

International price comparisons based on purchasing power parity

Because exchange rate movements, in general, tend to be more volatile than changes in national price levels, the purchasing power parity approach provides the proper basis for comparing living standards and examining productivity levels over time

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Imagine you are planning a trip to France and would like to figure out how much currency you will need during your visit. You would need to know how much in French francs it would cost for incidentals such as meals, sightseeing, and souvenirs. What information would be helpful to you in making your estimate? You could check the price of, say, a lunch in your hometown and then convert that figure into francs using the exchange rate. This type of estimate would not be very accurate, however, because it is likely that a lunch in your hometown costs relatively more or less than a lunch in France. A better estimate would be based on the price of a lunch in France.

Similarly, if you were opening a subsidiary company in Japan, how would you determine the salaries for your employees? Again, using the exchange rate to convert the salary you would pay in the United States into yen would not be accurate. To adequately compensate employees moving overseas, you would need information about the cost of living in Japan.

Finally, if a government or international organization were comparing national expenditures across different countries, merely collecting the gross domestic products (GDPs) of the countries

and using exchange rates to convert them into a single currency would not yield an accurate comparison. Again, the comparison based on exchange rates does not take into account differing prices among the countries.

In each of these scenarios, analysts could construct better estimates if they convert the data into a common currency and value it at the same price levels. In September 1998, the Organisation for Economic Co-operation and Development (OECD) released price level data and measures for 1996 as a part of the Eurostat-OECD purchasing power parity (PPP) program. (Eurostat is the statistical office of the European Union.) The purpose of this program is to compare economic data across countries without using exchange rates. As illustrated in the previous scenarios, exchange rates do not necessarily reflect the relative purchasing powers of the different currencies and applying them can produce inaccurate comparisons. To accurately compare GDP data across countries, one must express the data in a common currency and value it at the same price level. These problems are similar to those encountered in comparisons of GDP across time for one country. Of course in the case of comparison across time, the data are

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already expressed in one national currency, but the figures must accommodate changes in the price level for the comparisons to have any meaning. Purchasing power parities are estimates derived from the relative price levels in different countries and reflect the rate at which currencies can be converted to purchase equivalent goods and services. Therefore, a PPP is the rate of currency conversion that equalizes purchasing power of different currencies and so has the dimensions of an exchange rate as well as a price index. PPPs are preferable to exchange rates for converting national expenditure data into a common currency because they also adjust for differences in price levels and reflect only differences in the volume of goods and services purchased between countries.

International organizations involved with multilateral comparisons of real GDP and its components increasingly base such comparisons on PPPs.¹ The European Commission also uses PPPs to determine funding levels, as well as to adjust staff salaries. Moreover, two recent reports analyzed the strengths and weaknesses of the PPP programs.² Independently, both came to the same conclusion, reaffirming the importance of using PPPs for real multilateral comparisons of GDP and related aggregates.

Historically, the first comprehensive investigation of the relative value of money in different countries was published in 1940 by Colin Clark. This study compared the purchasing power of many currencies across a range of consumption goods. In the early 1950s, Irving Kravis and Milton Gilbert, at the Organization of the European Economic Community (predecessor to the OECD), used national accounts data to compare national incomes of four western European countries and the United States. The methodology they developed was further refined in benchmark studies for 1970, 1973, and 1975.³ In the early 1980s, the Eurostat-OECD PPP program was later established independently, with its own methodology, timetable, and mission to compare national incomes and price levels for the European Union and OECD member countries. Benchmark studies were published under this program for 1980, 1985, 1990, and 1993.

This article analyzes the 1996 Eurostat-OECD purchasing power parities study, which covers 32 countries, including all of the current 29 member countries of the OECD, except one (Korea), plus four additional countries (Israel, Russian Federation, Slovak Republic and Slovenia).

Methodology

Purchasing power parities measure relative price level differences for one time period across countries. In that respect, PPPs can be thought of as interspatial price indexes, and the methodology and data requirements belong to the methodology of index number theory. For example, to calculate intertemporal price indexes used to measure price change for one country over time, one needs to price a representative bas-

ket of goods and services with the expenditure patterns in the country determining the items selected. Likewise, to calculate PPPs, one needs to price a representative basket of goods and services across countries. In the interspatial case, however, this becomes difficult to implement, as the different countries can have very different expenditure patterns. The availability of common representative products is dependent on the number of countries, the extent to which their markets and expenditure patterns are similar, and the type of specification used to define selected products. Even between economies as similar as the United States and Canada, there remain important differences in expenditure patterns due to differences in climate, tastes, packaging, regulations, and the like. Therefore, the initial groundwork for calculating PPPs is to determine a list of goods and services and their detailed specifications for pricing by each country. The final lists for the 1996 comparison contained both traded and nontraded goods and services that covered around 4,000 items, including about 2,900 consumer goods and services; 800 pharmaceuticals; 186 capital goods; 50 motor vehicles; 34 government, education, and health services; and 20 construction projects.

