Survey of Expectations in Israeli Industry as a Leading Forecasting Tool

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Background

The *Survey of Expectations in Israeli Industry* has been carried out for over 30 years, since 1978, by the Economic Research Department of the Manufacturers' Association of Israel (MAI), among a representative sample of around 700 industrial plants. It is conducted once a quarter, by a computerized survey system, with questionnaires being sent by e-mail.

The *Survey of Expectations in Industry* presents quarterly trends in Israeli industry for the previous quarter, as well as the industrialists' expectations for the coming quarter. These trends are analyzed by industrial branch and the companies' size[2].

The survey examines a large number of economic parameters every quarter, including real trends in industrial production, sales to the domestic market, exports, employment and investments, alongside trends relating to export prices, financing expenditure and export profitability. In addition, every quarter the survey examines the various obstacles confronting the Israeli industrialist, with specific reference to the difficulties in recruiting professional workers, difficulty in contending with the credit crunch, and barriers to export growth. Since 2004 the survey also examines the principle trends in the overseas activities of Israeli companies.

Throughout the years we have maintained a fixed questionnaire, with only slight changes, in order to obtain a continuous and comparative data base. Thus, with regard to most of the **parameters** in the survey, we have a computerized data base with indexes since 1978.

Close to 200 industrialists respond to the survey every quarter, while the rate of response varies between 20% to 30%. In general, we observed a rise in response rates during periods of recession, with a drop in response during periods of growth.

The main index used in the *Survey of Expectations* is "weighted net balances". This index represents the rate of reporting an increase, minus the rate of reporting a decrease, weighted according to the intensity of the reported changes[3]. In general, it may be determined that a negative "weighted net balance" means a decrease, while a positive one means an increase. Zero means no change compared to the previous quarter, i.e. a freeze.

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[2] Small and medium as against large (by the no. of employees)

[3] **The answers in the questionnaire vary between 1 - 5, meaning:**
If 100% answered "3=No change" the index should be 0%.
If 100% answered "1=Significant Decrease" the index should be -100%.
If 100% answered "5=Significant Increase" the index should be +100%.

Survey of Expectations in Industry as a Leading Forecasting Tool

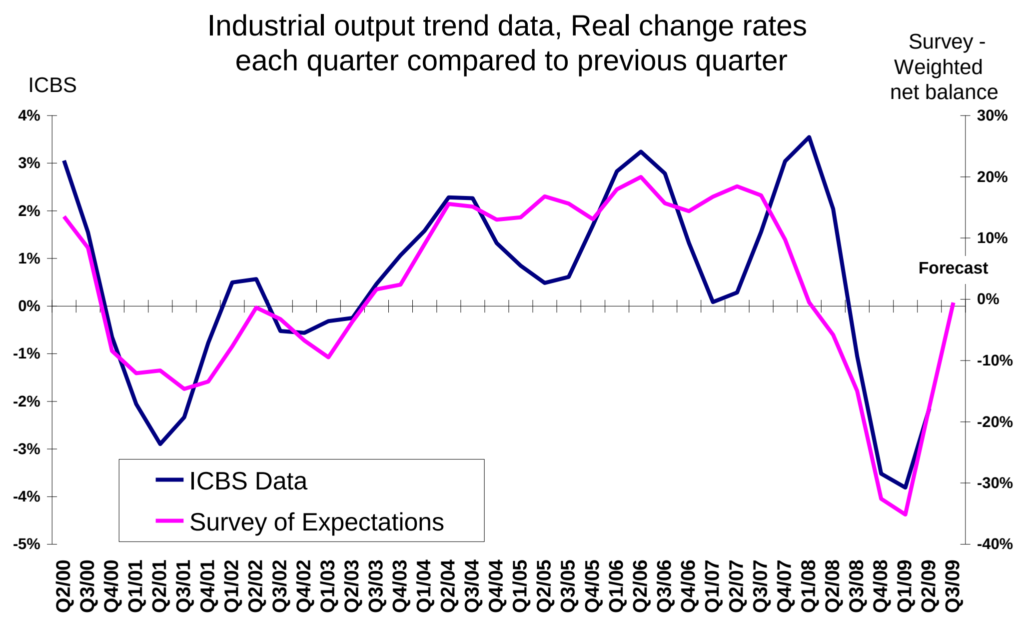
The *Survey of Expectations in Israeli Industry* was among the first to identify the changes in the growth trend[4], when already at the beginning of 2008 it pointed to a move towards a decline in industrial activity – this, about half a year before the official macro data of the Israeli Central Bureau of Statistics (ICBS) began indicating a decrease in industrial activity.

