2005 ICP: Results and Major Findings

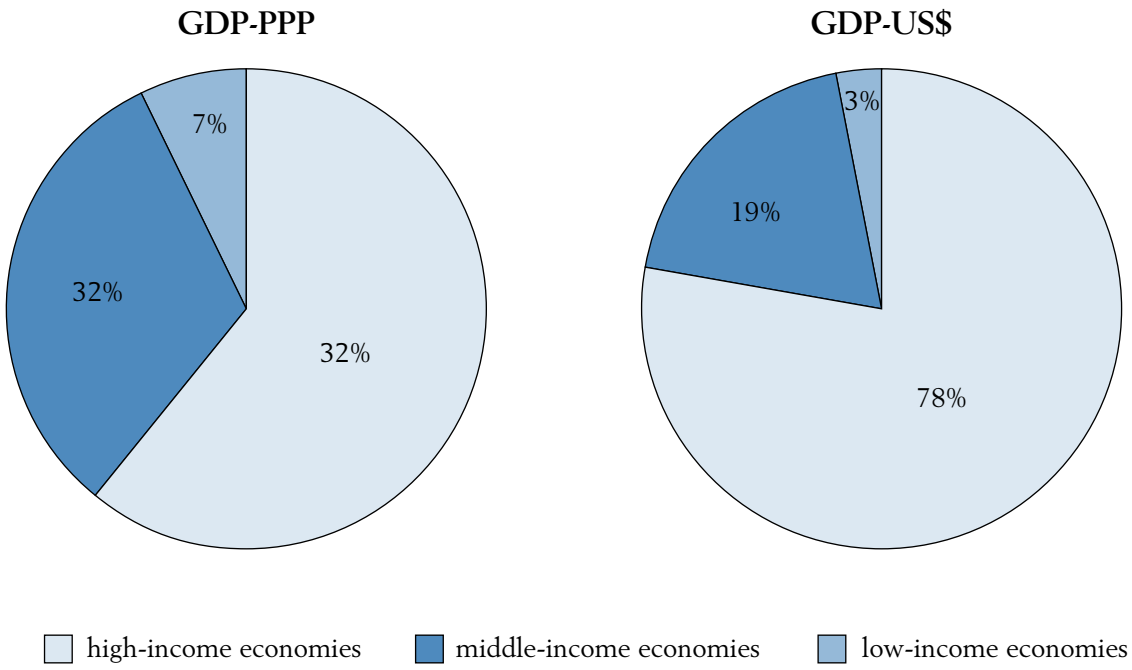
Overview

The 2005 International Comparison Program has produced estimates of the relative price levels of GDP and its principal aggregates for 146 economies. These purchasing power parities express the values of local currencies in relation to a common currency. In this report, the common currency is the U.S. dollar in 2005. When applied to the value of GDP or any component of GDP, the resulting values reflect the real value of consumption in each economy, corrected for differences in price levels and unaffected by transitory movements of exchange rates. This report provides PPPs and related measures for GDP, actual individual consumption by households, collective consumption of governments, and gross fixed capital formation. Additional tables provide the same data for several important components of the GDP (such as food, clothing, and housing, to name a few). The 146 economies account for more than 95 percent of the world's population and 98 percent of the world's nominal GDP. Table 8 lists the economies not included in the 2005 benchmark surveys along with estimates of their PPP-based GDP per capita (computed as described in the section "Estimation of PPPs for nonbenchmark economies").

This was the most extensive and thorough effort ever to measure PPPs across economies. Teams in each region identified characteristic goods and services to be priced. Surveys conducted by each economy during 2005 and 2006 provided prices for more than 1,000 goods and services. New and innovative data validation tools were implemented to improve data quality. Initial calculations of PPPs were conducted at the regional level. In addition, a representative group of economies, selected from each region, priced a common set of goods and services. PPPs were calculated separately for this "ring" and used to calibrate the regional PPPs to the global level. It is these global PPPs that are now reported here. Like the regional results, they have been benchmarked to 2005, regardless of the year in which data collection took place.