The second component needed to calculate purchasing power parities is the expenditure patterns for the participating countries. These figures, expressed in national currencies, are derived from the national accounting data for each country. The classification system that provides the framework for the calculations is the 1968 System of National Accounts and the 1979 European System of Economic Accounts. The definition of expenditure starts at the basic heading level, which includes a group of similar commodities that are representative of the purchases made in participating countries for which a sample of detailed item specifications can be determined. Eurostat had 270 basic headings, while the OECD had 218. The difference between the two headings was attributed to the category, household final consumption expenditures; otherwise, the breakdowns were the same.

Once the detailed specifications of goods and services have been defined within the expenditure categories, each participating country provides national average prices for as many of the items as possible. Possibly, the most important issue in price selection is choosing identical products that are also important in terms of expenditure patterns. These prices, expressed in national currencies, are for the most part, transaction prices, although in some cases, list prices are used as a proxy. Many of the countries perform special pricing surveys to meet the requirements of the program; however, the United States primarily provides prices calculated from data already collected by the Consumer Price Index (CPI) and Producer Price Index (PPI) programs. The Bureau of Labor Statistics does not do any special sampling for the OECD item specifications and, as a result, the average prices provided are not the same as the average price series produced by the CPI. Where possible, BLS adjusts the underlying data from the CPI average price series to

match the OECD questionnaire specifications. If insufficient average price data exist to estimate OECD specifications, then list prices are used in lieu of, or to supplement average price data when necessary. In particular, all of the OECD transportation survey, most of the clothing survey, and some of the consumer durables and furniture surveys contain list prices for the United States. In addition, by using regression methods and rent data collected for the CPI, the United States is able to estimate prices for the rent specifications priced by the other participating countries. Ideally, the price surveys are completed on a flow basis over 3 years, and prices are moved forward to the benchmark year with intertemporal price indexes provided by each country.

From the matrices of prices submitted by each country, unweighted bilateral price ratios (parities) are calculated. The resultant bilateral comparisons illustrate the quantities of “country A” at the prices of “country B” and the quantities of “country B” at the prices of “country A.” Obviously, all item specifications cannot be priced by all countries due to differences in what is available on the market, so missing parities are imputed from the existing data. These unweighted parities are then aggregated using the expenditure data provided by the countries. Finally, the purchasing power parities, thus calculated, are used to convert the national expenditures into a common currency and price level, as well as to construct price level indexes for analytical purposes. A country’s price level index is used to interpret whether average prices are high or low, relative to a base country or a country grouping. The price level index is derived by simply taking the PPP-to-exchange-rate ratio.

Presentation and analysis of results

The 1996 purchasing power parities, exchange rates, and price level indexes for all of the participating countries are presented in table 1, with the U.S. dollar as the reference currency. Although the U.S. dollar is the reference currency, the associated PPPs refer to the price structure of the group as a whole, not just the U.S. domestic price structure. With the OECD equal to 100, the most expensive country was Switzerland, at 151, and the least expensive was the Slovak Republic, at 36. As shown in chart 1, prices in the United States were slightly below those of the OECD as a whole in 1996, with an index value of 91. If a country’s price level index is less than 91, then purchases made with a dollar converted at market exchange rates in that country are less expensive, compared with making the same purchases in the United States. Likewise, a value greater than 91 means U.S. prices are relatively cheaper. In general, the currencies of the lower income countries—including the former communist countries as well as Turkey, Mexico, Portugal, and Spain—were undervalued, relative to the U.S. dollar. In other words, a U.S. dollar converted at market exchange rates has greater purchasing power

Table 1. Purchasing power parities, exchange rates, and price level indexes, 1996

(National currency per U.S. dollar)

Country	Purchasing power parity	Exchange rate	Price level indexes
United States	1	1	91
OECD ¹	1.1	1	100
Australia	1.3	1.278	92
Canada	1.19	1.363	79
Czech Republic	11.7	27.15	39
Hungary	72.6	152.6	43
Iceland	76.8	66.71	104
Japan	166	108.8	138
Mexico	3.79	7.601	45
New Zealand	1.48	1.455	92
Norway	9.11	6.459	128
Poland	1.36	2.661	46
Switzerland	2.05	1.236	151
Turkey	39.3	81.4	44
European Union ²922	.788	106
Austria	13.6	10.59	116
Belgium	36.8	30.97	108
Denmark	8.33	5.799	130
Finland	5.89	4.593	116
France	6.57	5.117	116
Germany	2.03	1.505	122
Greece	214	240.8	81
Ireland673	.625	98
Italy	1583	1544	93
Luxembourg	39.7	30.97	116
Netherlands	2.04	1.686	110
Portugal	122	154.3	72
Spain	124	126.7	89
Sweden	9.68	6.71	131
United Kingdom641	.6441	91
Israel	3.25	3.192	92
Russian, Federation	2191	5124	39
Slovak Republic	12.2	30.65	36
Slovenia	96	135.4	64

¹ The OECD presently includes 29 countries: the European Union (15), Australia, Canada, Czech Republic, Hungary, Iceland, Japan, Korea, Mexico, New Zealand, Norway, Poland, Switzerland, Turkey, and the United States. Korea is not included in this analysis.

