Voorburg Group on Service Statistics

Service Price Index for Architectural Services

Sima Assaf

Central Bureau of Statistics
Israel

September 2006

Background

1. Development of specific service sector price indices began in Israel in 2003 as an extension of the familiar PPI system for estimating prices in the production sector. It was decided to initially focus on the primary industry of "business activities" since it is the largest industry of services in the economy in revenue terms. In 2004, "architectural and engineering services" was approximately 27.4% of the total turnover of "other business activities".

Developing a price index for architectural services began on the basis of a survey of that sector in Israel. The international PPI Manual was used as the basic model for developing the index, which was then adapted to the unique features of the Israeli economy. Different models of architectural services were examined as well, some of which were developed in countries such as Canada, Sweden and France, and some emanate from our experience in developing a price index for legal services, accounting services and security services.

2. Service industries have come to play an increasing role in the Israeli economy. In 2004, trade and service industries accounted for slightly over 77.9% of Israel's Gross Domestic Product.[1] These industries accounted for almost 73.5% of employment (not including military service). Over time, the percentage has grown steadily.

Description of architectural service activities in Israel

3. The industry of architectural and engineering services in Israel in 2005 accounts for approximately 2.1% of the total turnover of services in Israel.

4. The architectural and engineering industry is relatively dispersed. The enterprises in this industry comprise of a few large and medium-size companies, and a host of small companies.

[1] State of Israel Central Bureau of Statistics, Productivity, national account 1995-2004, 25/2004.

According to data from the "Dealers and Revenue of Economic Industries"[2], 89% of architectural and engineering companies have annual revenue of up to 1 million Shekels (equivalent to approximately 225,000 USD), which constitute 26% of the entire annual revenue of the industry. 9% of architectural and engineering firms have annual revenue in the range of 1-5 million Shekels, which are 22% of the entire annual revenue of the industry. 0.2% of architectural and engineering firms have annual revenue of 40 million shekels or more, which are 25% of the entire annual revenue in the industry.

The index includes only the architectural industry and will be expanded in the future to the engineering industry as well.

5. There are four kinds of customers in this market, as follows:

- **Public and Institutional facilities**: government buildings, municipalities, hospitals, educational institutions, libraries, museums, etc.
- **Commercial Buildings**: office buildings, shopping centers, lodging facilities, warehouses, restaurants, service stations, planning renovation work and/or founding offices, shops and other commercial buildings.
- **Residential Housing**: single unit and multi-unit housing, including planning new private buildings and preparing applications for construction permits from the relevant authorities.
- **Industrial Manufacturing Facilities**: plant, building design and configuration.

6. The architectural industry is a competitive market. The field has been influenced by the recession in the construction field in Israel, which resulted in a sharp decline in the magnitude of activities of architects and, of course, in profits. Good reputation is, of course, an advantage. The field of Architecture is regulated and requires a license according to the Law of Engineers and Architects from 1958. All public institutions in Israel that are funded (at least partially) by the government are subject to the Auctions

[2] State of Israel Central Bureau of Statistics, Dealers and revenue of economic industries according to value added tax 2004

Act. This law lists various conditions for eligibility, including a certain minimum size, experience and submission of references.

The largest offices in the field work mostly with public institutions, government offices and municipalities. The unique characteristics of such projects – similarity in essence, fixed clients and expansion over a long period of time, make it easer to measure. Smaller offices, on the other hand, have smaller projects that are temporary and do not last the whole year.

The classification and the main services of the industry

7. The classification of the price-index should be based on the following classification principles. The classification of the main industries will be determined according to a combined classification method, called ISIC "International standard industrial classification of all economic activities 1993" after making the necessary modifications to the structure of the Israeli market.

Description	**CPC code**
Architectural services, urban planning and landscape architectural services	832
Architectural advisory and pre-design services	83211
Architectural design and contract administration services	83212
Other architectural services	83219
Urban planning services	83221
Landscape architectural services[3]	83222

[3] Urban planning and landscape architectural services are main fields in the architectural industry in Israel.

Sample design

8. Four potential frames were analyzed in order to sample architectural firms:

- The sample already used for the "Survey of Trade and Services conducted by the Central Bureau of statistics" (CBS).
- Business Register (CBS).
- Dun's Guide
- Internet

The sample in the "Survey of Trade and Services" is based on the revenues of the firms but does not provide information regarding the distribution of revenue among sub-groups across lower degrees of the classification.

Another source of data is the "Dun's Guide" file which is a business guide that includes data on companies in Israel and lists of large security firms and their specialization fields.

In the CBS Business Register every business is listed with identifying details, revenue information and the number of employees. Information regarding revenue is taken from the Business Register, in order to ease the burden on companies and to achieve greater cooperation from them.

9. Architectural firms were sampled from this combined frame where sample size is proportional to the sample size in the PPI of manufacturing, determined by revenue and variance of price movements.

The actual firms sampled by a combined method of cut-off and judgmental sampling. Firms that employ less than 5 employees were not included in the sample.

In the price indices, the risk of using a non-probability sample is relatively small because the variance of price changes between producers over time is relatively small. Additionally, because the small firms are unstable, a probability estimate would not have yielded the desired results. Finally, the sample size reflects the relative weight of the specific industry out of all service industries.

