



**Economic and Social  
Council**

WORKING PAPER NO 10

5 May 2006

ENGLISH ONLY

**ECONOMIC COMMISSION FOR EUROPE**

**STATISTICAL COMMISSION**

**CONFERENCE OF EUROPEAN STATISTICIANS**

Group of Experts on Consumer Price Indices

Eighth Meeting

Geneva, 10-12 May 2006

Item 11 of the provisional agenda

**E-COMMERCE IN THE ISRAELI CPI\***

Supporting paper submitted by the Central Bureau of Statistics of Israel

The meeting is organised jointly with the International Labour Office (ILO)

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\* This paper has been prepared by Mr. Yoel Finkel and Mrs. Merav Yiftach, Israel Central Bureau of Statistics, at the invitation of the Secretariat. Paper posted on Internet as received from the authors.

# **E-COMMERCE IN THE ISRAELI CPI<sup>1</sup>**

Submitted by the Central Bureau of Statistics, Israel

## **I. Introduction**

In January 2005, the Central Bureau of Statistics in Israel (ICBS) conducted its bi-annual update of consumption weights for the Consumer Price Index (CPI).

The consumption weights for the basket of goods and services were derived from the annual Household Expenditure Surveys (HES) conducted by ICBS in 2002-2003. These surveys included questions relating to household consumption by electronic commerce. ICBS has utilized these data and findings from other sources (media, journals, academic research, private firm surveys) to implement actual measurement of specific goods and services consumed through electronic commerce and in the monthly CPI. In this paper we discuss the issues relating to the inclusion of E-commerce in the Israeli CPI.

## **II. E-commerce in the Israeli CPI – the issues**

The goods and services to be included in the E-commerce index may be of the following nature:

- ❑ Purchased from Internet sites that are "extensions" of the traditional shops (food from supermarket chains, items from department store sites, etc.).
- ❑ Unique to E-commerce (the goods may be similar to those of traditional outlets but may be sold exclusively on internet sites).
- ❑ Consumption patterns of services that did not exist in the pre-internet period (consuming services in different fashion than the regular index – like financial services, banking, stock markets or consumption of public services via internet and consuming goods and services by on-line auctions).
- ❑ Consumption of Internet provided services (connection to Internet and ISP added value services).

The two major issues that we were explored, prior to inclusion of Internet shops into the Israeli CPI, were analysis of price trends for goods and services provided by E-commerce (whether they differ from the price trends for the traditional outlets); and whether pricing methods for these deviated from the "normal" price schemes (like auctions). This was accomplished by:

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<sup>1</sup> This paper has been prepared by Mr. Yoel Finkel and Mrs. Merav Yiftach, Israel Central Bureau of Statistics, at the invitation of the Secretariat.

- Gathering of data on E-commerce consumption through media, research articles, surveys (public and private), IT related journals and other sources to determine weights
- Building an internet site "register" for current price collection based on data from major credit card companies or IT journals
- Collection of prices over time for regular and unique goods and services
- Compilation of price indices and comparison with the actual CPI.

Many issues had to be resolved in the process: which goods and services to choose, how to collect the same items on a monthly basis and from which sites, how to handle special pricing schemes, etc<sup>2</sup>.

### III. Consumer Expenditure through E-commerce

The following is a description of the Israeli E-commerce market in 2003/4 based on multiple sources from the *private sector*:

- 47% from the Israeli population use the Internet.
- 82% of users do so in a daily basis.
- 42% (with access) do so more than 10 hours a day.
- 42% (with access) have purchase goods or services on a regular basis.
- 60% from the users are men.
- 47% of users purchase electronic goods, 22% books, 17% hardware, 14% travels, 13% compact disks.

The most popular uses of Internet services, based on these sources, are gathered in *Table 1* below.

Uses	Percent
Games	46%
Bank transactions	48%
Newspaper reading	74%
E-Mail	84%
Listen to radio	28%
Shopping	42%
Chat	43%
Application download	65%
Matchmaking	10%

An *official* source for consumption of E-commerce is the Household Expenditure Surveys (HES), conducted annually by ICBS. HES were first performed in the early 1950's; until 1997 they took place approximately once every five years. Since 1997, ICBS has conducted the survey on an annual basis, among the total population of households.<sup>3</sup> The survey aims to obtain data on the components of household budgets, as well as additional data that characterize various aspects of the living standard of households, such as consumption patterns, leisure activities and entertainment, level and composition of nutrition, level and

<sup>2</sup> For extended analysis and results of the simulations conducted by ICBS see: Finkel and Yiftach, [E-commerce in the Israeli CPI](#), Ottawa Group, Seventh Meeting, Paris 2003.