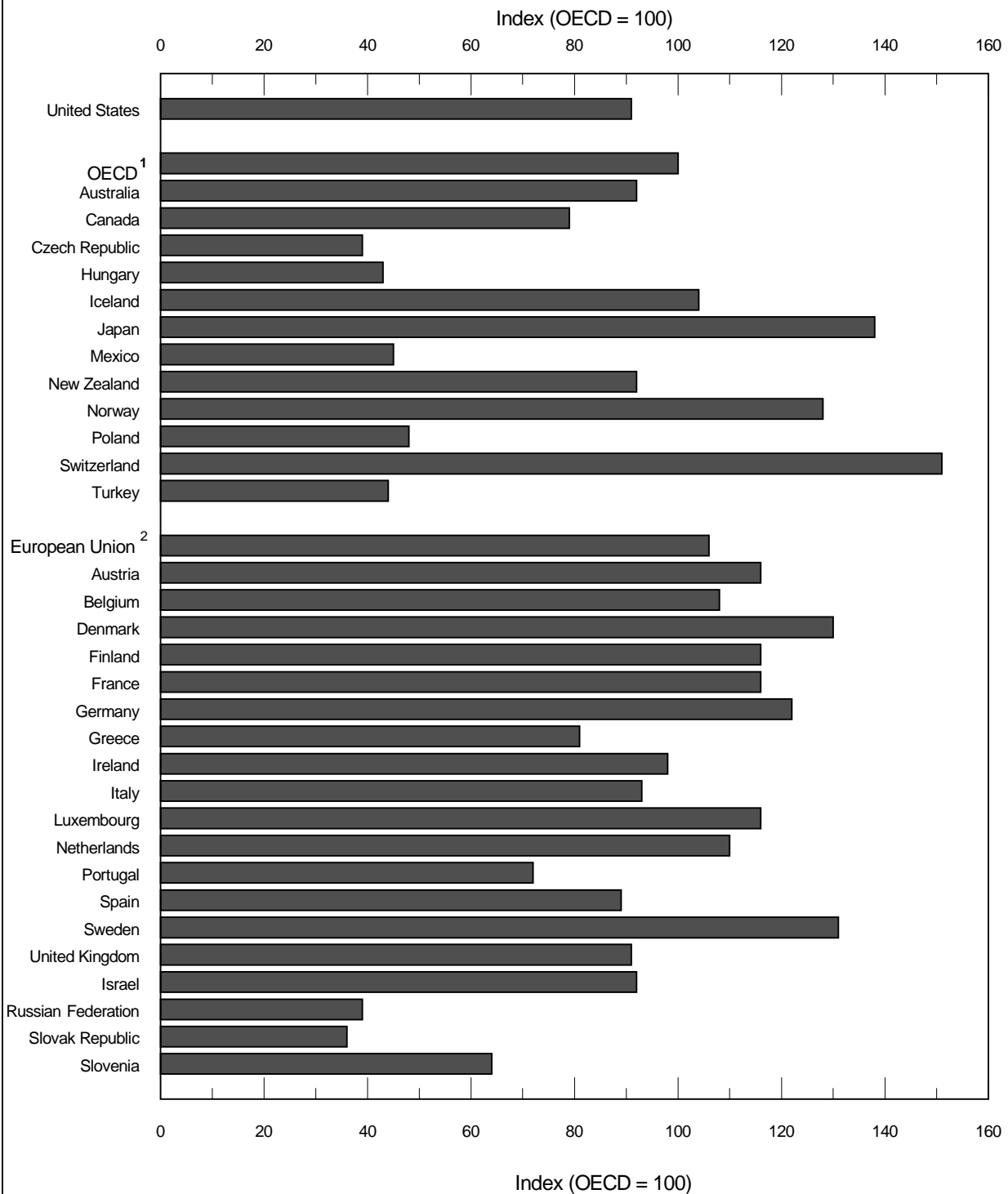
² Currently, there are 15 countries in the European Union: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

SOURCE: OECD.

in a lower income country than in the United States.

One explanation for low-income countries having prices lower than high-income countries is that prices are cheaper for nontraded items, such as housing and services. This idea is based on the theory that the differences in prices broadly reflect differences in productivity; therefore, high-income countries have more productive labor forces than low-income countries. The differences in productivity are particularly significant for traded goods, and are reflected in higher wages and prices. As a country develops, theoretically, its productivity in the traded goods sector increases faster than that for nontraded goods; nonetheless, firms making nontraded goods must also pay higher wage rates. The higher productivity for

Chart 1. Price level indexes by country, 1996



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Table 2. Gross domestic product per capita 1996