Over the years, the survey has proved its ability to predict changes in trends in their early stages, even months before publication of official data by the ICBS. This ability has also been tested over time by statistical examinations:

1. A report made by an external research company[5] regarding the survey's ability to foresee tendencies in industry found that: "**80% of the observations were able to predict the accurate trend of changes in the index of industrial production, export and employment in correlation with the indexes published by the ICBS".** (Based on 1978-1995 data base).

2. A statistical regression performed by the Economic Research Department of the MAI, based on 2000-2009 data base, showed that: "**there is a positive correlation of 0.81 between the ICBS official trend data base of industrial production and the trend line of the *Survey of Expectations in Industry*".** (Graph No. 1)

Graph No. 1: ***A high & positive correlation between the Survey of Expectations in Industry & official data***

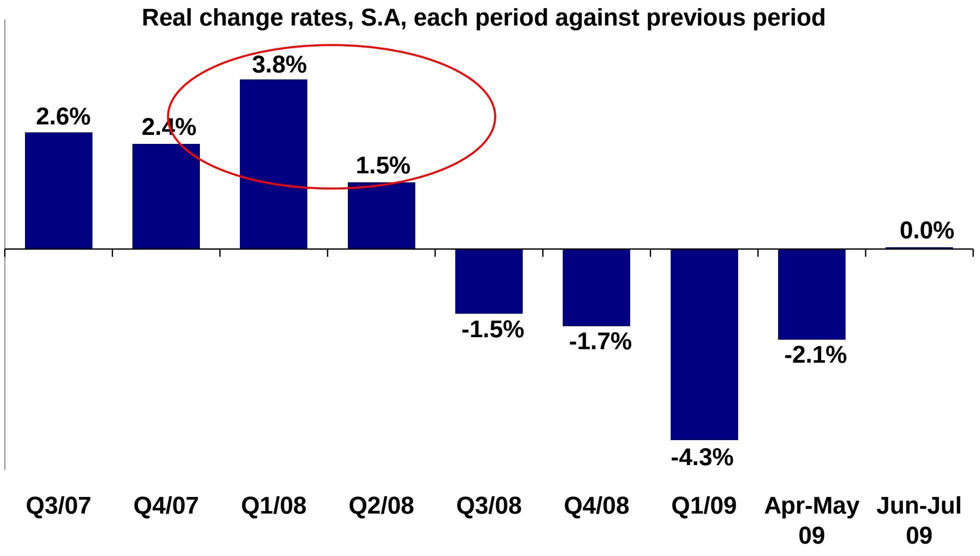


[4] A growth trend characterized the Israeli industry in the years 2005 – 2007.
[5] MEGAMOT - Prediction Technologies Ltd.

Graph No. 1 demonstrates visually the high correlation between industrialists' reports in the survey and official macro data. This graph presents the development of the industrial production trend index, which is published monthly by the ICBS, with a two month delay, as against the trend line for industrial production according to the weighted net balance of the *Survey of Expectations in Industry*, published at the end of every quarter in relation to the previous quarter, and including also a forecast for the next quarter.

The survey's ability to present an early forecast reached its peak at the beginning of 2008, when official macro-economic indicators continued to show rapid growth in Israeli industry – accumulated growth of around 5.5% during the first half of 2008 (Graph No. 2), while the survey's data indicated a regression in Israeli industrial production.

