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# PRODUCER PRICE INDEX FOR SERVICES: REPORT ON INVESTICATION AND SECURITY SERVICES

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## 1. Description of investigation and security service activities

The industry of investigation and security service activities In Finland accounts for approximately 0.3 per cent of the total turnover of service industries in Finland. The main services of the industry are guarding of people and property, which generate the vast majority of the turnover of the companies operating in the industry and are, therefore, the foundation on which these companies build their business activity. ***In practise the share of the turnover of investigation in Finland is very small. This means that the methods described here are mainly valid for the security part of the activity.*** For large companies in the industry, investigation and security services are usually activities of lesser importance, supplementing their guarding activities. However, they are significant to the companies from the point of their comprehensive security service image, and are used to enhance the range of the offered services so as to cover all the security needs of their customers. Small companies, in turn, naturally also offer guarding services but often specialise precisely on these services that generate smaller turnover, which they have then made into their own areas of special expertise.

Over the past decade or so, this industry has been growing strongly, and still continues to do so. The growth follows the global trend of increasing investments in security matters, especially by business enterprises. At the same time, central governments have been cutting their expenditure on security services. These facts together with today's mounting atmosphere of insecurity have generated strong demand for the services of this industry. In addition to the foregoing, many business enterprises have subcontracted their security services to companies operating in the industry, thereby contributing to the growth of the industry even further. As the services and the companies in the industry get better, central governments are co-operating more and more with these specialist companies in producing and supplying their security services. While this development trend prevails, the growth of the industry can be expected to continue, as it will enable the companies operating in this industry to also start offering services traditionally provided by the police. However, in many countries this kind of development would necessitate legislative changes, as well as toughened criteria with regard to the training and development of staff in these companies.

The enterprises in this industry usually comprise a few large and medium-size companies, and a host of small operators. The large companies generate a considerable proportion of the total turnover of the industry, and are often major international companies constituting market leaders in many countries. The small companies are minor localised operators, whereas the large companies operate over extensive geographic areas. The range of the services offered by these companies also grows as company size increases: the largest firms can supply a fairly sophisticated range while the smallest ones are content with providing the already mentioned traditional investigation and security services. The industry's main customers are other business enterprises and the turnover of the whole industry comes almost entirely from the services bought by them. Because of the proportion of its service contracts with business enterprises, demand by households only makes up a minor part of the industry's total demand. Nevertheless, improved availability of the services has been increasing the demand for them from households, too. However, for the time being the services provided to households will continue to make up a minor proportion of the total market.

Despite the strong growth of the industry, its market structure has remained relatively stable. Between them, the large companies cover a significant proportion of the market and dominate the industry. The market shares of these companies are steady and only really change as a consequence of business takeovers. The small companies in the industry fight for their market shares under pressure from the large ones. The market shares of these companies can fluctuate significantly as a result of competition. Nevertheless, the influence of this fight for market shares is minor on the market structure of the whole industry. Because of the aforementioned reasons, many countries use a five-year cycle for reviewing the weights of the price indices for the industry, and this can generally be regarded as a satisfactory weight revision interval.

## 2. The classification and definitions

The companies offering investigation and security services usually concentrate on their areas of core competence. They supply almost exclusively only those services that relate to their own industry, that is, they hardly ever engage in activities that depart from the main activity of their own industry. This makes their classification straightforward. ISIC and NACE classify enterprises supplying investigation and security services as follows:

|      | Revision | Class | Label |
|------|----------|-------|-------|
| ISIC | 3.1      | 7492  | Investigation and security activities |
| NACE | 1.1      | 74.60 | Investigation and security activities |

The services under these classes are
- Surveillance, guarding and other security services
- Transport of valuables
- Body guarding
- Surveillance and street patrolling of residential buildings, offices, factories, construction sites, hotels, theatres, amusement venues, sports stadia, shopping centres, etc.
- Public transport safety procedures, such as security checking of luggage and passengers at airports and security guarding of trains and underground trains
- Store detective services
- Operation of service telephone lines or the like for remote monitoring of mechanical equipment
- Screening of alarms (to identify false alarms) and calling of police, fire or ambulance services as necessary
- Consultancy on household and public sector security systems, including background security vetting of individuals
- Destruction of data from any data carrier
- Private investigation activity

