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28 August 2007

Israel's per capita GDP adjusted for purchasing power parity (PPP)

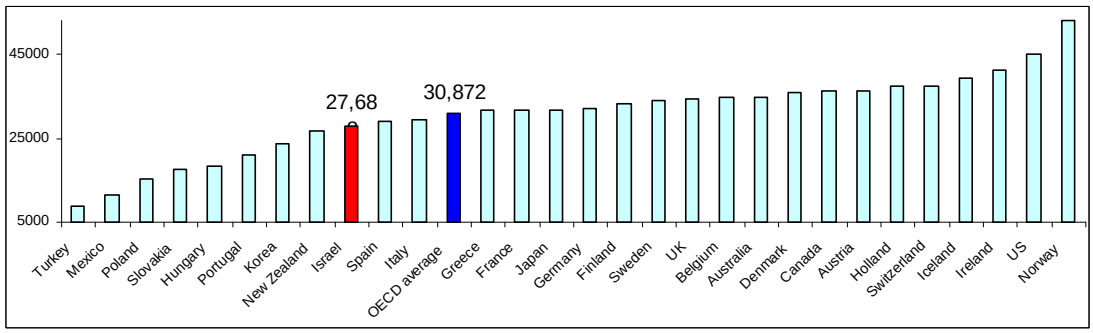
- **According to the latest estimates by the Central Bureau of Statistics/OECD—which, adjusted for purchasing power parity, is the most stable of all the existing estimates of per capita GDP in Israel—per capita GDP in Israel was $ 27,688 in 2006. This places Israel in the twenty-first place in a descending list that includes Israel and the OECD members.**
- **In April 2007 the IMF published an amended estimate of per capita GDP in Israel, adjusted for purchasing power parity, revising its previous estimate upwards significantly. This revised estimate places Israel in the eighteenth place in the above list.**
- **There are considerable differences in the adjustment for purchasing power parity carried out by different international institutions.**

Major international bodies, including the OECD, the International Monetary Fund (through the World Economic Outlook), the World Bank (through the World Development Indicators), and the University of Pennsylvania (through the Penn World Tables), publish comparisons of per capita GDP adjusted for purchasing power parity (PPP) in countries around the world, including Israel.

a) Major findings

The Central Bureau of Statistics in Israel estimates annually the measure of purchasing power parity, based on the PPP exchange rate published by the OECD once every three years (for more details, see methodology below). According to this CBS/OECD estimate, Israel's PPP-adjusted per capita GDP in 2005 stood at $26,051, placing Israel twenty first on the descending list including Israel and the OECD member countries,[1] and in 2006 it stood at $27,688, also placing Israel twenty first. (See Figure 1 below).

Figure 1
PPP-Adjusted Per Capita GDP in Dollars, Israel and OECD Countries 2006



SOURCE: Based on OECD and CBS data.

[1] See the Statistical Abstract of Israel, 2006, Table 28.7 "Gross Domestic Product and Per Capita GDP" (not including Luxembourg).

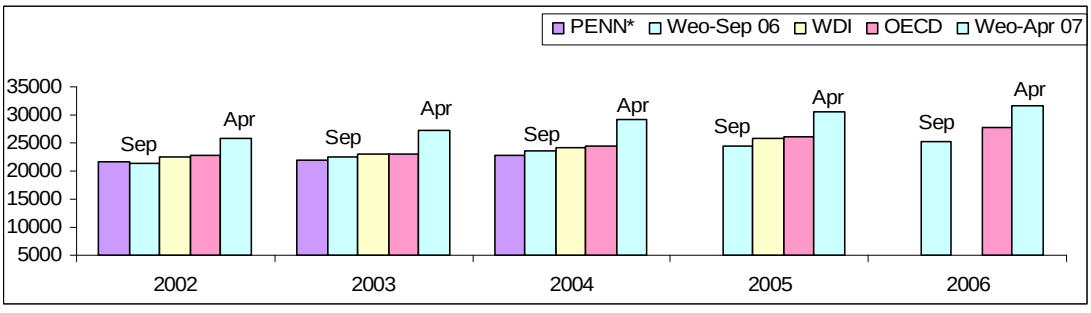
The IMF recently changed its forecast of the level of PPP-adjusted per capita GDP in Israel. The World Economic Outlook published in April 2007 estimates Israel's PPP-adjusted per capita GDP in 2007, at $ 31,767, which puts Israel at eighteenth place in the list with the OECD countries. That comparison of per capita GDP shows that Israel is in a similar position to that of several OECD countries, including France ($ 31,872) and Germany ($ 32,178), and not very different from the OECD average of $ 32,098. The gap between per capita GDP in Israel and the OECD average, according to this calculation, is only $300.