<sup>3</sup> For a more extensive description of survey methodology and findings see Household Expenditure Survey 2001, General Summary, Central Bureau of Statistics Israel, Publication #1201, April 2003.

composition of income and housing conditions. In addition, the survey is used for market research, for construction of models to predict consumer behavior, for research on the effect of taxes among the various population groups, etc. One of the most important uses of the survey is to determine weights for the consumption basket of the CPI.

As of 1997, the survey population includes 94% of the urban and non-urban household population. The *investigation unit* is the household, i.e., a group of people living in the same dwelling most days of the week with a shared budget for food expenditures.

- Data were collected from each of the 7,500 households<sup>4</sup> in an integrated fashion, in the following ways:
- A questionnaire on household structure – filled out by the interviewer, providing basic demographic and economic data on each member of the household.
- A bi-weekly diary – in which the household independently records each member's daily expenditures over a period of two weeks.
- A questionnaire on larger expenditures and on income – filled out by the interviewer on the basis of household reporting, related to the three-month period preceding the interview date.

Estimates from the bi-weekly surveys and quarterly questionnaires are "inflated" into yearly expenditures and divided into monthly expenditure estimates.

From HES data we learned that the percentage of households that used Internet services grew from 4.6 percent in 1997 to 40.7% in 2004.

**Table 2 Consumption of Internet services (%), 1997-2001**

Year	1997	1999	2001	2003	2004
Internet Services	4.6	11.9	22.5	30.8	40.7

In 2004, the percentage of households that used the Internet (had regular access) in the highest income decile<sup>5</sup> was 68.7% compared to only 11.9% for the lowest decile.

**Table 3 Consumption of Internet services by income deciles (%), 2004**

Deciles	1	3	5	7	9	10
Internet Services	11.9	22.9	38.2	55.2	63.8	68.7

According to these data, potential of E-commerce consumption has grown at high rates over the previous years and is a common phenomenon, especially for the higher income groups in the population.

Household expenditure on E-commerce was over 2% of total household expenditure in 2004. E-commerce expenditure on *questionnaire* items (the "expensive" items like electronic and

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<sup>4</sup> Net figures of households are nearer to 6,500 after taking into account households that are not part of the definition of the population and households that refused to participate. The participation rate over the last years is nearly 90%.

<sup>5</sup> TP Household population divided into ten equal parts according to some variable. In this case, the income deciles are divided according to net income per standard person – a household's total current gross income (including income in-kind from housing and motor vehicle consumption) after deduction of compulsory payments (income tax, social security and health taxes), divided by the number of standard persons in the household.

durable goods) was over 2.5% and expenditure on *diary* items (the daily, more frequent expenditures, like food) through E-commerce was about 1/2% of total diary expenditure.

From HES we received an indication of consumption by type of outlet where we see a large portion of consumption for electronic goods (including computers) over the web.

**Table 4: Consumption by type of shop (%), 2004**

Type of shop	Regular Outlets	Catalogue	Internet	Duty free/abroad
Household and garden's furniture	94.5	3.2	1.6	0.7
Electronics household appliances	86.6	4.8	7.7	0.7
Washing machine and dryers	89.6	1.8	8.0	0.6
Electronics entertainment	80.4	2.2	10.1	7.3 <sup>6</sup>
Fitness appliances	92.0	1.7	3.3	3.0
Computers	93.2	1.7	4.8	0.3
Jewelers	95.6	0.3	0.2	3.9

#### IV. Price measurement with E-commerce

Anticipating an exponential increase in E-commerce expenditure, ICBS began price collection of several Internet based goods and services in January 2001. During the 3+ year period of January 2001-June 2004, over 5,000 prices were collected from nearly 100 Israeli based internet sites (extracted from private firm surveys and IT journals), covering 72 consumption sub-groups in the CPI. The number of prices collected from these sites varied between single prices for certain sites and between 50-200 prices in others. Five of these sites (books and CD's) accounted for more than 40% of the prices. Five other sites (electronic equipment) accounted for another 20% of the prices collected by ICBS. These data were consistent with the expenditure data from HES and private research firms.

