17TH MEETING OF THE VOORBURG GROUP

Nantes, France
September 2002

SESSION 1: PRODUCER PRICE INDEX FOR SERVICES

CHALLENGES IN THE DEVELOPMENT OF A PRICE INDEX FOR EGINEERING SERVICES IN SWEDEN

Martin Bylin
Martin Ribe
Statistics Sweden

Challenges in the development of a producer price index for engineering services in Sweden

Introduction

Since January 2000, the Department of Economic Statistics at Statistics Sweden has been conducting a project with the purpose of developing price indices for the service industries in concordance with the European Union's recommendations. These indices will be used within the National Accounts to calculate the production value of services, in constant prices. The service price indices will also serve as a foundation for calculating price controls, and for business cycle analyses. The purpose of this paper is to briefly describe the development of a producer price index for engineering services and the methodological difficulties encountered.

The Swedish engineering services industry

Engineering services in Sweden include consulting work within heating and air conditioning, energy, electricity, industrial engineering, project management, construction and installation (site engineering), and even meteorological services and geodetic studies. Many large groups of companies have one or more subsidiaries that often offer all of these services.

Total net sales in the engineering services industry in Sweden were SEK 50 250 billion in 2000, according to Sweden's Business statistics. There were 20 200 enterprises within the industry, which together employed 46 546 people. Most of these enterprises (98.5%) have fewer than 20 employees. In terms of sales, the 10 largest enterprises are accounted for 18 per cent of total net sales, while the 100 largest enterprises are accounted for 42 per cent of total net sales[1].

The market and price setting for engineering services

During the development process, the project has had contact with and visited several of the larger enterprises in engineering services, as well as the industry association, the Swedish Federation of Consulting Engineers and Architects. These contacts have provided useful information as a foundation for future work.

The market for engineering services is extensive and varied. It includes electrical installation, heating and air conditioning, inspection, and industrial engineering for different industries. In connection with these services there are also elements that are not exactly consulting services, such as education and software production. The latter activities will not be addressed here, since they can be considered to belong to other industries.

Engineering services have in the last few years changed and become more rationalized as a result of technological developments, for example the increasingly more effective computer accessories. Technological developments can be expected to continue to rationalize the work, through even better computer-aided design (CAD) programs and other developments. The workload can often go in waves; large projects can be difficult to organise such that the volume of work is constant over time. In addition, there are fluctuations in the economy and in demand. General oversupply or undersupply in the market also impacts the prices of the services.

[1] For further information see Bylin M. & Ribe M. (2001) Service price index for architectural, engineering and related technical consultancy services SE-SIC 92 group 74.2, TPI project report no.3

Charging by the hour seems to be a dominant form of price setting in this industry, usually with periodic invoices even if some modifications occur. This information comes from the contacts the project has had with the industry. Previously, there were often fixed offers with a set total amount for the entire project, but now it seems that this is something that the industry have relinquished.

Hourly rates normally vary based on different personnel categories, not by the type of work. Personnel categories that are used include project manager, person responsible for a project, or person responsible for an assignment. Each category can have one or several rates within it. The categories can vary somewhat across different enterprises, and the meaning can even vary within a group of companies with uniform names. The category "project manager" and "person responsible for a project" can be different for different projects, since the projects can be of completely different orders of magnitude. In addition, an individual consultant's personal qualifications and reputation can influence the rate charged.

Electrical installation, heating and air conditioning, and the like are considered to be fairly tangible areas for measuring prices. They involve relatively homogeneous types of services, and it should thus be possible to track hourly rates for different personnel categories.

It is also be fairly easy to measure prices in the area of examination and inspection. Here it is possible to follow prices for certain specified services ("model pricing"), instead of hourly charges.

It is more difficult to determine prices for industrial engineering services. Projects in this area can be very large with different phases that have different requirements in terms of consulting contributions. The qualifications of the consultants can also be important. There is the risk that hourly rates even within personnel categories are not completely comparable over time, due to changes in the content of the services. Furthermore, enterprises may be paid for the customer value or benefit from the services, in addition to the actual hourly charges. The price can sometimes vary with the extent to which the finished product's performance turns out to exceed the specified minimum requirements.

Definition of engineering services

Engineering services are defined as engineering consulting work specified by an hourly volume, activity area and category of personnel. These types of services occur in different areas.

Quality from a customer perspective

If there are "famous experts" among the leading consultants at an engineering consulting enterprise, this seems to be considered a form of guarantee that the enterprise has high quality services. This can result in higher hourly rates for the entire enterprise. At a more basic level, the education of the engineers is also a form of guarantee of a certain basic level of quality. The above-mentioned quality aspects should be relatively constant over time and therefore not very problematic for calculating indices. It is true for some of the engineering services, such as electrical installation, heating and air conditioning, and inspection. A different situation can arise concerning industrial engineering services. The customers' quality requirements may vary more over time depending on the nature of the current services. "Famous experts" can also be important here as a quality guarantee.
It is also true that the quality of the planning of an industrial plant can partly be measurable afterwards, when one sees the resulting performance. For example, one can determine the amount of remaining pollutants in purified fumes in order to measure the quality of a flue-gas cleaning plant.

Sample

The sample is taken as a sequential PPS sample with the sample probability proportional to the number of employees plus one. Sweden's Business register are used as a sampling frame. The rationale for this is that the number of employees is a more stable variable than total sales, which is missing for a number of enterprises and is often out-of-date. The correlation between the number of employees and total sales is relatively high, which indicates that the number of employees is a reasonable proxy for total sales. The approximation is better for larger enterprises than for smaller enterprises.

Data collection

Data will be collected quarterly using form or electronic forms. Average hourly rate charged during the relevant quarter, for an optional personnel category in each area, will be collected for each of five fields of operations. The five areas are project management, industrial engineering, electrical engineering, heating and air conditioning/energy, and construction and installation. For weighting purposes, it is advantageous to also collect data on the number of hours invoiced for each personnel category. At the moment there is a trial survey in progress where a number of voluntary enterprises within the field of engineering services participate. These have been given a questionnaire (appendix 1) and up to the present half of the enterprises have been able to answer the questions, which may be seen as promising for our project in the future.

Quality adjustments

Actual performance per engineering consultant hour may increase due to technological developments. In order to get prices that reflect constant service performance, one could hypothetically need to adjust quality for any possible performance increases. This is however hardly possible and potentially also not desirable, and therefore is not done. This is judged to be true for certain of the engineering services, such as consultancy on electrical installation, heating and air conditioning, and inspection.

Quality adjustments could be more necessary in the case of industrial engineering, since the content of the services may well vary more over time. Even here, however, quality adjustments are hardly practical. If some form of charging for customer benefit occurs in addition to charging for hours worked, this can in a way reduce the need for quality adjustment of hourly invoicing, since it partly takes care of a factor that reduces comparability.

Future plans

The goal during 2002 is to complete the production of an index for engineering services together with an index for architectural services. These fields of activity are similar to each other for instance in their basing hourly rates on different personnel categories.