

Purchasing Power Parities and related economic indicators for EU, Candidate Countries and EFTA¹

Final results 2002 and preliminary results 2003

Statistics
in focus

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Prices and purchasing
power parities

Authors

*Silke Stapel,
Jarko Pasanen,
Sebastian Reinecke*

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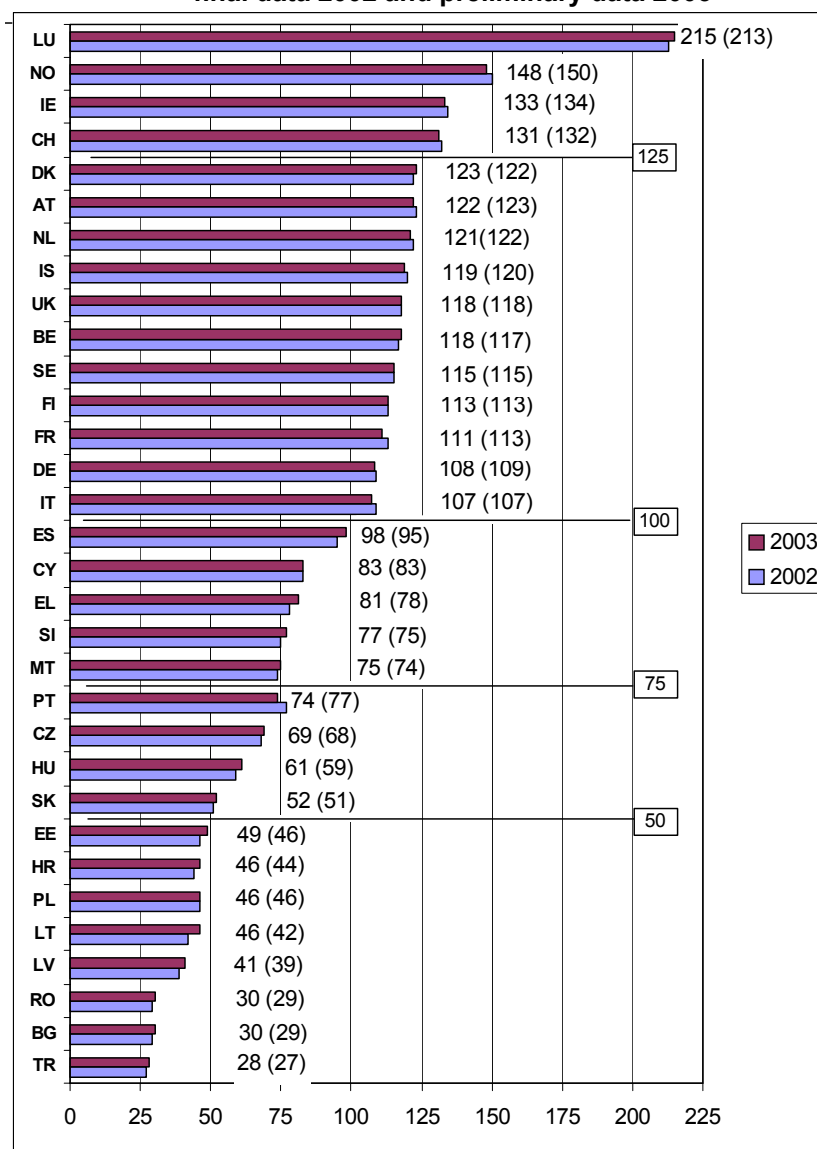
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This article presents Purchasing Power Parities and related economic indicators at the level of Gross Domestic Product (GDP) and Final Consumption Expenditure of Households (HFCE) for the 31 countries⁽²⁾ participating in the Eurostat coordinated group of the European Comparison Programme (ECP). Additionally, Eurostat estimates for Croatia are given for the first time.

Chart 1: Per capita volume index at the level of total GDP, EU25=100
final data 2002 and preliminary data 2003



Note: The figures outside brackets refer to 2003. The ones in brackets refer to 2002. The grouping refers to 2003.

⁽¹⁾ Excluding Liechtenstein

⁽²⁾ The 25 EU Member States, Bulgaria, Romania, Turkey, Iceland, Norway and Switzerland



The ECP – in which Eurostat closely co-operates with the OECD – is aimed at making annual volume comparisons of the main National Accounts (NA) aggregates; GDP and its components.

In this article, preliminary and final data stemming from the regular PPP dissemination calendar, and data series back to 1995 are put forward. The PPP dissemination calendar is presented in detail in Box 2.