The IMF's forecast for 2007 is significantly different from that of the World Economic Outlook in September 2006. At the end of 2006, the IMF had forecast that Israel's per capita GDP in 2007 would reach $25,250. By this calculation, Israel would be in twenty-first place in the list comparing Israel with the OECD countries. The gap between Israel's per capita GDP the OECD average ($30,636) would be much higher at $5,380. In addition, the forecasts for France ($31,777), Germany ($32,683) or Japan ($33,010) for example, did not change as significantly as did Israel's. France, for example, was in sixteenth place, similar to its ranking in the forecast issued in April 2007. The US, likewise, with per capita GDP of $45,000, was ranked in second place in both of the IMF forecasts.

The difference between the two World Economic Outlook publications stems from the difference in calculating purchasing power parity. Israel's PPP exchange rate for 2007 as published in April 2007 was significantly lower than that in September 2006: NIS 2.90 to the dollar compared to NIS 3.64 to the dollar, respectively. Per capita GDP in terms of local currency for 2007 was almost identical in the two forecasts: NIS 92,814 in April 2007 compared to NIS 93,672 in September 2006. In the World Economic Outlook of April 2007, Israel's PPP exchange rate was adjusted (reduced) retroactively, using the lower PPP exchange rate in the calculations of previous years too, thus raising Israel's estimated PPP-adjusted per capita GDP for those years as well as in the forecast for 2007 (see Figure 2 below).

Moreover, the statistic for Israel's per capita GDP as appears in the latest publication of the IMF is significantly higher than the figure from the other international bodies mentioned (Figure 2).

Figure 2
Comparison of PPP-Adjusted Per Capita GDP among International Institutions, 2002-06



* Penn World Table Version 6.2, University of Pennsylvania, September 2006.

The difference in Israel's PPP-adjusted per capita GDP over a period as short as six months calls for an explanation of the IMF's method of calculation. To understand the IMF's methodology better, one must also compare the methods of calculation of

other bodies that use uniform international prices when comparing Israel's GDP with other countries. In the following section, we compare the various methods.

b) Methodology

1) *Israel's PPP exchange rate—The International Comparison Program*

Internationally comparable price levels are based on comprehensive international research produced every three years by the International Comparison Program (ICP). This research, under the auspices of the World Bank and each participating organization (the OECD, the EU (Eurostat) and others), collates data via a survey of participating countries, attempting to ensure uniformity of product definition with regard to quality and units of measure.

In 1996, Israel began to take part in the survey conducted by the OECD as part of the above research project. The Central Bureau of Statistics collects data on prices of some 3,000 goods and services in Israel, and passes the data on to the OECD, which calculates the purchasing power parity in accordance with standard practices. Each such product is set a uniform international price using a weighted average of the prices in all surveyed countries (with the weighting in accordance with the size of the country and its level of prices) multiplied by a constant proportion. This proportion is set such that the numerical value of GDP calculated using the same international prices would be equal to the US GDP in dollars and in US prices (US PPP = 1). As part of this process, the OECD publishes the relevant PPP exchange rate for each country.