The new benchmark results replace the PPPs and related measures derived from previous surveys conducted during 1993–96 (for most developing economies) and 2000 and 2002 (for the CIS and the Eurostat-OECD). Data for the economies in the 1993–96 benchmark had been extrapolated forward and backward, using domestic price indexes. Because such extrapolations happen at an aggregate level, they cannot capture changes in relative prices at the detailed level of the original surveys. Furthermore, the 2005 ICP covered a much broader set of goods and services and, in most economies, collected more prices for them. (Appendix G provides more detail about the changes in scope, coverage, and methodology that affected the comparison of the previously estimated PPPs with those coming from the 2005 benchmark surveys. The appendix also includes a table showing the comparison by economy.)

Figure 1 World Shares: GDP-PPP vs GDP-US$



Source: 2005 ICP.

Compared with previous estimates, the size of developing economies has decreased by 7 percentage points. The global GDP shares of the largest developing economies are also smaller. China, which was previously estimated to have 14 percent of global GDP, now has 10. And the estimate of India's share has been revised from 6 to 4 percent. But it must be emphasized that these are changes in estimates, the previous ones having been based on very old and very limited data. The real outputs of their economies have not changed, only the way we measure them has. This illustrates why it is important to have new benchmark surveys because the extrapolation procedures do not capture the structural changes taking place within economies over time.

The Size of Economies

Figure 1 shows the distribution of World GDP to low-, middle-, and high-income economies when using PPPs and average exchange rates. Note that the world share of the GDP for middle-income economies increases from 19 to 32 percent of the world economy when using PPPs instead of exchange rates to calibrate the data to a common currency. The 2005 ICP results show that developing economies (low- and middle-income economies[1]) make up a significant share of the world economy:[2] around 39 percent. However, disparities remain striking. Low-income economies, which include 35 percent of the world's population, produce 7 percent of global GDP. Middle-income economies, with 48 percent of world's population, produce 32 percent of global GDP. The GDP of high-income

1. The categorization of countries (as adopted by the World Bank) is based on the following cutoffs: low-income countries have per capita gross national incomes (measured using exchange rates) below $905; middle-income countries have per capita gross national incomes (measured using exchange rates) above $905 and below $11,115; high-income countries have per capita gross national incomes above $11,115.

2. In what follows, "the world" should be understood as the sum of countries participating in the ICP. Countries not participating are not considered in the discussion.

economies accounts for 61 percent of the world economy, received by only 17 percent of the world's population.

Table 1 shows the share of the world GDP by the largest countries. Note that when measured using PPPs, 2005 world GDP is 55 trillion dollars, or 24 percent larger than GDP converted to U.S. dollars using market exchange rates. The reason is that exchange rates tend to understate the purchasing power of the currencies of less developed economies. This effect is particularly noticeable for low- and lower-middle-income economies. For example, India's share of global GDP in 2005 is slightly greater than 4.3 percent when measured using PPP-based GDP, but only 1.8 percent when measured using market exchange rates.

Using the new PPP estimates of GDP, the United States remains the largest economy in the world, with a world share of 22.5 percent, followed by China with 9.7 and Japan with 7.0. Of the 12 largest economies, which together account for two-thirds of global GDP, 5 are low- or middle-income economies: Brazil, China, India, Mexico, and Russia, which collectively account for almost 22 percent of global GDP.

In each region,[3] some major players emerge. Africa's economy is dominated by the Arab Republic of Egypt, Morocco, Nigeria, South Africa, and Sudan, which collectively account for two-thirds of the region's GDP.[4] Brazil accounts for one-half of the South America economy. Russia dominates the Commonwealth of Independent States (CIS) with three-fourths of the total GDP. In the Asia-Pacific region, China and India take the largest share, with almost two-thirds of regional GDP. In Western Asia, Egypt[5] and Saudi Arabia account for more than three-fifths of the regional GDP.