Purchasing Power Parities

Purchasing Power Parities (PPPs) are currency conversion rates that are applied to convert economic indicators in national currency to an artificial common currency, called Purchasing Power Standard (PPS), which equalises the purchasing power of different national currencies.

Table 2 shows parities from 1995 to 2003 at the levels of GDP and HFCE. These PPPs are used to convert countries' GDP or HFCE at national currencies to remove the effect of different price levels and to enable meaningful volume comparisons between countries.

Box 1: Product level PPPs

In their simplest form PPPs are price relatives that show the ratio of the prices in national currencies of the same product in different countries. E.g., if the price of a loaf of bread in France is 1.87 euros and in the United Kingdom it is 0.95 pounds, then the PPP for bread between France and the United Kingdom is 1.97 euros to the pound. This means that for every pound spent on bread in the United Kingdom, 1.97 euros would have to be spent in France to obtain the same volume of bread. Therefore, to compare the volumes of bread purchased in the two countries, either the expenditure on bread in France can be converted to pounds by dividing it by 1.97 or the expenditure on bread in the United Kingdom can be converted to euros by multiplying it by 1.97. PPPs, however, are not published at the product level, but various higher levels of aggregation up to GDP. This is due to the fact that, for cost reasons, the PPP programme is built to deliver justifiable results only at highly aggregated levels.

Per capita volume indices

The **per capita volume indices**, shown in **Chart 1 and Table 1**, represent the real volume of GDP in per capita terms. They are expressed in relation to the European Union (EU25=100). If the per capita GDP volume index of a country is higher than 100, that country's level of GDP in per capita terms is higher than the EU average and vice versa.

Although the indices are available for all the participating countries they are not intended to rank countries strictly. They only provide an indication of the comparative order of magnitude of the per capita volume in one country in relation to others. It is therefore preferable to use these indices for dividing countries into groups of a comparable level as shown below. To even underline this point, the countries are shown within groups in alphabetical order of the codes (for codes see table 1).

In 2003, based on the preliminary PPPs for the GDP, the grouping of the participant countries was the following:

Group I ($\geq 125\%$ of the EU25 average): Switzerland, Ireland, Luxembourg, Norway;

Group II ($\geq 100\%$ and $< 125\%$ of the EU25 average): Austria, Belgium, Germany, Denmark, Finland, France, Iceland, Italy, the Netherlands, Sweden and

the United Kingdom;

Group III ($\geq 75\%$ and $< 100\%$ of the EU25 average): Cyprus, Greece, Spain, Malta and Slovenia;

Group IV ($\geq 50\%$ and $< 75\%$ of the EU25 average): Czech Republic, Hungary, Portugal and Slovakia;

Group V ($< 50\%$ of the EU25 average): Bulgaria, Estonia, Croatia, Lithuania, Latvia, Poland, Romania and Turkey.

In 2003 the per capita GDP volume indices varied from 41 (Latvia) to 215 (Luxembourg) within the EU25. For Bulgaria, Romania and Turkey the index showed a volume of around 30% of the EU25 average.

The per capita GDP of Luxembourg is by far the highest among the participants. One of the reasons for this is the large share of cross-border workers in total employment: while contributing to GDP, they are not taken into consideration as part of the resident population which is used to calculate GDP per head.

GDP per capita volume indices are mainly constructed to compare countries within a given year and they should not be over-interpreted when compared over time, particularly when it comes to small changes from year to year. When compared over a longer time period the per capita GDP indices show a relatively stable pattern. Moving from a group to another is relatively

rare. Over the period from 1995 to 2002, only Ireland has significantly changed its grouping, moving from 99% of the EU average in 1995 to the highest group ($\geq 125\%$) with an index of 134 in 2002.

The figures show that Germany, France, Italy and the United Kingdom recorded practically the same level, in relation to the EU average, of GDP per capita in PPS for the years 1997 to 2000. Yet there are significant developments for the individual countries if one looks over the whole period 1995 to 2003. For

the United Kingdom an upward tendency is visible, while Germany and Italy show slight downward tendencies. However, all four countries belong to the same group in all years.

For Greece and Spain a certain catching-up with the average of the EU can be observed between 1995 and 2003. The same can be said about a number of New Member States, namely Estonia, Latvia, Lithuania, Hungary, Slovenia and Slovakia.