As stated, in January 2005 ICBS updated the weights of the Consumer Price Index, although the base period of the index remained 2002=100.0 points. Therefore, since July 2004 we transformed our collection related to e-commerce to the one that we anticipated use in "real measurement" from January 2005. During this period we continued to check to ensure the availability of the price observations and the feasibility of the process. The major questions were:

- Which websites are available to the consumers?
- Will we have an easy and free access to these sites?
- What is the availability to access the same web site every month, under the same conditions conditions?
- What would be the products that we will collect every month?
- Did they have enough specification to ensure collection of the same product every month?
- How to collect the sales and how to express them in the CPI measurement?

The actual decisions, based on the several years of experience from the simulations, for the actual price measurement were:

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<sup>6</sup> Israel has a unique service where one can purchase electronic equipment at the airport, store it until return and pick up on arrival. This explains the large expenditure at the duty free shops for this category.

- The goods to be included in the E-commerce were chosen from the existing CPI item sample as representative items.
- Data were collected from 9 web sites according to the CPI item specification (brand, size, etc.).
- Sales that are offered to all consumers are to be taken into account.
- The data were collected according to the regular CPI methodology in the Israeli CPI. This meant staggering of the websites into 4 weekly groups where they are “visited” by the price enumerator during the same week, every month (according to table 5 below).

**Table 5: CPI measurement schedule (as of July 2004)**

Sub Group	Web site	Date
Food, household equipment (not electric)	1	1-8
	2	8-15
	3	15-31
Books and compact disks	4	1-8
	5	8-15
	6	15-21
Electrical equipment for homes and kitchen appliances	7	1-15
	8	15-31
Cosmetics	9	1-15

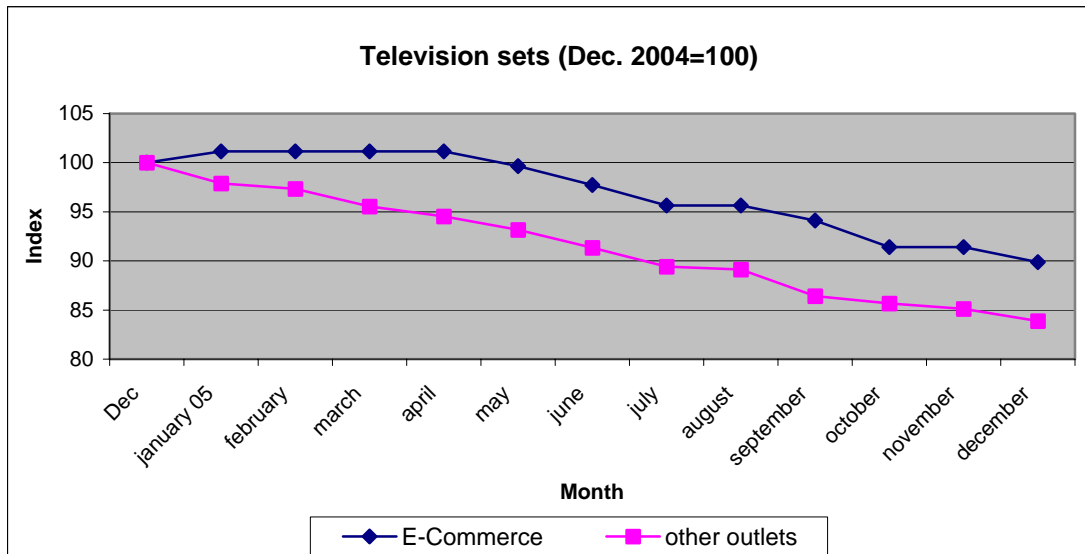
The price data are collected monthly, according to the timetable above and the amount of items for which price observations are collected:

**Table 6: Number of items in the CPI measurement**

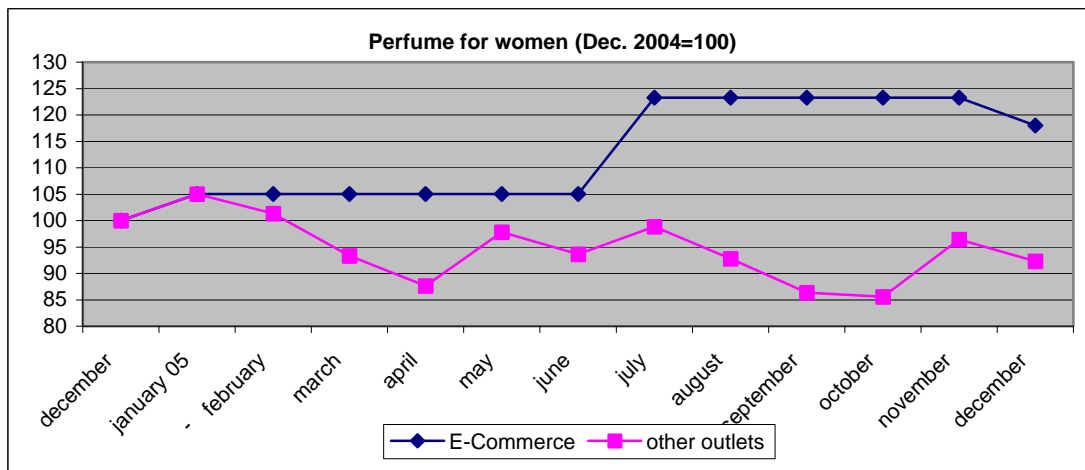
Major group	Food inc. Fruits and vegetables	Household maintenance	Furniture & Household equipment	Health	Education, culture & entertainment	Other goods and services
Number of items	118	16	14	22	19	35

In figures 1-5 below, comparisons are presented between product indices derived from prices collected on the websites and those collected from the traditional outlets.