As the survey is conducted once every three years, the Central Bureau of Statistics carries out estimates of the PPP exchange rate for the intervening years. For example, the CBS carried out such an assessment for the years 2003-06. This assessment was based on the purchasing power parity equation, so that the change in the PPP exchange rate was based on the ratio between the change in prices according to Israel's GDP—the GDP deflator—and the US GDP deflator. This ratio is multiplied by the PPP exchange rate of the previous year, taking 2002 as the base year (see table below). The estimate is calculated each year in order to adjust for changes in GDP. (In the Statistical Abstract of Israel, the superscript *r* denotes a revised estimate.) As the PPP exchange rate for 2002 (NIS 3.46 to the dollar) was published only in 2005, the CBS in earlier publications had calculated the estimate for 2002 using the same method but based on the 1999 survey results (when the PPP exchange rate was NIS 3.64 to the dollar). Hence the measure for 2002 which appears in the Statistical Abstract for 2004, is higher and stands at NIS 3.75 to the dollar.

Comparison of PPP Exchange Rates from Different Institutions

	2000	2001	2002	2003	2004	2005	2006	2007
WEO, Sep 2006	**3.75**	3.71	**3.84**	3.74	3.66	3.63	3.60	3.64
WEO, Apr 2007	**3.08**	3.06	**3.15**	3.08	2.99	2.93	2.93	2.90
WEO*	**3.25**	3.24	**3.33**	3.25	3.16	3.04	3.02	
OECD**	**3.58**	3.52	**3.46**	3.38	3.29	3.23	3.21	
WDI,2007	**3.25**	3.24	**3.32**	3.26	3.17	3.09		

* Another calculation based on the World Bank's PPP exchange rates of 2000.
** Figures in 2002 from OECD survey, in other years CBS calculation.

2) *The World Bank's method of calculation*

The explanation of the World Bank's method of calculation is based on data published in the WDI in April 2007, in addition to information that was received from the World Bank in answer to a direct enquiry. The calculation is based on the measure of Israel's PPP-adjusted per capita GDP for 2002, as published by the OECD: $22,616. Based on this statistic, we get a PPP exchange rate of NIS 3.32 to the dollar for 2002, the base year (see table). For the years between the surveys, the method of calculation is by means of extrapolation (similar to the CBS method in Israel). When comparing the latest publication of the WDI to its earlier publications, we can see that the corresponding statistic for 2002, as appears in the 2007 publication, is lower by 16 percent: NIS 3.32 compared to NIS 3.80 which appears in the earlier publications.[2] The World Bank claims that in earlier publications they had used estimates, as the OECD published the corresponding data on 2002 only in 2005.

3) The IMF's method of calculation

The IMF's method of calculation is similar to that of the CBS in Israel, though it differs in two major respects: first, the IMF calculates the PPP exchange rate with a base year of 2000 and not 2002; and secondly, the IMF bases its figures on data from the World Bank in 2000[3] and not on the original data published by the OECD. The IMF's answer to the source of the difference between the different publications, was that they were indeed based on 2000 data as published by the World Bank, and that the World Bank had reduced the PPP exchange rate in its calculation by 16 percent, which contributed to the discrepancy. Also, the table shows that the IMF is not based exactly on the same 2000 data as presented by the World Bank: NIS 3.08 to the dollar compared to NIS 3.25 to the dollar as shown in WDI. Furthermore, even in calculations using NIS 3.25 to the dollar (see WEO* in the table), one does not arrive at the World Bank's figures. We therefore conclude that there is probably another calculation by the IMF, as the change in the PPP exchange rate, in its latest publication, was greater than 16 percent.

From this we can see that the data published by the above institutions, not including the University of Pennsylvania,[4] are based on the OECD survey conducted every three years, as part of the International Comparison Program. The base year for calculations constitutes one of the major differences between these institutions. The CBS/OECD estimates apparently provide the most stable estimates. The CBS's method of calculation for the years in between the surveys, based on extrapolation, are consistent over the years and are calculated directly using the OECD data.

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[2] One should note that in the earlier WDI publications, one can find data for one year with no retroactive revision, so the data is based on a 2004 publication which includes the per capita GDP for 2002.

[3] World Economic Outlook (April 2004), Box A2: "Revised Purchasing-Power-Parity-Based Weights", pp 183-184.

[4] The explanation of the University of Pennsylvania's method calculation was very general (even after a direct approach), and did not make specific reference to Israel.