Table 1: GDP per capita in PPS (EU25=100), 1995 – 2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003 ^p
Belgium (BE)	120	118	117	116	116	117	117	117	118
Czech Republic (CZ)	70	72	70	67	66	65	66	68	69
Denmark (DK)	125	126	126	125	127	127	126	122	123
Germany (DE)	119	118	116	114	113	112	110	109	108
Estonia (EE)	34	35	39	40	39	42	43	46	49
Greece (EL)	72	71	72	72	72	72	74	78	81
Spain (ES)	87	88	88	89	92	92	92	95	98
France (FR)	115	114	115	115	114	114	115	113	111
Ireland (IE)	99	103	113	117	122	126	129	134	133
Italy (IT)	115	115	113	114	112	111	110	109	107
Cyprus (CY)	86	85	84	84	85	86	89	83	83
Latvia (LV)	30	31	33	34	34	35	37	39	41
Lithuania (LT)	34	35	37	39	38	39	41	42	46
Luxembourg (LU)	179	178	185	193	208	219	213	213	215
Hungary (HU)	50	49	51	52	53	53	56	59	61
Malta (MT)	:	:	:	:	78	79	75	74	75
Netherlands (NL)	120	120	121	121	121	122	124	122	121
Austria (AT)	129	130	127	125	127	128	124	123	122
Poland (PL)	41	42	44	45	46	46	46	46	46
Portugal (PT)	73	73	74	75	77	77	77	77	74
Slovenia (SI)	68	70	71	72	74	73	75	75	77
Slovak Republic (SK)	45	46	47	48	47	48	49	51	52
Finland (FI)	106	106	111	114	112	114	114	113	113
Sweden (SE)	118	118	116	115	118	120	116	115	115
United Kingdom (UK)	110	112	114	114	113	114	115	118	118
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Bulgaria (BG)	31	28	26	26	26	27	29	29	30
Croatia (HR)	37	40	42	42	40	42	42	44	46
Romania (RO)	:	:	:	:	:	25	27	29	30
Turkey (TR)	30	31	33	32	30	30	26	27	28
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Iceland (IS)	125	128	127	129	128	126	125	120	119
Norway (NO)	133	140	142	134	142	162	158	150	148
Switzerland (CH)	146	140	142	141	136	135	131	132	131

Notes:

- For 1995-1998 the data shown for New Member States and Candidate Countries are based on backwards extrapolations.
- The data for Malta for 1995-1998 were estimated to obtain EU25.
- The data for 2003 are preliminary. (p)
- For Cyprus there is a break in the data between 2001 and 2002, due to different revision timetables of PPP and GDP. The revision of Cyprus' National Accounts will be taken into account in the PPP for 2001 and before, after it is finalised. For the years 2002 and 2003 the current state of the Cypriot revision has been incorporated into the results.
- The data for Croatia (HR) are Eurostat estimates.

Price level indices and price dispersion

Price level indices (PLIs), see **Table 3**, are obtained as the ratio of PPP to the exchange rate for each country and they present a comparison of the price levels with respect to the EU average. A value above 100 indicates a higher general price level than the EU average; a value below 100 indicates a lower general price level. In a country with an index above 100, the use of exchange rates would overestimate the size of the economy of the country; while the opposite holds if the PLI is lower than 100.

PLIs also indicate the degree to which a country's exchange rate reflects its general price level vis-à-vis the general price level of the reference country: a value over 100 indicates that the exchange rate understates the general price level; a value under 100 indicates that the exchange rate overstates the general price level.

Table 3 shows PLIs for GDP and HFCE. Like the volume indices PLIs are not intended to

rank countries strictly, but to provide the order of magnitude.

In 2003 the PLIs for HFCE were between 50 (Slovakia) and 139 (Denmark) among the EU Member States. When considering all participating countries in the ECP the range was wider: from 41 (Romania) to 145 (Norway).

The New Member States and the Candidate Countries all have PLIs below the EU25 average; the highest index being that of Cyprus (94 in 2003).

In general, PLIs for HFCE are less dispersed in the EU than in the whole set of 31 countries. This is confirmed by the coefficient of variation, which is a measure of dispersion, of different country groups. The coefficient was 29% for the EU25, 15% for the EU15 and 21% for the New Member States in 2003. For the whole set of countries the price dispersion was noticeable higher, showing 35% in 2003.