Table 1

World shares of GDP

Share of global GDP	Gross domestic product as share of global GDP: PPP-based (percentage)	Gross domestic product as share of global GDP: Market exchange rates (percentage)
United States	22.5	27.9
China	9.7	5.1
Japan	7.0	10.3
Germany	4.6	6.3
India	4.3	1.8
United Kingdom	3.5	5.1
France	3.4	4.8
Russian Federation	3.1	1.7
Italy	3.0	4.0
Brazil	2.9	2.0
Spain	2.2	2.5
Mexico	2.1	1.7

Source: 2005 ICP.

Measures of Living Standards

Table 2 shows that the economies with the highest GDP per capita are Luxembourg, Qatar, Norway, Brunei Darussalam, and Kuwait, all very small and accounting for less than 1 percent of the world economy in total. The economies with the lowest GDP per capita, all in Africa, are the Democratic Republic of Congo, Liberia, Guinea-Bissau, Niger, and Ethiopia.

Because of margins of error inherent to any similar statistical exercise, particularly in poor economies with low statistical capacity, little significance should be attached to small differences in estimated values. Nevertheless, the overall distribution of economies' PPP-based GDP per capita provides a reliable picture of the distribution of average income between economies. PPP estimates show substantial income inequalities among economies, although the degree of inequality is less than if GDP per capita were measured using market exchange rates. In 2005, the PPP-based GDP

3. Membership in a "region" is defined by its participation in one of the five regional rounds of the ICP program or in the Eurostat-OECD program. While most countries are classified according to their geographical location, this is not the case for countries belonging to the Eurostat-OECD grouping. Eurostat covered 37 economies: the 25 European Union (EU) member states, the European Free Trade Association (EFTA) economies (Iceland, Norway, and Switzerland), and Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Romania, Serbia, and Turkey. The OECD part of the program included nine other economies: Australia, Canada, Israel, Japan, the Republic of Korea, Mexico, New Zealand, the Russian Federation, and the United States.

4. Algeria did not participate in the ICP. It is probably the largest nonparticipating economy.

5. Egypt participated in both the Africa and Western Asia comparisons.

Table 2

Economies with the Highest and Lowest GDP per Capita

Highest	GDP per capita (percent of world average)	Lowest	GDP per capita (percent of world average)
Luxembourg	780	Congo, Dem. Rep.	2.9
Qatar	765	Liberia	4.3
Norway	530	Guinea-Bissau	6.3
Brunei Darussalam	529	Niger	6.5
Kuwait	501	Ethiopia	6.6

Source: ICP 2005.

per capita of 17 economies was less than $1,000 (or less than 11 percent of the world average). In the richest 39 economies, GDP per capita exceeded $20,000, which was more than double the world average of $8,900.

Figure 2 shows the distribution of the global GDP by economy. The economies are arranged in the order of GDP per capita along the horizontal axis and presented as rectangles. The rectangle's length along the horizontal scale corresponds to each economy's share of the world population. Correspondingly, the GDP per capita as a percentage of the world average is shown on the vertical axis. The economy's GDP size would be then represented by the rectangle area for each economy, which is the product of population and GDP per capita and thus would be directly comparable among economies. As the economies are shown in increasing order of real GDP per capita, the United States with the sixth largest GDP per capita is placed at the right, with the remaining countries reflected by the dark line because of their small population. The intersection of the 100 percent line with the rectangles shows that about three-fourths of the world population is in economies with per capita GDP below the world average.

Even though China's and India's per capita consumptions are both less than half of the world average, their economies rank number two and five, respectively, which shows the effect of their large populations accounting for about 40 percent of the world total.

Figure 3 shows per capita measures by region for GDP, actual individual consumption, collective consumption expenditure by government, and gross fixed capital formation.

Per capita measures of PPP-based GDP are useful for comparing average living standards in different economies. The Eurostat-OECD region has the highest GDP per capita, by a wide margin. The CIS is next, ahead of South America and Western Asia.