Over the past decade, the services of the industry have been developing strongly especially due to advancements in technological solutions, which the large companies in the industry have been able to exploit efficiently and thereby make considerably better progress than the small operators in the field have been capable of. A good example of this are the emergency call centre services with extensive geographic coverage that are offered by the largest companies in the industry. Small and local operators are unable to provide services of similar scale because of the substantial fixed costs involved. Partly precisely for this reason many small companies in the industry have concentrated on their own, narrow areas of competence, thus gaining a competitive edge through their special expertise or geographic location. The development of the services offered by the industry has focused on reinforcing its own strengths. Consequently, it has caused no classification problems thus far, as the competing has not extended to other industries.

As co-operation between central governments and security companies intensifies, the services offered by the security companies have been increasingly approaching the traditional tasks of the police. However, this has not yet caused problems in the classification of the services, but the kind of future situation is well foreseeable in which some of the services of the companies get classified into categories traditionally associated which the tasks of the police. Yet, even in such situation the share of the services concerned is likely to remain minor, with no bearing on the classification of enterprises into different industries.

Companies engaged in investigation and security service activities can be adequately and exhaustively classified according to ISIC. It is the most frequently used classification, which many countries have adapted and improved to suit the special national characteristics of different industries. These national adaptations must always be thoroughly taken into account in the compiling and reviewing of a price index for the industry.

In Finland, security service activities have been divided into five service types, on four of which price data are collected. The service types are:

- District guarding services
- Local guarding services
- Store guarding services
- Emergency call centre services
- Money transport services

Except for money transport services, price data are collected on all of these service types. No price data have been available for money transport services, as their collecting is problematic. The contracts selected for the index calculation have been grouped according to the types of services on which the enterprises drawn into the sample provide price data.

## 3. The sample

The population of the companies engaged in investigation and security service activities is comprised of a large group of small companies and a few medium-size and large companies. The collection of price data from small companies is difficult in practice, which is why purposive cut-off sampling often has to be used to reduce the size of the population. This means that the smallest enterprises get excluded from the total population of the companies in the industry. An example of a commonly used cut-off threshold would be one per cent, that is, all the companies whose turnover falls short of one per cent of the total turnover of the industry are excluded from the population. However, it should be noted here that the sample is then no longer representative of the entire industry. However, in practice, the inconsistency in the representation is not significant.

Nevertheless, among the small companies there may be some that are undergoing strong growth and are approaching the cut-off threshold. If it can be assumed that they will very soon be crossing the threshold they can be included in the population.

The sampling methods usually opted for are stratified sampling according to company size or PPS (Probability Proportional to Size) sampling. These sampling methods allow for differences in company sizes to be taken into consideration. The size of the sample is, in practice, determined either with statistical methods or according to available resources.

Purposive and statistical sampling methods can often been successfully combined. For example, if an industry is dominated by a couple of enterprises, these can be formed into their own stratum from which all units are selected into the sample with probability one. The remaining enterprises from the other strata are selected using either PPS or random sampling. If necessary, a sampling design with more than one dimension can be resorted to. If, for example, regional differences are observed in a price change, the use of geographic area as a stratification variable can be considered.

Sampling can involve several levels, meaning that before actual data on a price are obtained, the price observation concerned may have gone through more than one sampling. For instance, a sample may have been drawn first of enterprises, then of representative services and finally of contracts. However, random, stratified or PPS sampling can be used at all levels of sampling.

Finland's Business Register is used as a sampling frame. The enterprises were stratified into two strata depending on turnover. In this pilot stage the sample was realised only for the strata consisting large enterprises. The sample will be supplemented later on with smaller enterprises. The good geographical coverage was already obtained using only large enterprise strata. The actualised total sample size was 3 enterprises and 160 price quotations. The actual coverage rate in terms of turnover is approximately 42 %.