Weights

10. At the lowest level of aggregation, all contracts of each enterprise and service type are assigned equal weights. At the next level of aggregation, service type weights within each enterprise are based on turnover shares of each service type. The enterprise weights are calculated from the data of "trade services, transportation and communication" and from the business register.

The data collection

11. The enterprises were each visited by economists from the Central Bureau of Statistics at least once, in order to urge the firms to report the necessary information and to fully understand their methods of determining tariffs. A visit at the firm is conducted in order to study the main characteristics of the industry, its main areas of activity, its pricing methods, its acquisitions and contracts and its discount offerings. It is then determined which types of activities are accurately measurable, while keeping quality fixed. We also agree on a uniform pricing method that reflects the actual prices of transactions. The intention is to measure actual transactions of firms that offer architectural services to typical clients over time, in order to reflect actual price changes, not declared prices.

12. The principal task was to establish a sample selection of actual transactions, which were representative of the services typically provided by the firms. The goal of this procedure is to ease the calculation of reliable indicators based on periodical changes in prices. The selection of the pricing method must take into account the special characteristics of pricing in the industry.

13. The objective is always to monitor finalized prices, that is, after allowing for any discount. The selection of approach in each case depends upon the pricing practices in the industry and the availability of data.

At the first stage, the services price index will be published on a quarterly basis. In the future it may be published monthly.

The pricing methods

14. There are several ways to calculate the fee for architectural services in Israel.

❖ Model pricing

Several Architectural offices adopted a formula to calculate the fees created by Construction Ministry and the Defense Ministry. This formula has proven to be easy, efficient and reflective so architectural offices use it with private clients as well.

There are several parameters that are included in this formula, as follows:

- Building size
- Building type
- Value of the building
- Percentage of the value of the building

The fees are usually determined at the end of each stage, according to the stage of work progress, as follows:

- Preliminary planning
- Advanced planning
- Detailed planning
- Higher Supervision

❖ Fixed fee for square meter

Fixed fee for a square meter is usually used in the planning of commercial centers and public buildings. It is important to note that typically the fee per square meter varies in proportion to the overall size of the project. The greater the overall size, the lower is the fee per square meter.

❖ Fee according to housing units

This fee changes according to the geographical area, the complexity of the project and the number of the units.

❖ Hourly Rate

This fee is usually used when performing changes or additions to an existing project and the rate is usually determined according to the professional level of the architect. The rates published by the Architects Association are used as a baseline and are then changed following negotiations with the client.

Main pricing methodologies used in pricing architectural services

15. In Israel, fees are usually a combination of the Hourly Rate and the Pricing Model. Most architects use the Pricing Model while the Hourly Rate is usually used when making changes in an existing project. We decided to combine the two methods and review the results over time.

Issues in maintaining constant quality

16. Defining the unique output and assuring the measurement of a constant quality service is a challenge in virtually all service industries. Defining the unique output in services industries is usually not straightforward and is often extremely difficult. To define a unique output, it is necessary to understand what is being transacted between the service provider and the customer. In all cases, the providers must have practical knowledge regarding its essence and price.

Maintaining constant quality

17. Keeping the quality fixed in the architectural market is complicated since it requires comparing between different projects. Focusing on larger offices mitigates this problem since these offices work on similar projects throughout a long period of time.

18. In the architectural services, changes in quality mainly arise from variations in the composition of the agreed services. In order to keep quality fixed we focused on specific components of any particular service.

For example, when an employee is paid hourly, the measurement is classified according to:

- the company's field of activity and specific service group
- Tariff of a specific customer
- location, the price of the service may depend on the place where it's supplied
- the architectural' professional level

There are five types of architect levels, differentiating age, level of experience and employee skill. The levels are:

- Senior consultant/ partner in a private office
- Senior academic (head of a team)
- Academic (or practical engineer/Senior technician)
- Junior Academic (or practical engineer/ technician)
- Designer

It is important to choose stable and large customers in order to determine the changes of prices over time. It is also advised to always measure the same service.

The calculation of the price index

20. The PPI uses the Laspeyres formula. The price indexes are calculated for extended periods.

The calculation is divided in three stages:

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

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

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 firms indices $I_{t,f}$ by weighting together the firm specific service type indices $I_{t,c}$ for each firm:

$$I_{t,f} = \sum_{c=1}^{nf} w_{t,c} I_{t,c}$$

Where n^f is number of service types in firm f the $w_{t,c}$ is the turnover share of the service type c inside the firm f.

3. In the third stage the total index link for architectural services I_t is calculated, by

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

weighting together the indices calculated in second stage.

The sum over all firms were $w_{t,f}$ is the turnover of firm f divided by the sum of the turnover of the firms included into the sample.

Conclusion

21. The Israeli Central Bureau of Statistics is currently within the final stage of developing a price index for architectural services. Data on prices are collected primarily from the largest companies in the industry whose combined market dominance is considerable. These companies primarily offer architectural services. The prices of the services are monitored quarterly and the index is calculated as a Laspeyres type of chain index. At the first stage the index will be experimental; it is still at the testing phase, and has not yet been published. The main goal in the future is to complete an index for engineering services.