Box 2: Regular annual PPP revisions at Eurostat

PPPs are established on an annual basis, therefore only annual revisions apply. According to the regular publication calendar, PPPs are released as preliminary estimates 12 months after the end of the reference year (T) and revised to final data after 24 months. In addition, an early estimate of PPP, a so-called nowcast is published - at a high aggregation level - 5 months after the end of the reference year. This regular PPP revision / release calendar is in line with the data delivery timetable for NA data as given in the ESA95 regulation⁽¹⁾. The current regular Eurostat revision calendar for PPP is summarised as follows:

T+5 months:	now-cast of PPP for the year T, based on the first GDP and main aggregates estimates for T (available T+4 months) ⁽²⁾ and extrapolated prices of T-1;
T +12 months:	preliminary PPP for the year T, based on the first estimate of detailed GDP expenditure weights (available T+9 months), the first consumer price survey of T; and first estimates of other input data
T+24 months:	final PPP for the year T, based on revised detailed GDP expenditure weights (available T+21 months), both consumer price surveys for T and revised data for all other input data

In addition, the changes of the level of GDP and other aggregated expenditure data are taken into account with regard to volume indicators, as the PPP are always applied to the latest available NA data. These revisions of NA aggregates are frequently done in one or more of the 31 participating countries, affecting the relative position of the country and the EU average.

The weights underlying the PPP calculations, however, are not always fully consistent with the latest aggregated GDP data to which the PPP are applied. This is due to a built-in feature of the NA compilation and revision process, where more aggregated data may be revised more often than the detailed expenditure weights, which are usually revised only once a year and submitted to Eurostat with delays of T+9, T+21 months etc. To obtain full consistency the PPP calculation should be re-run after each ESA95 data delivery to Eurostat. Obviously, this is not feasible and thus, establishing and revising PPP in line with the NA delivery calendar for detailed expenditure weights and applying these PPP always to the latest available aggregated data is a compromise between up-to-dateness of data, stability of data and workload.

⁽¹⁾ ESA95; *European System of Accounts 1995, Council Regulation (EC) 2223/1996 of 25 June 1996*

⁽²⁾ According to latest EU legislation concerning data delivery from Member States to Eurostat, the t+4 months deadline has been changed in July 2003 to T+70 days for early delivery of aggregated NA data. As soon as all countries are able to fulfil this requirement, the nowcast could be published earlier, too.

Table 3: Comparative price level indices of GDP 1995-2003, EU25=100

	GDP									HFCE								
	1995*	1996*	1997*	1998*	1999	2000	2001	2002	2003p	1995*	1996*	1997*	1998*	1999	2000	2001	2002	2003p
BE	114	110	107	107	107	105	103	102	103	114	110	107	107	109	106	103	102	104
CZ**	38	41	41	44	44	46	49	54	53	41	43	43	46	45	47	50	55	55
DK	138	136	133	132	129	128	128	131	133	139	137	132	131	128	128	131	136	139
DE	127	121	116	116	115	112	112	111	112	120	114	110	110	108	106	107	108	109
EE**	38	45	47	51	52	53	55	56	57	42	50	52	55	57	57	60	62	62
EL	77	80	82	79	81	79	80	78	80	83	87	88	85	87	84	85	82	84
ES	85	87	85	85	84	84	86	86	87	88	90	87	87	85	85	85	85	86
FR	114	112	107	107	106	104	103	104	107	119	117	110	109	109	107	105	106	108
IE	93	96	102	101	105	108	113	116	119	99	102	106	104	108	112	116	122	127
IT	83	92	94	93	93	92	94	96	99	86	95	96	95	95	94	96	98	102
CY**	82	81	82	83	83	84	83	88	92	84	83	84	84	84	84	84	91	94
LV**	33	36	40	41	45	50	51	51	48	38	42	47	49	51	58	58	58	55
LT**	26	31	39	40	41	46	47	48	48	31	36	43	45	46	52	53	55	54
LU	124	121	118	116	112	112	114	114	116	116	111	107	107	102	101	103	102	105
HU**	44	44	46	45	45	47	49	55	56	44	44	46	46	47	48	52	57	58
MT	:	:	:	:	66	69	71	69	68	:	:	:	:	72	75	76	74	73
NL	112	109	104	105	106	105	105	107	108	110	107	103	104	105	104	104	105	107
AT	117	113	108	108	106	104	105	106	107	118	113	108	108	105	102	103	105	107
PL**	43	46	47	49	47	52	58	55	49	46	50	51	53	51	56	63	59	53
PT	74	75	75	74	74	74	75	76	78	75	75	74	74	74	73	75	76	79
SI**	74	72	72	74	73	71	72	74	75	77	73	73	75	75	73	73	76	77
SK**	41	41	44	43	41	43	43	44	48	40	40	42	42	40	44	45	45	50
FI	121	116	113	112	112	111	112	112	113	135	129	125	123	124	123	123	124	126
SE	119	128	126	123	121	124	116	118	121	125	135	132	128	125	127	117	121	124
UK	89	90	105	109	112	118	115	112	105	89	90	105	108	112	117	114	111	103
CC																		
BG**	25	21	25	30	30	32	33	35	36	33	27	34	37	37	38	40	42	42
HR***	54	54	55	57	55	56	58	59	59	:	:	:	:	:	:	:	:	:
RO**	:	:	:	35	31	36	37	37	37	:	:	:	43	37	42	42	41	41
TR**	46	46	49	49	49	54	44	49	51	50	47	50	53	54	61	48	52	55
EFTA																		
IS	105	104	110	115	120	130	116	124	128	119	116	124	127	129	136	125	134	136
NO	129	128	132	128	127	126	130	141	136	132	130	136	130	131	133	138	149	145
CH	153	150	136	136	138	139	144	142	139	156	149	139	139	142	142	147	147	143