The selection of the contracts was made in co-operation with enterprises. The contracts were first divided into service categories and then further into two geographical areas (greater Helsinki area and rest of the country) and into 2 price categories that reflect the actual volume of the service. The sample size for each

contract strata inside of the enteprise was proportional to group's weight according to information obtained from enterprise. The Enterprises selected representative contracts from each strata (one enterprise send their data into Statistics Finland were the selection was made using PPS) using either random sampling or judgement.

## 4. Weights

In the lowest level of the aggregation all the contracts, inside of each enterprise and service type, have equal weights. In the next level of aggregation the service type weights, inside of each enterprise, are formed based on turnover shares of each service type. This information is asked yearly from enterprises. The enterprise weights are calculated from Business Register turnover data. These weights can be updated yearly if necessary.

## 5. The pricing methods

The selection of the pricing method must take into account the special characteristics of pricing in the industry. Long-term contracts, tailored to customer needs and specifying in great detail the contents and the price of the service concerned for the whole contract duration, are typical in the investigation and security service industry. Such contracts are prevalent especially in the large companies of the industry, and their prices are arrived at after mutual negotiations between companies.

List prices if available are often the quickest and least labour-intensive way to obtain relevant service price data. In practice, however, the list prices published by companies do not represent the real prices customers pay for their services. Large customers may be able to plead their major customer potential and get lower prices than those published. By contrast, contracts with customers with only minor market power generally follow fairly closely published list prices.

The list prices are not easily available in Finland. The common practise is that enterprises encourage the potential customer to take the first contact by e-mail or phone. Based on negotiations with enterprises it was decided that contract prices are collected, from the companies. These prices show directly the real prices paid for the services and their periodic monitoring is also usually easy due to the length of the contracts.

## 6. The advantages and disadvantages of contract pricing in investigation and security services

When the contracts are well selected, the contract pricing gives an accurate picture of  real transactions price movements. Under certain assumptions it is  almost as effective as model pricing.

Perhaps the largest shortcoming of the contract pricing is that it requires considerable initial effort from the data supplier, in order to make sure that representative contracts become selected in a statistically correct and efficient manner. In addition, it has to be ensured that all the price determining characters are specified in the sample contracts. On the other hand, once the contracts have been selected and the initial effort made, pricing from contracts is quite a cost-effective method for collecting price data.

Timeliness of the price data is a problem in pricing from contracts, in other words changes in prices do not necessarily show in contracts as quickly as they do in list prices. The price change of a new contract may not be of the same magnitude as that of an old contract. It might be necessary to update some proportion (e.g. 2 %) of  the contracts in the sample on continuos bases.

Quality changes caused by dissimilarities in renewed contracts contents might also cause some potential problems (this might also be problem in case that part of the sample is continuously renewed). To make sure that the contents of the contract is unchanged is time consuming and requires familiarity with the price determining character of the contracts. Substituting contracts may be difficult to find, which is why changes in quality are not easy to follow.

## 7. Index calculation

The price index for security services is Laspeyres type of chain index. The index is calculated in four stages:

1. In the first stage the *enterprise specific service type indices* $I_{t,j}$ are calculated from matching contracts from current *t* and previous *t-1* periods. Do to the lack of weighting information the geometric average is used:

$$I_{t,j} = \sqrt[n]{\prod_{s=1}^{n} \frac{p_{t,s}}{p_{t-1,s}}}$$

where *n* is the number of matching contracts and $p_{t,s}$ is the price of a certain contract in time period *t*.

2. The second stage is to calculate the *enterprise indices* $I_{t,e}$, by weighting together the enterprise specific service type indices $I_{t,j}$ for each enterprise:

$$I_{t,e} = \sum_{j=1}^{n^e} w_{t,j} I_{t,j}$$

where $n^e$ is number of service types in enterprise *e*. The $w_{t,j}$ is the turnover share of the service type *j* inside the enterprise *e*.