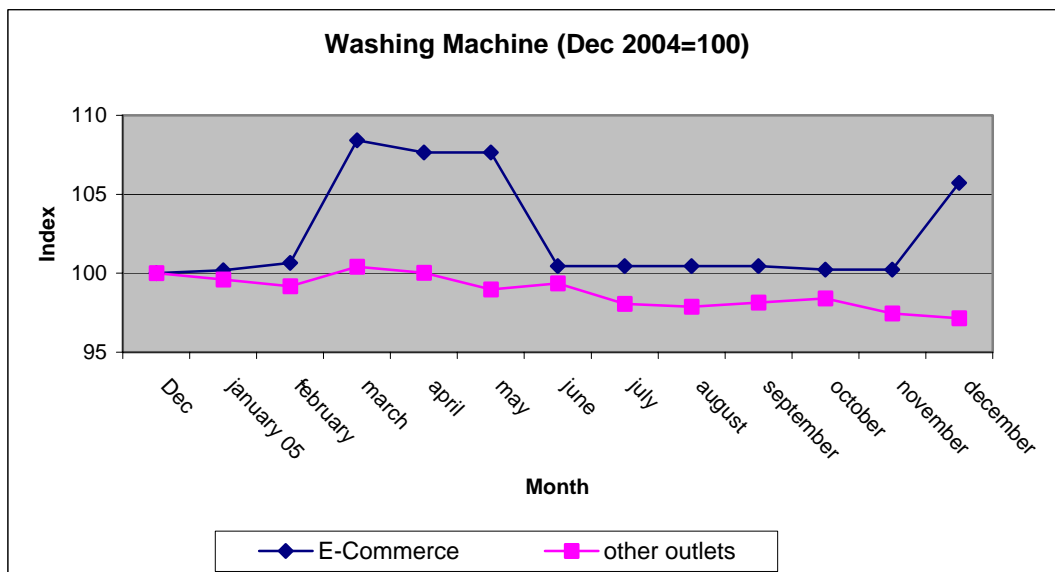
**Figure 1**



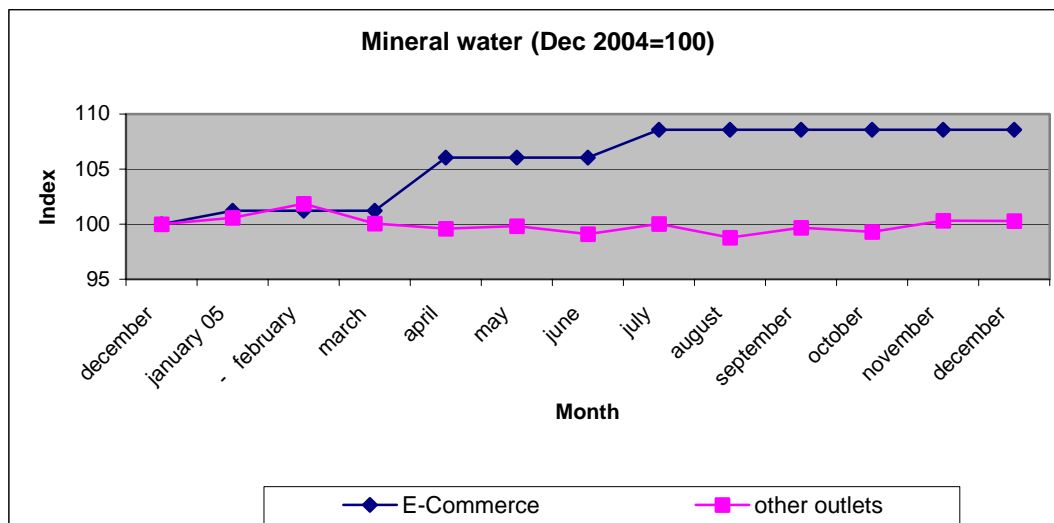
**Figure 2**



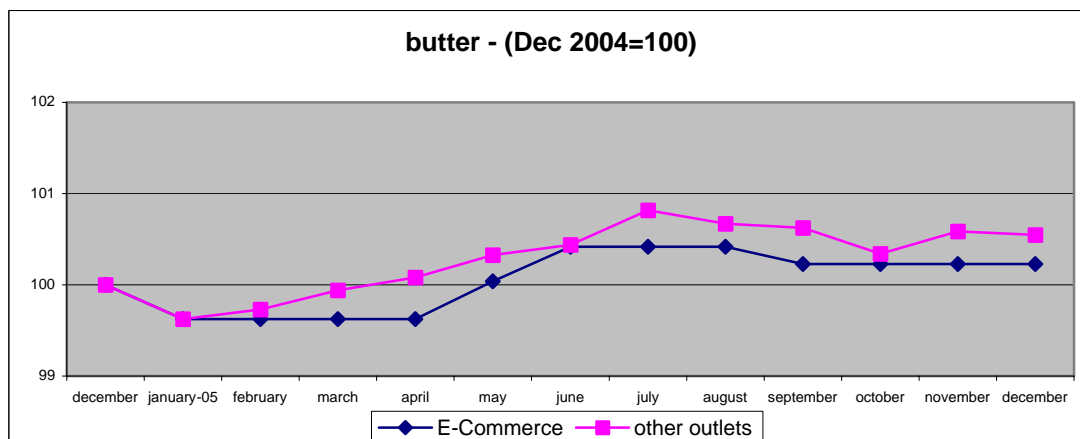
**Figure 3**



**Figure 4**



**Figure 5**



Excluding the case of butter, in which the e-commerce index is lower than the regular index, the index derived from the e-commerce price quotations is higher. This is due to the fact that sales prices (and more of them) seem to be observed at the traditional outlets. In addition, variance in the e-commerce indices is larger due to the smaller number of price observations. The price changes in the e-commerce indices, over the one-year period, behave differently and seem to justify the efforts to collect and compute these indices on a regular basis.

From an operations point of view we learned that most of the items included in our e-commerce basket can be computed monthly. The same items can be priced based on their identifying characteristics. Accessibility to the chosen sites is suitable. Treating e-commerce as an additional outlet layer enables us to blend these price observations into our regular computer system for the CPI.

## V. Summary

ICBS launched a multi-year project to compute price indices for goods and services consumed by E-commerce. Like all indices in the CPI, we must define the E-commerce domain,

calculate consumption weights, construct survey samples (outlets, items, prices) and measure price changes on a current basis. Although we encountered several difficulties in performing these tasks in the past, we decided on actual measurement as of January 2005.

Data received from private sector sources and Household Expenditure Surveys (usually conducted by national statistical agencies) are sufficient for deriving consumption weights of E-commerce.

We presented in this paper some of the methods adopted at ICBS to compute price indices for E-Commerce. This market is growing, consumption of individuals and households are rising and competition between the websites and traditional outlets may lead to differences in price behavior. A special index layer relating to e-commerce prices should therefore represent these differences. It should be stated that the limitations of these indices are that they simulate for traditional methods of consumption. While e-commerce has introduced new ways of commerce (like auctions), these are yet to be compiled in our CPI.