p preliminary data

* EU25 includes estimations for Malta

** Data for 1995-1998 based on retranslated PPPs

*** Eurostat estimates

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

Use of Purchasing Power Parities

PPP is a concept that is not immediately and easily understood. This has generated misunderstandings as sometimes PPPs are used for purposes for which they are not suited. In essence PPPs are price comparison in space and therefore the most recommended applications are spatial ones – i.e. comparisons of PPP converted indicators across countries at a given point in time. The most common usages of PPPs are to generate comparable volume measures in per capita terms across countries and to calculate general price level indices. They can be also used in other areas such as labour productivity comparisons at GDP level and in measuring the relative size of economies.

The differences in values of GDP between countries, even when revalued in a common currency using exchange rates, do not only correspond to a “volume of goods and services” component but also to a “level of prices” component, which can sometimes assume sizeable proportions. Exchange rates are determined by many factors, which reflect demand and supply on the currency markets, such as international trade and interest rate differentials. In other words, exchange rates usually reflect other elements than price differences alone. To obtain a pure comparison of volumes, it is essential to use special conversion rates (spatial deflators) which remove the effect of price level differences between countries. Purchasing Power Parities (PPPs) are such currency conversion rates that convert economic indicators expressed in national currencies to an artificial common currency, called Purchasing Power Standard (PPS). This conversion equalises the purchasing power of different national currencies.

Despite being designed for spatial comparisons, PPPs and related economic indicators can be used for inter-temporal comparisons but with certain limitations and with necessary care. In addition, the sampling of items and price collection for PPPs are not designed to capture the pure price change over time as in the case of consumer price indices but price differentials over space. In effect, GDPs converted using PPP should be understood more like current price volume series.

Finally, it needs to be underlined that PPP-based indices cannot be used to establish a strict ranking of countries because PPPs are statistical constructs rather than precise measures. They provide only an indication of the relative order of magnitude in a country in relation to others in the comparison. Therefore, these indicators are best used to assign countries to groups as, for example, in all Eurostat and OECD publications on PPP. In Table 4 below the uses of PPP-based data are divided into three groups, “recommended uses”, “uses with limitations” and “non-recommended uses” in a summary form.

Table 4: Uses and limitations of PPP-based data

Recommended uses	<ul style="list-style-type: none"> ▪ Spatial volume comparisons of GDP, GDP per head, GDP per hour worked, size of economies ▪ Grouping of countries by volume index of GDP ▪ Spatial comparisons of relative price levels
Use with limitations	<ul style="list-style-type: none"> ▪ Inter-temporal analysis of relative GDP per capita or relative prices ▪ Analysis of price convergence ▪ Cost of living index across countries ▪ Use of PPP established for expenditure categories for the deflation of other values, as e.g. household income.
Non-recommended uses	<ul style="list-style-type: none"> ▪ As a precision tool to establish rankings between countries ▪ As a way of constructing national growth rates ▪ As a measure to generate output and productivity comparisons by industry (unless there are industry-specific PPPs) ▪ As a measure to undertake price level index comparisons at detailed level. ▪ As an indicator for the over- or undervaluation of a currency ▪ As equilibrium exchange rates

To know more about:

“Purchasing Power Parities and Real Expenditures, 1999 Benchmark Year”, OECD, 2002

“Eating, drinking, smoking – comparative price levels in EU, EFTA and Candidate Countries for 2003” Statistics in Focus 30/2004, Eurostat, 2004

“Purchasing Power Parities and related economic indicators for EU, Candidate Countries and EFTA, Data 1991 to 2003, including final results of the revision 1995 - 2000” Statistics in Focus 37/2004, Eurostat, 2004

Further information:

➤ **Databases**

[EUROSTAT website/Economy and finance/National accounts \(including GDP\)/Annual national accounts/GDP and main aggregates](#)

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