3. In the third stage the *total index link for security services* $I_t$ is calculated, by weighting together the indices calculated in second stage.

$$I_t = \sum_{e=1}^{n} w_{t,e} I_{t,e}$$

The sum goes now over all enterprises. The $w_{t,e}$ is the turnover of enterprise *e* divided by the sum of the turnover of the enterprises included into the sample.

4. The chained Laspeyres type of index from period 0 to t is now obtained by multiplication of links $I_t$:

$$P_{0t}^{L} \prod_{T=1}^{t} I_t$$

where $P^L_{0t}$ is now the Laspeyres type chain index.

## 8. Dealing with changes in quality

In the investigation and security service industry, changes in quality mainly arise from variations in the compositions of the agreed services. Changes in quality must always be dealt with and decisions made as to whether they require any adjustments in the compilation of the index. In practice, minor changes can be ignored, but the goal that should always be striven for within the available resources is not to weaken the quality of the index because of these changes, otherwise its representativeness suffers and price changes can no longer be regarded as reliable.

Of course the ideal alternative would be to substitute a changed contract with a new one with identical contents. The price of the substituting contract would have to fluctuate in the same way as the price of the replaced contract would have done. Substitutes with identical contents can usually be found for standard contracts. However, quite often contracts, especially major ones, contain such detailed specifications that finding substitutes for them may be difficult or even impossible.

It may also be possible to quantify a change in the quality of a service. In this case, use of the changed contract in the index could be continued, but the quality change would have to be allowed for continuously in the compilation of the index. In practice, however, a quality change cannot often be quantified and a substituting service is not available until a quality change occurs.

## 9. The data collection

The most important thing when information is being collected from data suppliers is to make sure it is correct and appropriate. The information must describe well the services of the industry and thus represent as well and as diversely as possible the price development in the industry. In order to achieve this, it has to be ensured from experts in the industry that the collected information is relevant and sufficient. The experts representing the industry must be from upper management of companies, commanding a broad overview of the services concerned and of the industry as a whole. This will ensure high quality and representativeness of the index for the industry.

In an ideal situation, besides price data, the following information should be collected about services:

- Type of service
- Customer details
- Possible quality changes
- Special conditions of contracts

In practice, however, the target companies cannot be overburdened with data supply obligations, as this would endanger the quality of the data. This is why all the desired data are often not received from the target companies. Decisions about which data are the most central and crucial in a given situation must be made case-by-case, and efforts should then be focused on getting these data.

Special efforts in the data collection should be made to ensure that the contents of the data remain unchanged from one collection round to the next, in other words the supplying companies must be consulted to make sure that a service has not changed in terms of its contents since the previous collection round. If there has been a change in contents, a price change no longer measures directly the desired price, and steps have to be taken to allow for a change in quality.

In Finland, price data are collected on the four service types already mentioned, on which the data are requested from companies operating in the industry. Customer details are obtained in the form of customer numbers in connection with the reporting of price data. In addition, the companies supplying the data are requested to inform about any possible quality changes in the context of price data reporting, so that these can be reacted to and the quality of the index kept high. The questionnaires are send quarterly to the enterprises by e-mail. The contract prices with identification number and quality change comment are received in excel-format. The price collection was started during the summer 2003.

## 10. Results

The index is still experimental and the results are unofficial, they have not yet been published. The series starts from third quarter of 2003. The series has been back estimated to first quarter of 2003 using the sub index of wage and salary earnings (NACE 7460).