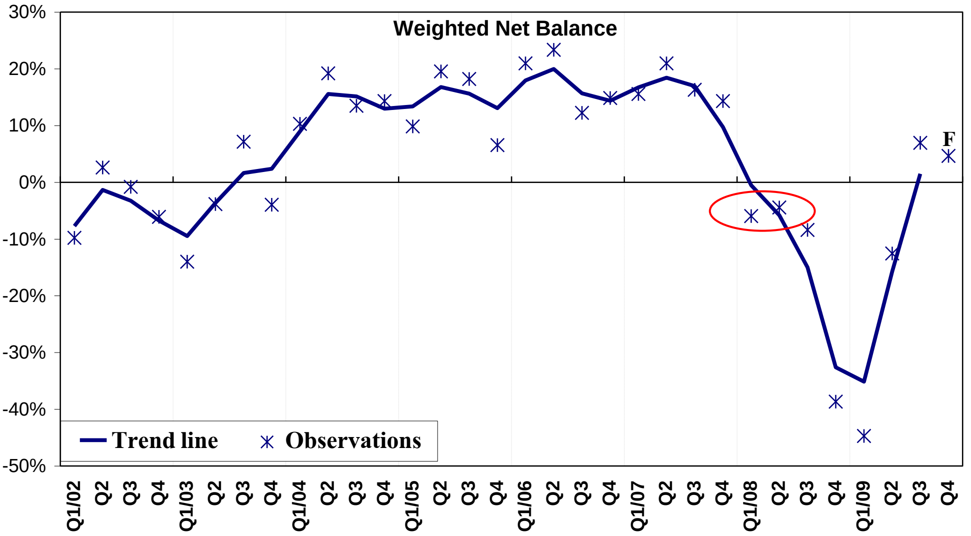
Graph No. 2: ***According to the ICBS - Industry Continued Growing during the First Half of 2008***



The first signs of regression were shown by the *Survey of Expectations,* published in April 2008, when for the first time since 2004 the industrialists reported a decrease in production - a negative weighted net balance of minus 6% in the first quarter of 2008. A quarter later, the July survey reflected a continuous decrease for two quarters in a row - a negative weighted net balance of minus 4.5% in the second quarter of 2008 (Graph No. 3).

Graph No. 3: ***Since the beginning of 2008 -Survey's data indicated a regression in industrial production***

Industrial production

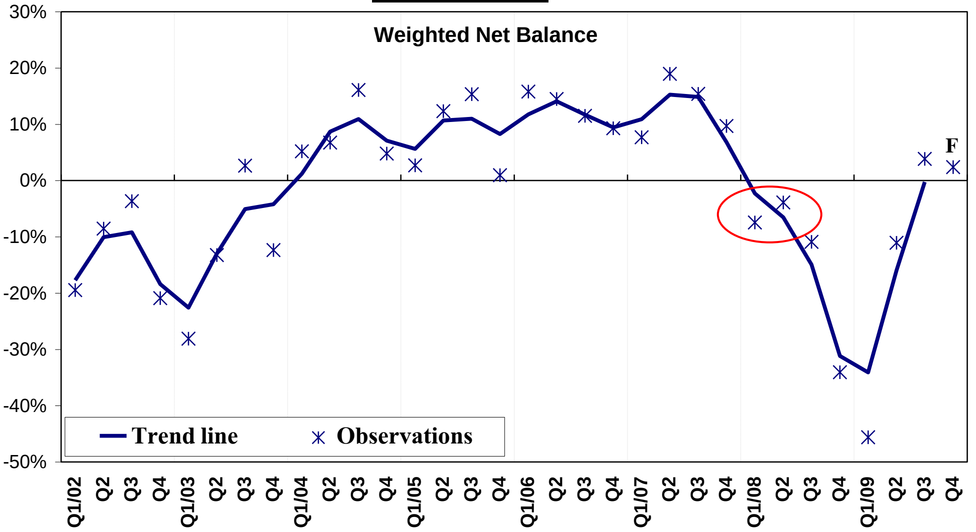


The graphs in the survey present the observations (=industrialists reports) for each quarter, as well as the trend line[6], which slides the line, in order to present a clearer trend. The rates of change shown in the survey's graphs do not represent actual rates of change, but constitute only an indication of the direction and the intensity of the change.

By examining other indicators derived from the *Survey of Expectations* at the beginning of 2008, we were able strengthen our assessment that the growth trend had changed, despite the official positive data: a recession was shown both in local sales (Graph No. 4), as well as in exports (Graph No. 5).