Country	Nominal GDP per capita	Nominal ranking	Real GDP per capita	Real ranking
Luxembourg	40,821	2	35,113	1
United States	27,831	9	30,694	2
Norway	35,968	4	28,113	3
Switzerland	41,424	1	27,504	4
Japan	36,509	3	26,447	5
Iceland	27,000	10	25,882	6
Denmark	33,229	5	25,521	7
Canada	19,767	17	25,078	8
Belgium	26,403	11	24,490	9
Austria	28,383	8	24,406	10
Germany	28,738	7	23,525	11
Australia	21,611	15	23,440	12
Netherlands	25,507	13	23,199	13
France	26,189	12	22,488	14
Italy	20,764	16	22,332	15
Sweden	28,755	6	21,987	16
United Kingdom	19,611	19	21,537	17
Finland	24,424	14	21,019	18
Ireland	19,632	18	20,130	19
New Zealand	17,850	20	19,379	20
Israel	17,679	21	19,131	21
Spain	14,892	22	16,822	22
Portugal	10,960	24	15,236	23
Slovenia	9,471	25	14,728	24
Greece	11,745	23	14,581	25
Czech Republic	5,473	26	14,017	26
Hungary	4,431	27	10,281	27
Slovak Republic	3,533	29	9,792	28
Mexico	3,580	28	7,920	29
Poland	3,530	30	7,593	30
Russian Federation	2,906	31	7,497	31
Turkey	2,894	32	6,617	32
European Union ¹	22,986	...	21,660	...
OECD ²	21,903	...	21,903	...

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SOURCE: OECD.

traded goods in high-income countries, therefore, results in higher wages and prices in both the traded and nontraded goods sectors, relative to wages and prices in low-income countries.

It is important to note that the PPPs published by the Eurostat-OECD program are not intended to be used as proxies for equilibrium exchange rates. They are calculated to facilitate international comparisons of prices and volumes for GDP and its components. Purchasing power parities as equilibrium exchange rates have long existed in international trade theory.⁴ PPP theory predicts that in equilibrium, a dollar should buy the same basket of goods and services in all countries, as free trade causes prices in the various countries to converge. In the long run, then, the exchange rate between two countries should reflect the ratio of the price levels. The relationship between exchange rates and PPP has been studied numerous times over the years and a variety of reasons have been pro-

vided to describe why exchange rates and PPPs diverge. One important difference between the data published by the Eurostat-OECD program and theoretical purchasing power parities is that the equilibrium exchange rate PPPs only refer to domestically produced tradable goods and services that are valued at export prices. In contrast, the PPPs presented in this article cover the entire range of final goods and services included in GDP estimates; many of which are not tradable and some of which are imported. Furthermore, the prices of traded goods could diverge for a number of reasons such as price discrimination; incomplete exchange rate pass through⁵; currency fluctuations related to financial assets; or barriers to trade, such as quotas, taxes, tariffs, or transportation costs.

The primary purpose of the Eurostat-OECD estimated PPPs, however, is not to predict future exchange rate movements, but rather to convert national expenditure data into a common currency. Table 2 presents GDP per capita for all countries, expressed in both nominal and real terms. The nominal values are converted into U.S. dollars using exchange rates, while the real figures are converted using PPPs. Just as real-inflation-adjusted GDP per capita is recognized as the appropriate measure of living standards within a country, adjusted price differences across countries are just as important because such measures are used to adjust for price differences over time. The differences between the nominal and real figures illustrate the importance of correcting for differences in price levels when making international comparisons. The results show that even within a group of similar economies, there are significant differences between nominal and real per capita GDP. For the United States, the conversion using PPPs results in a GDP per capita estimate that ranks second among the 32 participating countries, as opposed to ninth, using the nominal data. The top 10 countries in real and nominal terms are illustrated in the box. These rankings of the countries in terms of GDP per capita can be greatly influenced by the use of the PPP

Top 10 countries in terms of gross domestic product per capita, 1996

<i>Real GDP</i>	<i>Nominal GDP</i>
Luxembourg	Switzerland
United States	Luxembourg
Norway	Japan
Switzerland	Norway
Japan	Denmark
Iceland	Sweden
Denmark	Germany
Canada	Austria
Belgium	United States
Austria	Iceland

SOURCE: OECD.

Chart 2. Gross domestic product of Japan, Germany, and Canada as percentages of U.S. GDP, 1970-97