PPI for security services 2003=100
NACE 7460

| Year | Quarter | Index |
|------|---------|-------|
| 2003 | I | 97,5 |
| 2003 | II | 101,0 |
| 2003 | III | 100,8 |
| 2003 | IV | 100,8 |
| 2004 | I | 106,1 |
| 2004 | II | 106,3 |
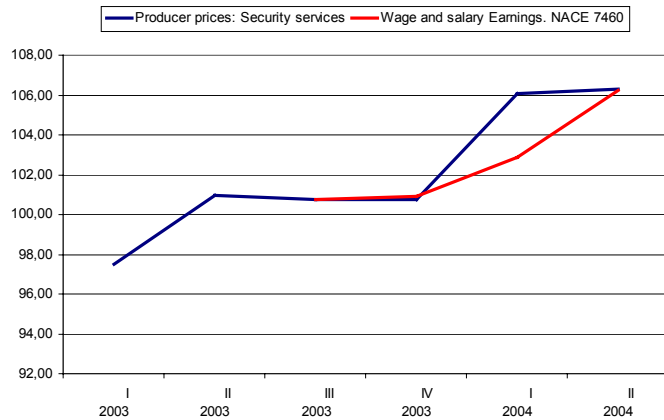


It is still too early to draw final conclusions how well the index is performing. The preliminary analysis are promising. At a moment it seems that PPI for security services is following quite closely the corresponding wage and salary earnings index. This seems to make sense because wages are the main cost component in security business.

## 11. Special characteristics of the industry

The industry is highly concentrated, that is, a few large companies account for a considerable proportion of the total turnover of the whole industry. Small companies are numerous, but their shares of the total turnover of the industry are negligible. For this reason, major contracts go to just a couple of the largest companies in the industry, because other companies are unable to offer sufficiently exhaustive services. Long-term contracts are also characteristic in this industry. The duration of the contracts entered into with customers is usually comparatively long, because the quality of the services stays stable for a long time and the demand for the services is continuous.

The largest single cost item in investigation and security service activities is labour costs. Therefore, labour costs are also the main determinant of the prices of the services. Wages and salaries are rigid and change seldom, often only once a year. For this reason contract prices also often only change once a year as a result of pay reviews. The changes in the prices of old contracts follow chiefly the development in labour costs. The bases on which the prices of the contracts to be newly drawn up are determined may differ slightly from those on which the prices in old contracts were settled, so it is important to also monitor new contracts so that changes in contract prices can be generalised to concern the whole industry.

## 12. Methods adopted in different countries

In Finland, data on real contract prices are collected from the largest companies in the industry whose combined coverage of the whole industry is considerable. These companies primarily offer only guarding services. The prices of the services of the industry are monitored quarterly and the index is calculated as a Laspeyres type of chain index. The index is at the testing phase, and has not been published yet.

The Czech Republic collects contract prices from approximately 30 data suppliers. The index calculated from these contract prices is published monthly. At the moment price data for the calculation of the index are only collected on one service, which thus represents the whole industry. Changes in quality are monitored against estimates obtained from the data suppliers, who are asked to estimate what proportion of a change in the price of the service is caused by a change in quality and what proportion represents a genuine price change.

Japan calculates an index for the industry from service contract prices. The collected service prices are inclusive of an excise duty. The index is published monthly and calculated as a Laspeyres index. Quality changes are taken into account case-by-case using the method most appropriate for the situation.

Slovakia has conducted a pilot project on the compilation of an index for the industry, and has started to calculate an index on the strength of its results. The index is calculated monthly.

Great Britain, Portugal, France, New Zealand, Mexico and Australia also calculate a price index for the investigation and security service industry. Contract prices are used in the collecting of data in France, New Zealand and Australia, whereas Mexico uses mark-up pricing. Great Britain collects both contract and list prices. The index is calculated quarterly in all other countries except Mexico, the Czech Republic, Japan and Slovakia where it is done monthly.

## 13. Future development prospects

The industry will retain its growth potential even in the future. An especially interesting trend of development challenging the services of the industry is the changed perception and role of central governments as producers and suppliers of security services. Central governments have traditionally offered security services as a basic, free commodity to all people. However, the trend in development even in this field is towards privatisation, as central governments seek cost savings during times of tightening budgets. It is still one of the central tasks of central governments to provide security services, but they are no longer capable of satisfying the growing need for security. It is for this task that investigation and security service companies are needed.

The quality of the index will be further improved by extending to coverage also to the small enterprise strata. It is not yet clear whatever the price behaviour of small enterprises is extensively different from the large enterprises. Lot of work has been done in numerous other service sectors. The appendix 1 shows the progress in other areas of service prices in Finland.