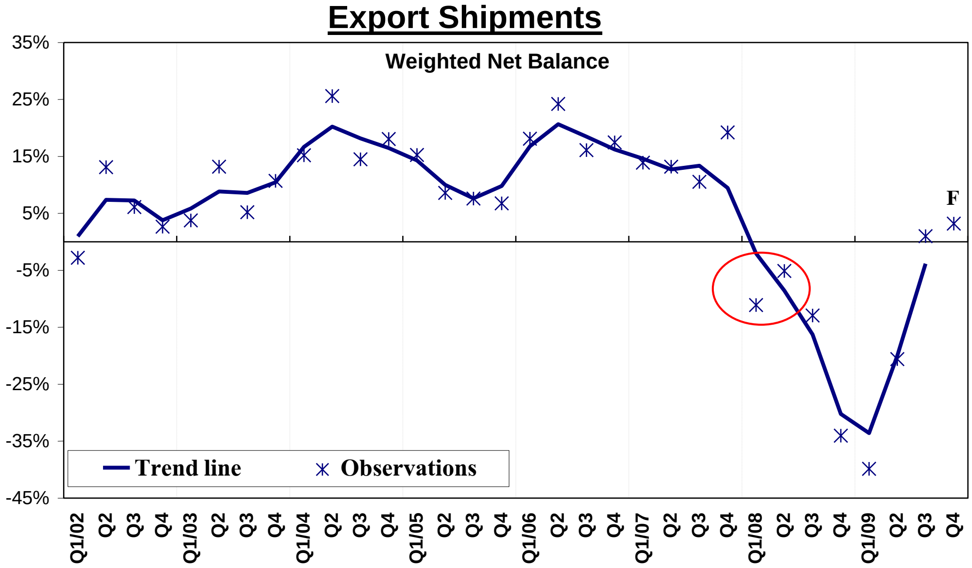
Graph No. 4: ***Since the beginning of 2008 - Survey's data indicated a decrease in local sales***

Local Sales



[6] The trend line is a moving average of 3 quarters, where each quarter is weighted differently: last quarter - 25%, current quarter - 50%, forecast quarter - 25%.

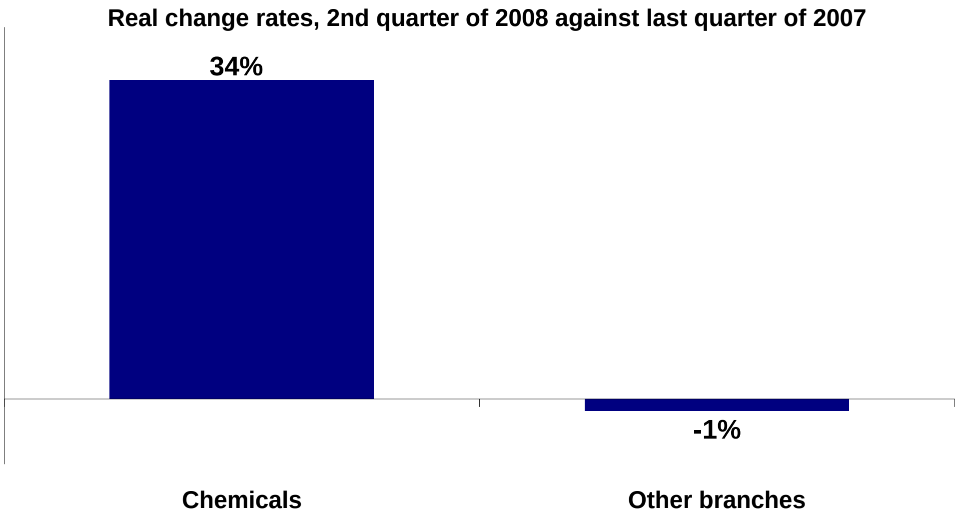
Graph No. 5: ***Since the beginning of 2008 - Survey's data indicated a decrease in industrial exports***



In spite of this, at the time we were a little bothered by the apparent contradiction between ICBS data and the survey's data. However - since past experience and statistical testing showed that when most of the industrialists in the survey report a drop, they are probably right – we searched for a legitimate reason for this paradox, and indeed found it.

A deeper analysis of ICBS data for industrial production by branches showed that most of industrial growth in Israel during the first half of 2008 derived from a single branch – chemicals[7] (and mainly from two large companies in this branch, which weighted together around 20% of total industrial exports[8]).

Graph No. 6: ***In First Half of 2008 - Industrial Growth Derived from rapid growth of Chemicals Branch***



[7] Total sales for the Chemical Branch in 2008 totaled in about $27 billion, accounting for around 28% of total industrial sales.