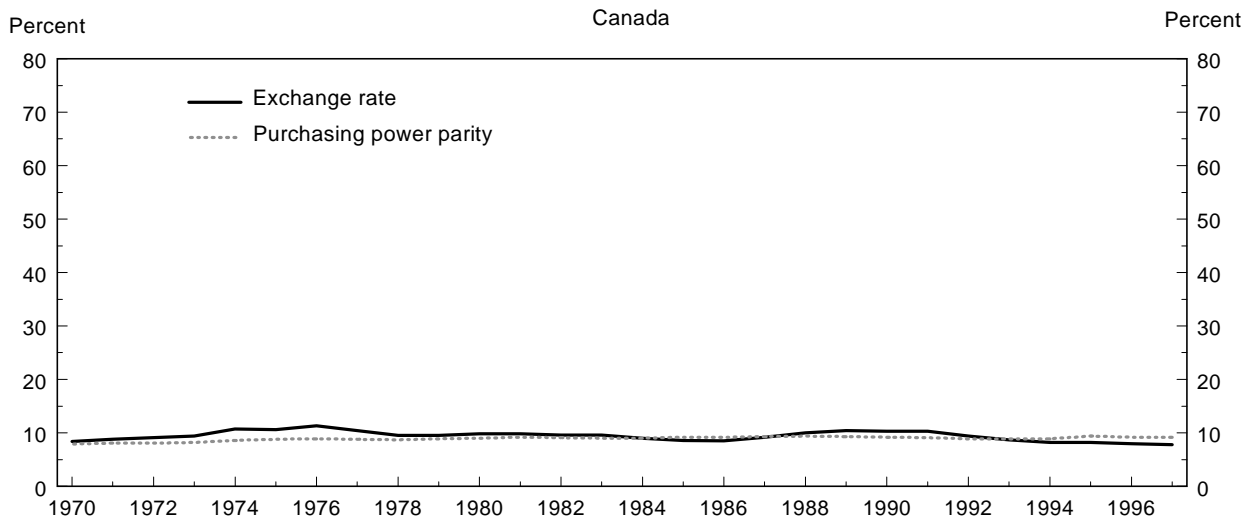
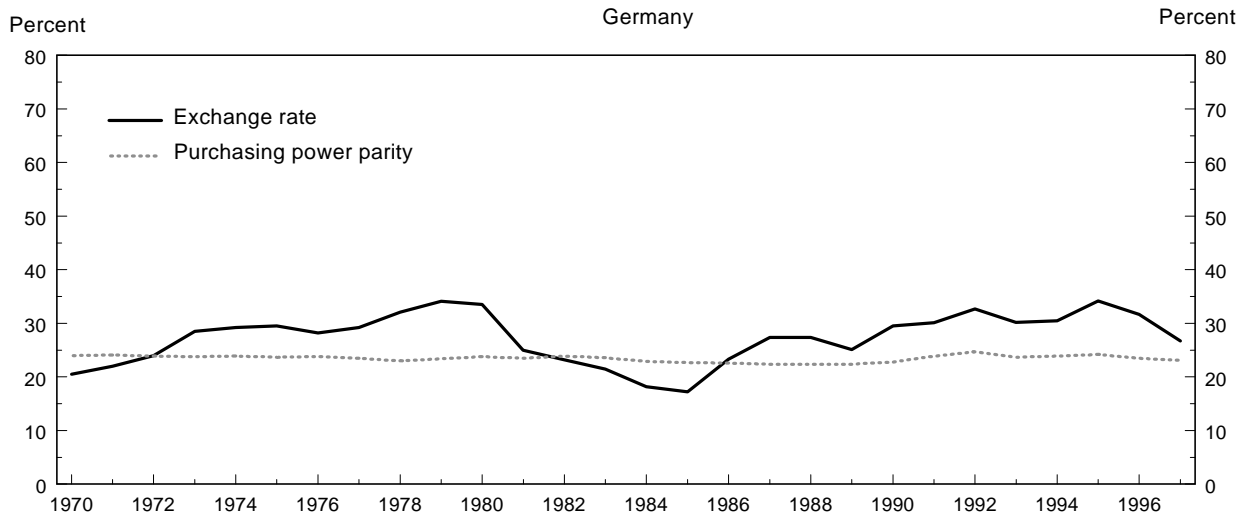
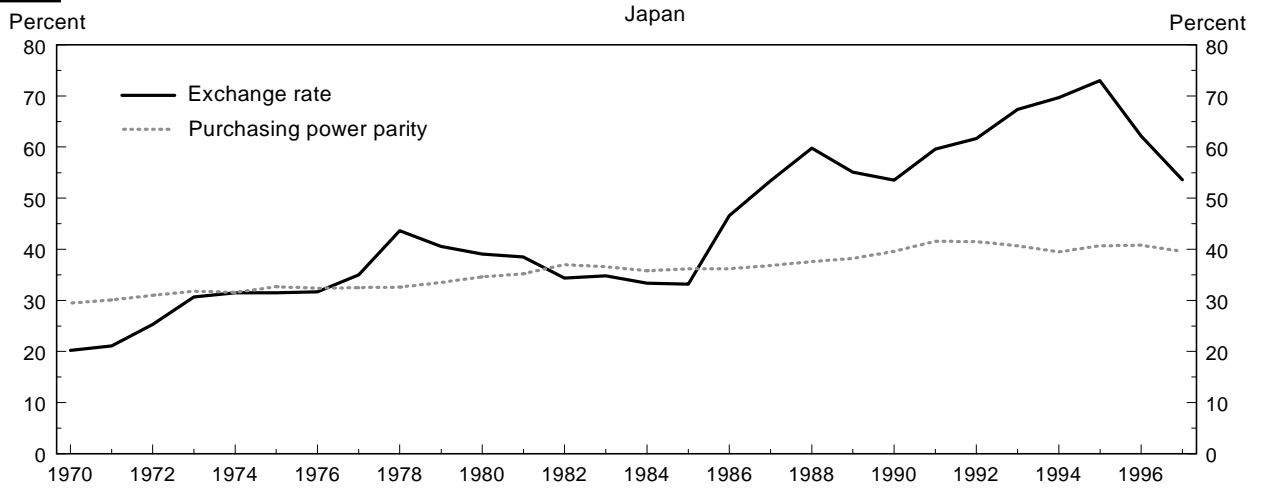


