i}$ is the price for specific service according to the above examples

2. The second stage is to calculate the *total index for maintenance and repair services, I* , by weighting together the index calculated by each enterprise in the first stage.

$$I = \sum_{F} {}^{F}w^{F}I$$

Where, ${}^{F}w = {}^{F}w$ for large enterprises which have their "own weight" according to their turnover,

And ${}^{F}w = \frac{\sum {}^{U}w}{n}$ for other enterprises, those in sample survey, share the remaining weights between themselves

n = number of enterprises in sample survey

4. Weights

Sweden's business register is used as the frame. A PPS (probability proportional to size) sample with a size measurement (number of employees plus 1), is drawn from the current SE-SIC 92[1] group.

An enterprise's turnover is used as the enterprise's weight for the index calculations. In those cases in which data on turnover is missing, an estimated turnover is used. This is obtained by first calculating the turnover per employee for those enterprises for which data on both the number of employees and the turnover are available. The number of employees in the enterprise lacking information on turnover is then multiplied by this factor. New weights are calculated annually.

5. Issues in Maintaining Constant Quality

The enterprise itself chooses the most commonly occurring printer, computer or server models. In order to follow the price development on maintenance and repair services, the chosen machinery and models should remain constant. When the chosen models no longer exist in any significant way, they are changed. When a machine or model is changed, *"the overlap method"* is used. For example, an actual basic price for the new model is collected by asking the enterprise to note down the price for maintenance/repair of both the old and new machines/models during one quarter or a specified period of time. After this time period, only prices for the maintenance/repair of the new model are collected.

It is essential to remind the enterprises at intervals to check the relevance of the chosen machinery or models. This can also mean that several enterprises choose to change models at the same time and,

[1] SE-SIC 92 stands for the Swedish Standard Industrial Classification 1992

therefore, a larger amendment in the index figures is also carried out at that time. This index amendment does potentially not depend so much on price changes as on changes in models.

The contents of different agreements and how commonly these occur are changing over time. It is therefore necessary to be continually updated about the sector. If possible, chosen agreements should be changed using the overlap method.

6. Price Measurement Challenges

Price development can sometimes depend on the chosen printer, computer or server model. When an enterprise notices that a certain model requires services and/or repairs more frequently than most other models, they raise the prices for service and repair for that particular model while their prices in general remain unchanged or are even reduced. The choice of model can therefore have a determining effect on the price index.

Both computers and printers become out-of-date very quickly and are replaced with newer models. This means that machine and model changes will happen relatively often. A two-year old computer or printer is considered by the industry as old. The guarantee time for private persons is accordingly short, often only one year. Computers and printers for which new service agreements are written are, for the most part, only new models, and those which are repaired after the end of the agreement time, are mostly old models.

The price for maintenance of computers, printers and servers depends on, among other things, the market situation, internal costs, the product supplier, quantity, the length of the agreement, the response time, time of day/week, the guarantee rules, new or old customer, place of business. It is not possible to get data on the average invoiced price for maintenance of, for example, certain computer or printer models with different response times and agreement lengths. The enterprises do not provide this detailed information because it is not in their interest due to the models' short lifecycle.

Total System Support is a new type of packaged service, which a number of enterprises are currently testing. This means that a service enterprise takes care of the services and repairs of all the enterprise's servers, printers and computers, etc. for a fixed monthly cost. This type of service package is currently not included in the survey.