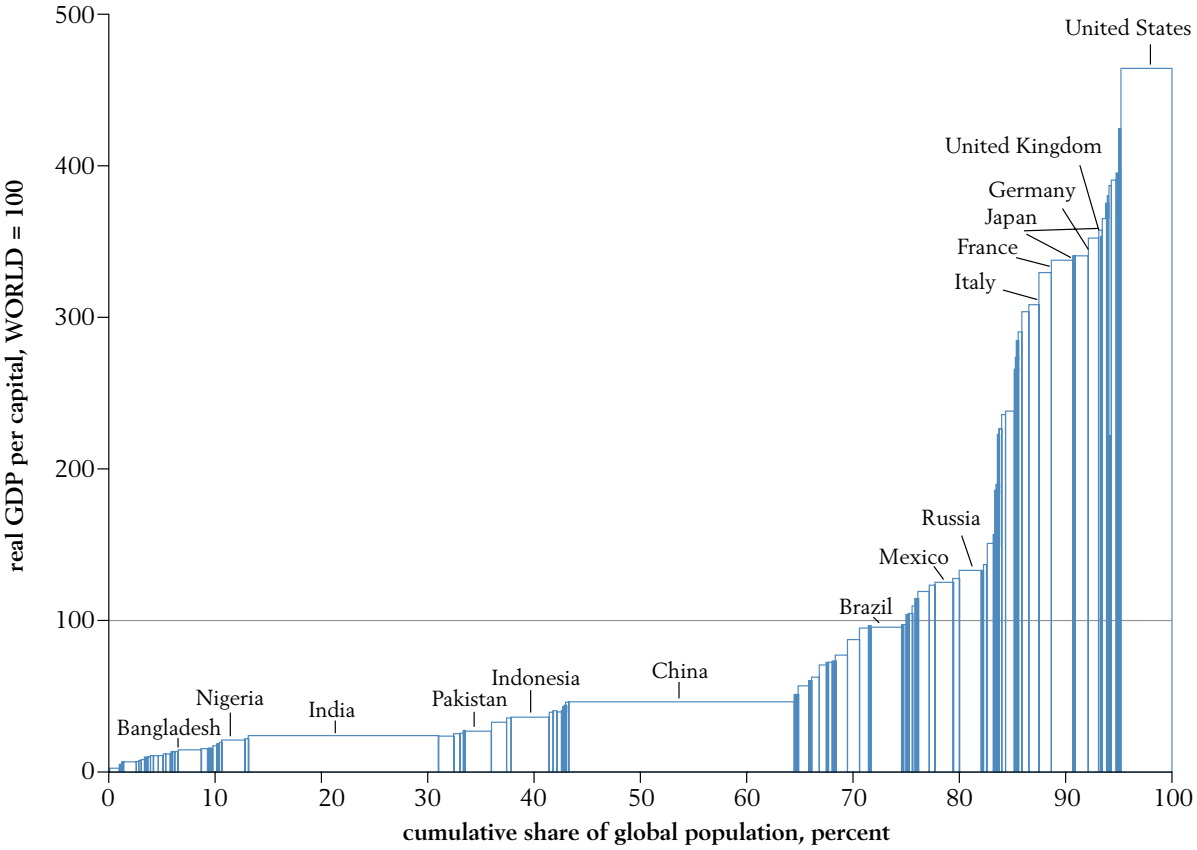
Actual Individual Consumption

Actual individual consumption (figure 3) is measured by the total value of household final consumption expenditure, expenditures by nonprofit institutions serving households (such as nongovernmental organizations [NGOs] and charities), and government expenditure on individual consumption goods and services (such as education or health). On average, individual consumption constitutes 69 percent of GDP. Therefore, the regional distribution of individual consumption per capita is very similar to that of GDP per capita. However, some differences can be seen in the Asia-Pacific and Western Asia regions, where consumption shares are lower and investment rates are higher.

Collective Government Consumption

Collective government consumption (figure 3) consists of expenditures incurred by general and local governments for collective consumption services such as defense, justice, general administration, and the protection of the environ-

Figure 2 Distribution of Global GDP by Economy



(Countries are in the order of increasing real GDP per capita; area of each rectangle corresponds to the share in global GDP of the corresponding country.)

Source: 2005 ICP.