Table 3. Comparison of real expenditure patterns as a percent of gross domestic product, selected countries, 1996

Country	Private consumption	Government consumption	Gross fixed capital formation
United States	70.1	12.4	17.5
OECD ¹	64.2	15.2	20.6
Australia	61.5	18.0	20.4
Canada	60.4	18.9	20.7
Czech Republic	44.2	34.6	21.2
Hungary	49.4	37.1	13.5
Iceland	55.1	26.4	18.5
Japan	56.3	10.9	32.8
Mexico	65.0	21.0	14.0
New Zealand	62.8	16.7	20.5
Norway	50.7	22.6	26.7
Poland	54.2	31.8	14.1
Switzerland	64.2	11.2	24.6
Turkey	61.1	20.5	18.4
European Union ²	63.0	17.2	19.8
Austria	55.0	19.7	25.3
Belgium	65.3	15.0	19.7
Denmark	54.4	27.3	18.3
Finland	54.3	24.9	20.8
France	60.4	19.3	20.4
Germany	67.7	10.7	21.6
Greece	64.9	17.0	18.0
Ireland	60.2	18.1	21.7
Italy	64.5	17.0	18.6
Luxembourg	65.4	10.6	24.0
Netherlands	63.7	15.0	21.3
Portugal	56.1	24.8	19.1
Spain	62.9	17.0	20.1
Sweden	54.6	28.1	17.3
United Kingdom	61.5	21.8	16.7
Israel	48.4	26.0	25.6
Russian Federation	48.9	36.6	14.4
Slovak Republic	44.1	33.6	22.3
Slovenia	53.0	27.5	19.4

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SOURCE: OECD.

data, as opposed to exchange rates. As can be seen from table 2, the PPP-based measures of real GDP per capita for Japan and the West European countries are not as high, relative to the United States, as the nominal market exchange rate-based measures would suggest.

For the poorer countries, the conversions using PPPs generally do not yield huge differences in the rankings; however, the differences in the GDP per capita levels for these countries can be quite large. In some cases, for example, Mexico, the real GDP per capita is more than double that of the nominal value. Although comparing the less developed countries with the most developed is analogous to comparing real output between distant time periods, generally, it can be said that the gap between high-income countries and low-income countries

narrows when purchasing power parities are used. As discussed earlier, the exchange rates of less developed countries are typically undervalued. Therefore, in poorer countries, labor-intensive services such as haircuts are cheaper than such services in rich countries, and using exchange rates to convert local currency GDPs into dollars understates the value of their output relative to rich countries.

The relationship between the nominal and real figures does not remain stable over time. Exchange rate movements are much more volatile than PPPs, which tend to move gradually with relatively small fluctuations. In particular, the estimated nominal figures in 1996 are quite different from previous-year estimates. An advantage of level comparisons based on PPPs is that actual output of goods and services in different countries does not change every time exchange rates between countries change as comparisons based on market exchange rates would imply. Comparative price level indexes, which incorporate market exchange rates in their calculation, subsequently are also more volatile.

When exchange rate movements are more rapid and of greater magnitude than changes in relative prices, using them as conversion factors to estimate real expenditures becomes meaningless. This is clearly demonstrated in chart 2 (top panel), which shows the GDP of Japan expressed as a percentage of the United States GDP for selected years. The comparisons are based on the conversion of GDP at current exchange rates and current PPPs, with the extent of divergence between the two bases over the 1970–97 period. In this example, if the 1995 ratios based on exchange rates are compared with those for 1985, Japan’s GDP relative to the United States, more than doubled, increasing 120 percent. Using the PPP results, however, yields a much more modest increase of 12 percent over the 10-year period. Moreover, if market exchange rates are used as the conversion factor, then the implication is that the relative standard of living of Japan fell 27 percent over the following 2-year period from 1995 to 1997. The PPP results show a dip of only 2.7 percent over that same period.