**Sources:**
Australian Bureau of Statistics. http://www.abs.gov.au
Bank of Japan. http://www.boj.or.jp/en/index.htm
Bank of Mexico. http://www.banxico.org.mx/siteBanxicoINGLES/index.html
CoESS: Confederation of European Security Services. http://www.coess.org
Czech Statistical Office. http://www.czso.cz/eng/redakce.nsf/i/home
Quality Guidelines for Official Statistics, Handbooks 43b. Statistics Finland.
Levy, Paul S., and Lemeshow, Stanley 1991. Sampling of Populations: Methods and Applications. John Wiley & Sons, Inc.
RAMON: Eurostat's Classifications Server.
http://europa.eu.int/comm/eurostat/ramon/cgi/SimWWWFrame.SimBottomFrame?p_nID=&p_lId=&p_pId=&p_langnom=&p_frameType=1&p_asso=&p_emp=&p_language=EN
Revised PPI-manual. http://www.imf.org/external/np/sta/tegppi/index.htm
Statistics Finland. http://tilastokeskus.fi/index_en.html
Statistics New Zealand. http://www.stats.govt.nz
Statistical Office of the Slovak Republic. http://www.statistics.sk/webdata/english/index2_a.htm
United Kingdom Office for National Statistics. http://www.statistics.gov.uk
Varjonen, Seppo. OECD-Eurostat 2003 Inquiry on National Collection of Services Producer Prices.
http://www.oecd.org/dataoecd/0/37/27257808.pdf

APPENDIX 1

| NACE | Industry | enter-prises | Price quota-tions | Price defini-tion | Data collection started |
|---|---|---|---|---|---|
| 551 | Hotels | 56 | 56 | list price | 1 / 2002 |
| 6024 | Freight transport by road | 15 | 60 | list price and transaction | 2 / 2003 |
| 6210 | Scheduled air transport | 4 | 30 | list price | 2 / 2004 |
| 6411 | National post activities | 1 | 22 | list price | 4 / 2001 |
| 6412 | Courier activities other than national post activities | 8 | 34 | list price and transaction | 1 / 2002 |
| 642 | Telecommunications | 2 | 81 | transaction | 1 / 2002 |
| 70209 | Letting of other real estate | 1 | 5000 | transaction | 1 / 2004 |
| 7132 | Renting of construction and civil engineering machinery and equipment | 21 | 228 | list price and transaction | 3 / 2002 |
| 7110 | Renting of automobiles | 4 | 59 | list price | 1 / 2003 |
| 7411 | Legal activities | 23 | 23 | list price | 4 / 2001 |
| 7412 | Accounting, book-keeping and auditing activities; tax consultancy | 17 | 137 | list price and transaction | 2 / 2001 |
| 7413 | Market research and public opinion | 6 | 15 | list price, transaction and model price | 4 / 2002 |
| 7430 | Technical testing and analysis | 23 | 57 | list price | 1 / 2004 |
| 7440 | Advertising | 34 | 161 | list price | 2 / 2002 |
| 7440 | Outdoor advertising | 6 | 22 | list price | 2 / 2002 |
| 7440 | Television advertising | 2 | 5 | list price and transaction | 3 / 2002 |
| 7440 | Radio Advertising | 9 | 9 | list price | 3 / 2002 |
| 7440 | Newspaper and magazine advertising | 7 | 23 | list price | 4 / 2002 |
| 7450 | Labour recruitment and provi-sion of personnel | 8 | 42 | transaction | 4 / 2002 |
| 7460 | Investigation and security activities | 3 | 144 | transaction | 3 /2003 |
| 7470 | Industrial cleaning | 6 | 185 | transaction | 3 /2003 |
| 9301 | Washing and dry-cleaning of textile and fur products | 14 | 147 | list price and transaction | 1 / 2001 |
| | **Total** | **266** | **6481** | | |
| | | | | | |