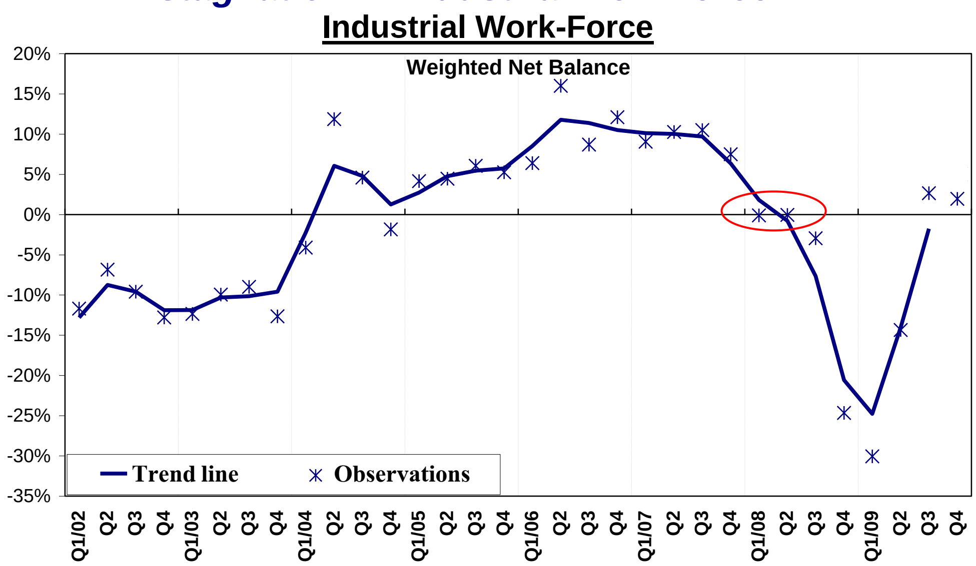
[8] In 2008 - Teva Pharmaceutical Industries Ltd exports were around 12% of total industrial exports & Israel Chemicals Ltd. (ICL) exports were around 9% of total industrial exports.

The chemical branch grew by an accelerated rate of about 34% during the first half of 2008, while the rest of industrial branches registered a slight regression (Graph No.6). Thus, the good performance of two large companies in fact masked the difficult situation that the majority of industrialists dealt with at that time.

An additional indicator that arose from the survey, and strengthened our understanding that this was a real recession, was the stagnation in industrial work-force that was reported by the industrialists over the two first quarters of 2008 (Graph No. 7). It is known that the labour market has a delayed reaction to economic changes, as industrialists are in no hurry to lay off workers due only to temporary drops of a month or two in orders. Thus, in the initial stages of the recession the industrialists prefer to freeze their work-force, and to mainly reduce overtime and shift work.

The dismissals of workers began only after two quarters, when the industrialists realised that the reduced activity was not temporary,

Graph No. 7: ***In the First Half of 2008 - Survey's data indicated stagnation in industrial work-force***



Thus, in July 2008, when industrialists already reported an actual drop in production for two quarters in row - the situation according to the *Survey of Expectations* was completely clear, that Israeli industry was in recession!

In addition, based on the industrialists' estimates at that time, we understood that this decrease was expected to be joined by dismissals of workers as of the third quarter of 2008.

Only about half a year later, in November 2008, the first official indicator was published pointing to the first month of regression in industrial production (September 2008 index).

We are all familiar with the rest of the story, as from September 2008 onwards the situation only worsened, with industrial production since then dropping at a cumulative rate of 11.5%, and the number of industrial workers being reduced by more then 5.5%.

This gap of timing (about half a year) in identifying the trend changes was very valuable and crucial to the Israeli economy, because at that period of time the Israeli policy makers could have taken some early and effective measures to prevent, or at least to ease the recession in the local market.

The Survey's Ability to Forecast Tendency Changes

How then can one explain the *Survey of Expectations*' ability to identify changing trends before the official data?

It is a fact that the ICBS data are also based on industrialists' reports; in fact, the ICBS has an advantage over our survey, as companies are legally obliged to submit reports, making it possible for the ICBS to obtain a much higher rate of response than in the *Survey of Expectations*.