Similarly, the movement of the Deutsche Mark versus the U.S. dollar has resulted in large fluctuations in the nominal GDP of Germany expressed as a percentage of U.S. GDP. (See chart 2, center panel.) Between 1970 and 1978, the GDP of Germany relative to the United States increased 57 percent, based on market exchange rates, whereas the same comparison based on PPPs, resulted in a modest 4-percent decline instead. Moreover, paralleling the depreciation of the mark, nominal GDP as a percentage of the U.S. GDP fell 22 percent between 1995 and 1997, compared with a 4.5-percent real decline. On the other hand, a comparison between Canada and the United States reveals exchange rate movements that are far less pronounced, resulting in a more stable relationship between nominal and real GDP movements. (See chart 2, bottom panel.) Because exchange rate movements, in general, tend to be more volatile than changes in national price

Table 4. Comparative price levels for final expenditure on gross domestic product at international prices

(OECD = 100)

Expenditure item	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Iceland	Ireland
Private final consumption expenditure	94	118	111	78	136	127	122	121	117	101
Food, beverages and tobacco	93	111	109	83	148	133	114	109	143	114
Clothing and footwear	104	125	142	100	134	149	145	134	145	112
Gross rent, fuel and power	103	105	113	84	118	112	129	141	79	78
Household equipment and operation	103	112	108	74	117	109	116	116	113	102
Medical and health care	78	116	93	63	128	117	93	111	91	81
Transport and communication	90	139	118	89	158	139	126	124	116	124
Education, recreation and culture	94	127	119	78	135	134	126	112	138	94
Miscellaneous goods and services	97	130	110	65	167	143	137	122	143	119
Net purchases abroad	100	100	100	100	100	100	100	100	100	100
Government final consumption expenditure	88	125	111	90	128	111	121	145	83	90
Gross fixed capital formation	93	109	101	69	124	98	103	119	99	92
Construction	81	114	107	61	131	82	100	126	101	84
Machinery and equipment	110	103	95	82	119	121	106	111	97	106
Increase in stocks	117	133	128	93	160	155	135	133	149	127
Balance of exports and imports	100	100	100	100	100	100	100	100	100	100
Gross domestic product	92	116	108	79	130	116	116	122	104	98

Expenditure item	Italy	Japan	Luxembourg	Netherlands	New Zealand	Norway	Sweden	Switzerland	United Kingdom	United States	European Union ¹
Private final consumption expenditure	94	149	109	112	94	136	138	151	95	87	108
Food, beverages and tobacco	106	187	105	101	102	166	139	142	105	80	107
Clothing and footwear	113	150	161	118	128	132	137	136	97	73	123
Gross rent, fuel and power	70	174	107	124	96	106	135	176	80	90	104
Household equipment and operation	105	184	117	106	110	120	128	130	89	82	108
Medical and health care	79	87	103	91	80	121	136	149	73	115	97
Transport and communication	104	117	107	128	103	158	143	146	113	86	119
Education, recreation and culture	109	135	109	104	95	142	142	141	92	88	109
Miscellaneous goods and services	101	168	112	124	76	158	148	155	108	83	113
Net purchases abroad	100	100	100	100	100	100	100	100	100	100	100
Government final consumption expenditure	95	124	166	111	82	131	131	201	88	114	107
Gross fixed capital formation	91	127	112	110	97	111	120	129	85	88	102
Construction	86	136	121	121	96	113	128	135	74	87	101
Machinery and equipment	99	115	103	99	99	110	114	123	99	88	104
Increase in stocks	121	173	129	125	125	161	154	154	117	97	123
Balance of exports and imports	100	100	100	100	100	100	100	100	100	100	100
Gross domestic product	93	138	116	110	92	128	131	151	91	91	106

¹ Currently, there are 15 countries in the European Union: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Swe-

den, and the United Kingdom.

NOTE: Data are from OECD.

levels, the PPP approach obviously provides the proper basis for comparing living standards and examining productivity levels internationally over time.

PPPs also can be used to examine differences in the structure of real expenditures across countries. Expenditure patterns for selected components of GDP are presented in table 3. To compute the structure of real expenditures, the data are converted to common currency using PPP, then the percentages are computed. More than two-thirds (70.1 percent) of the U.S. GDP is attributed to private consumption expenditures, the second highest percentage of all of the participating countries. The United States spent 12.4 percent of its GDP on

government expenditures and 17.5 percent of its GDP on gross fixed capital formation; these figures are relatively low, compared with the OECD as a whole. In terms of government spending per capita, Luxembourg, Germany, and Japan had the lowest figures reported in the OECD (10.6 percent for Luxembourg, 10.7 percent for Germany, and 10.9 percent for Japan). Predictably, government spending was higher among the transition economies of Poland, Slovakia, the Czech Republic, Russia, and Hungary than that for the other participating countries. Japan reported the highest level of private investment spending, by far, at 32.8 percent of GDP.

In addition, the components of national expenditure have

different underlying price levels and can be disaggregated into various personal consumption categories such as clothing, education, and transportation, as well as government expenditures, construction costs, and capital equipment purchases. Table 4 presents comparative price levels for final expenditure categories of GDP for the top 20 countries, based on GDP per capita ranking. Among the expenditure breakdowns, the index for private final consumption of goods and services is the most interesting for bargain-hunting tourists. The index, however, covers a number of items, such as rent and medical care that reflect domestic demand, rather than the expenditure pattern of the average tourist. It would be necessary to adjust the weights to reflect the spending patterns of a casual visitor to use the index for international bargain shopping.