Note: The economies with the highest GDP per capita, Luxembourg, Qatar, Norway, Brunei Darussalam, and Kuwait, are not shown in this figure because together they account for less than 1 percent of the world economy in total; and the United States is the sixth largest.

ment. Per capita expenditures for collective government exceeded the other categories in Asia, South America, and Western Asia and were the only component for the latter two regions that were greater than the world average.

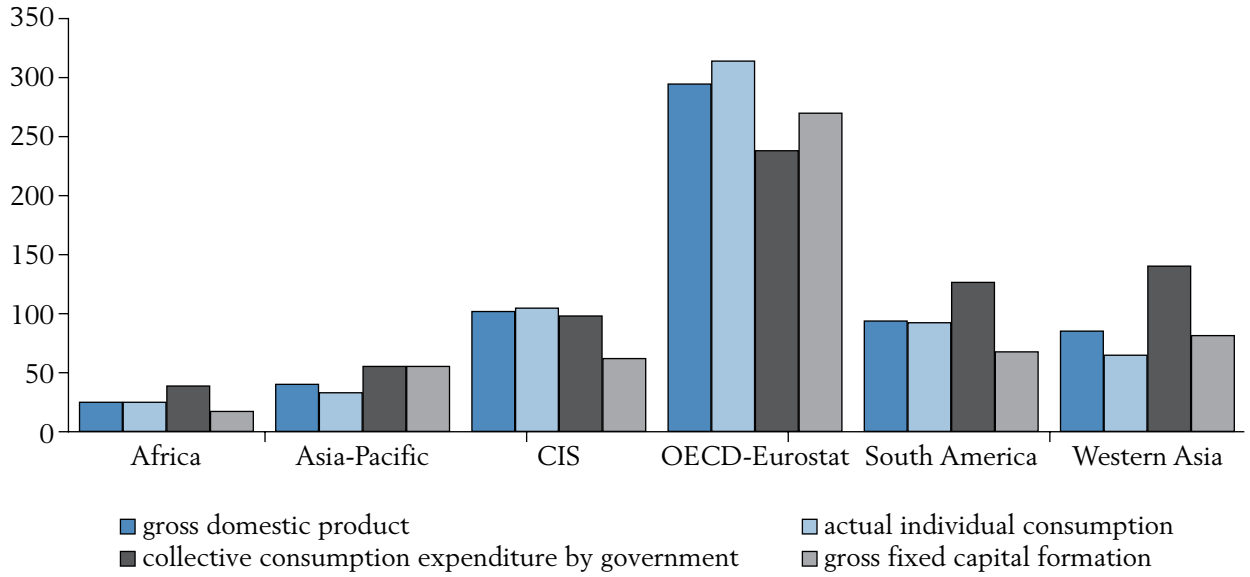
Gross Fixed Capital Formation

Gross fixed capital formation (figure 3) measures investment expenditures, which mostly comprise purchases of equipment and construction services. Compared with the regional dispersion of GDP per capita, investment expenditures per capita appear to be less unequally distributed across regions. In particular, differences between the Asia-Pacific, CIS, South America, and Western Asia regions narrow. On the other hand, Africa lags far behind, reflecting low investment efforts from national and foreign investors, plus high investment prices.

In figure 4, a more detailed picture of per capita expenditure is provided by the chart showing the variation of per capita expenditures for the major categories of the GDP.

Figure 3 Per Capita GDP, Actual Individual Consumption, General Government, and Gross Fixed Capital Formation by Regions

(per capita, PPP-based, world = 100)



Source: 2005 ICP.

The variation across countries is measured by the coefficient of variation; each bar shows the variation from the world average and includes two-thirds of the countries.