The first explanation for this is the simple fact that initial findings of the survey are published immediately at the end of each quarter (about a week after the end of the quarter), and relate to actual data for the past quarter and also include forecasts for the coming quarter, while the ICBS data relate only to trends in practice, and are published with a delay of around two months.

The second explanation, which is particularly valid in a country as small as Israel, can be found in the survey's methodology. As this is a qualitative and not a quantitative survey, companies' reports are not weighted according to their size[9]. For this reason, the *Survey of Expectations* provides a better representation of the situation among most of the industrial companies, and avoids a situation where one or two big companies cover up the real trends in the majority of the industrial companies.

This explanation is most relevant in the case of a small country such as Israel, with a GDP of around $200 billion, and with an extremely high centralization in exports (83% of exports are carried out by less then 3% of exporters).

We expect a similar situation in 2009 as well, when the establishment of the new Intel plant in Israel (that at its peak will account for around 5% of industrial exports) is expected to influence Israeli industry's official macro data and to cover up the real trend in the majority of the Israeli industrialists..

To conclude, due to the small size of the Israeli economy, its official macro data are significantly influenced by the performance of some large industrial companies, which frequently cover up the real situation of the remaining plants. Thus, the conclusion arising from this document is that **the *Survey of Expectations* is indeed a Leading Forecasting Tool** and a very important tool for understanding the real trends in most Israeli industrial companies.

[9] A large company's report receives the same weight as that of a small company.

Appendix

Each quarter the Survey examines the following indicators:

Main parameters (**actual & future** trends)

- ❑ **Industrial production -** since 1978
- ❑ **Sales to domestic market -** since 1978
- ❑ **Industrial export shipments -** since 1978
- ❑ **Order books (domestic market & export) -** since 1999
- ❑ **Employed persons -** since 1978
- ❑ **Investments (machinery & equipment) -** since 1999
- ❑ **Real financing expenditure -** since 1999
- ❑ **Export prices (foreign currency) -** since 1999

Other parameters (only actual trend)

- ❑ **Utilization rate of capital stock -** since 1999
- ❑ **Finished goods stocks -** since 1999
- ❑ **Raw materials stocks -** since 1999
- ❑ **Export profitability -** since 1978
- ❑ **Difficulties recruiting unprofessional workers -** since 2000
- ❑ **Difficulties recruiting professional workers -** since 2000
- ❑ **Difficulties retaining existing credit facilities -** since 2009
- ❑ **Difficulties obtaining new credit -** since 2009

Multinational activities (actual & future trend)

- ❑ **Industrial production in plants abroad -** since mid 2004
- ❑ **Employed persons in plants abroad -** since mid 2004
- ❑ **Investments in plants abroad (machinery & equipment) -** since mid-2004

Time Table

- ❑ The questionnaires are distributed about 10-12 days before the end of each quarter.
- ❑ About 2–3 weeks later we publish the initial findings, based on about 150–170 firms.
- ❑ About 1 month later we publish the final findings, based on about 180–190 firms.
- ❑ The final findings include a sectorial review.

Methodology

- **Survey Population:** manufacturing industries [10](excluding diamonds), with at least 20 employees [11].
- **Sampling Method:** Stratified Sampling
  - Primary stratum: **Industrial branch**
  - Secondary stratum: **Size** by: 1) revenues, 2) no. of employees
  - Tertiary stratum: **Export intensity**
- In each stratum a simple random sample is drawn with a uniform probability.
- **Base Sample:** Representative sample of about 730 industrial companies
- **Response Rate:** 20%-30% of the base sample
- **Imputation and Sampling Error examinations are not preformed**

The main index used in the survey is "Weighted net balances"

- **The index represents the rate of reporting an increase minus the rate of reporting a decrease, weighted according to the intensity of the reported changes.**

- Stage 1 => Basic index = (1 X %) + (2 X %) + (3 X %) + (4 X %) +(5 X %)
- Stage 2 => (Basic index/300-1)*3/2 = Weighted net balances

Tendency line = trend line - a moving average of 3 quarters, where each quarter is weighted differently:
last quarter - 25%, current quarter - 50%, forecast quarter - 25%.

[10] As defined in the CBS's Standard Industrial Classification of All Economic Activities 1993, Second Edition, Technical Publication no. 63, Jerusalem 2003.
[11] This population excludes establishments of self-employed proprietors and non-profit establishments.