Comparison of 1996 results

Every 3 years, the OECD-Eurostat PPP program estimates new benchmark PPPs. Although the 1996 results are generally consistent with findings from previous PPP studies, the data from the 1996 survey are not directly comparable with past surveys. The purpose of the PPP program is to compare the same market basket for several countries at the same time, hence some differences in results across surveys are to be expected. Table 5 shows the ranking based on volume and the associated volume indexes for 1993 and 1996 for all countries participating in the survey. The volume indexes are calculated using PPPs as the conversion factor. The general reasons for the differences in results between the two benchmarks are changes in expenditure patterns, relative price structure, product lists, and methodology. Norway and Iceland had the largest upward movement in ranking from 1993 to 1996. Norway's gain was largely attributable to an increase in expenditures, whereas the rise for Iceland was primarily due to a drop in relative prices. It should be noted that domestic changes in volumes, prices, and expenditures, as well as prices of other countries will affect the ranking.

Future plans

Even before the 1996 data were published, the participating countries began pricing for the 1999 benchmark study. The pricing process includes updating the lists of product specifications to ensure that representative items from all participating countries are included in the exercise. In May 1998, the International Price Program of the Bureau of Labor Statistics hosted a meeting of representatives from the U.S., Canada, Mexico, Australia, and the OECD to develop and discuss possible updates to the product specifications. Many of the items discussed will be included in the 1999 pricing round.

Also discussed at these meetings were possible areas for methodological research that could be used in future benchmark studies. For example, education and health care are

Table 5. Country rank and index of benchmark purchasing power parities for 1993 and 1996

Country	Rank, 1993	Volume index, 1993	Rank, 1996	Volume index, 1996
Luxembourg	1	144	1	160
United States	2	128	2	140
Switzerland	3	121	4	126
Japan	4	107	5	121
Canada	5	102	8	114
Belgium	5	102	9	112
Denmark	7	101	7	117
Austria	7	101	10	111
Norway	9	100	3	128
France	10	99	14	103
Iceland	10	99	6	118
Germany	12	97	11	107
Netherlands	13	93	13	106
Italy	14	92	15	102
Australia	15	91	11	107
United Kingdom	16	89	17	98
Sweden	17	88	16	100
Finland	18	82	18	96
New Zealand	19	81	20	88
Ireland	20	73	19	92
Spain	21	70	22	77
Portugal	22	62	23	70
Greece	23	57	24	67
Turkey	24	28	32	30
Israel	(¹)	(¹)	21	87
Slovak	(¹)	(¹)	24	67
Czech Republic	(¹)	(¹)	26	64
Slovak Republic	(¹)	(¹)	28	45
Hungary	(¹)	(¹)	27	47
Poland	(¹)	(¹)	30	35
Russian Federation ..	(¹)	(¹)	31	34
Mexico	(¹)	(¹)	29	36

¹ Did not participate in the 1993 survey.

SOURCE: *Key Indicators of the Labour Market*, International Labor Organization.

troublesome comparisons from an international standpoint, in part, because of the vast differences in government subsidization of these services. Pricing high-technology goods, such as computers, is complicated by the fast pace of technological change which makes it difficult to identify and price similar products in countries that may be at differing levels of development. Participants at the May 1998 meetings agreed to undertake a closer examination of these and other areas in an attempt to improve the comparisons.

While representatives of the European countries participate in regular meetings under the auspices of Eurostat, the May 1998 meetings provided a unique opportunity for representatives from the non-European countries of the study to exchange ideas and experiences. Future meetings of this working group are planned to build on this progress with the next scheduled meeting in November 1999. □

Notes

¹ For example, PPPs are used in numerous publications, such as the *World Economic Outlook*, International Monetary Fund; *Human Development Report*, United Nations; *World Development Indicators*, World Bank; *National*

Accounts and Main Economic Indicators, the OECD; and *National Accounts and Comparisons in Real Terms of the Aggregates of the European System of Economic Accounts*, Eurostat.

² See Ian Castles, "Review of the OECD-Eurostat PPP Program" (Consultant to the OECD, June 1997); and Jacob Rytten, "The evaluation of the International Comparison Project (ICP)" (Consultant to the International Monetary Fund, Statistic Division of the Department of Economic and Social Affairs of the United Nations Secretariat, and the World Bank, September 1998).

³ These studies are published under the auspices of the United Nations Statistical Agencies, the University of Pennsylvania, Eurostat, and the OECD. See Irving Kravis and Milton Gilbert *An International comparison of National Products and the Purchasing Power Currencies* (Organization for European Economic Cooperation, Paris, 1954).

⁴ Gustav Cassell, "Abnormal Deviations in International Exchanges," *Economic Journal*, December 1918, 413–15.

⁵ Catherine Mann, "Price, Profits, Profit Margains and Exchange rates," *Federal Reserve Bulletin*, 1986, pp. 366–79.

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