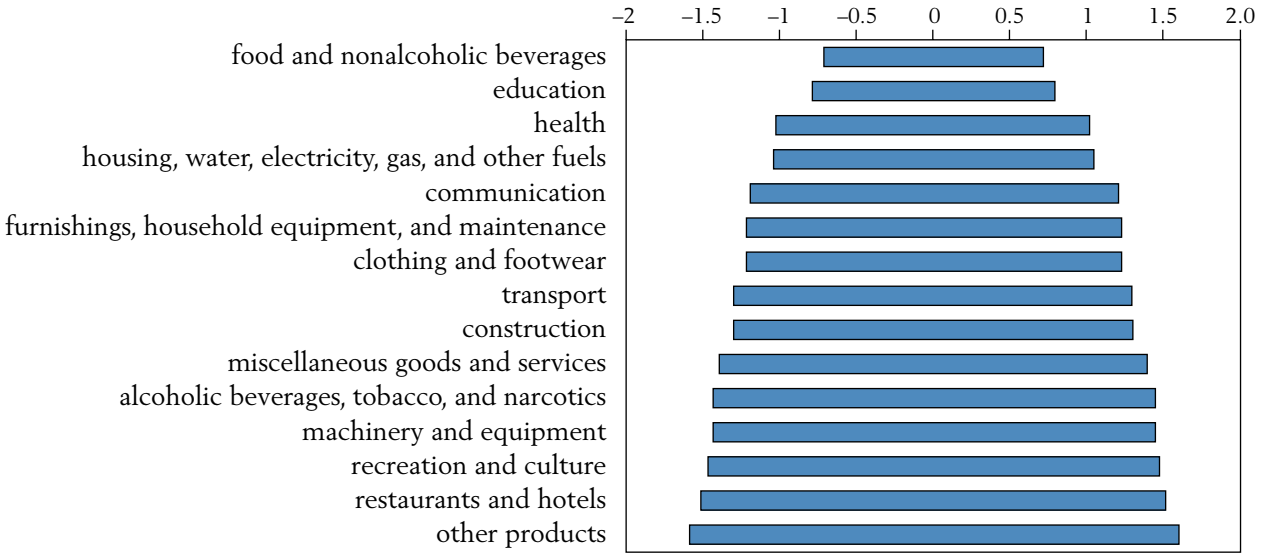
The per capita expenditures for food and nonalcoholic beverages show the least variation across economies compared with the other categories. The chart also shows that the basic categories such as food, health, education, and housing show the least variability across countries, with the spread increasing for categories reflecting those beyond the basic necessities. The range in per capita expenditures for miscellaneous goods and categories continuing down the chart are more than double that shown for food.

Price Level Indexes

A price level index (PLI) is the ratio of a PPP to a corresponding exchange rate. PLIs are used to compare price levels between economies. They indicate the price of GDP (or its components) in an economy if it were "purchased" after acquiring local currency at the prevailing exchange rate. PLIs are generally low in the poorer economies. This reflects the common experience of travelers who find many (but not all) of the goods and services in the poorest economies relatively cheap compared with similar products in their home economy. Figure 5 provides a multidimensional comparison of the per capita GDP scaled to the size of the economy with its price level index. But one can also see from figure 5 that for similar per capita GDP levels, PLIs can differ widely across economies. The PLI in Iceland is about 60 percent larger than in the United States. Average prices in Fiji are almost three times higher than in Bolivia. One can also see that after a certain level of per capita expenditures is reached, there is a rapid rise in prices rather than continued increase in expenditures. The PLIs also show the relative difference between real expenditures and those based on exchange rates. For example, the real GDP is double that of the exchange rate GDP for countries with a PLI of .50. Similarly, the real GDP for countries with a PLI greater than 100 is reduced by the size of the PLI.

Figure 4 Cross-country Differences in Indexes of Real Expenditures per Capita, by Product Groups

(coefficient of variation)



Source: 2005 ICP.

Price level indexes can be computed for each component of GDP, showing relative prices of actual individual consumption, collective government consumption, and gross fixed capital formation. Figure 6 provides a view of the price levels of the four major aggregates of the GDP. The first thing to note is the disparity in price levels between the Eurostat-OECD and the rest of the world; its prices are above the world average for all categories, while other regions are all below average. In all regions except Eurostat-OECD and Western Asia, gross fixed capital formation is the most expensive component of GDP. In Eurostat-OECD, government consumption is the most expensive component, particularly for the economies with the highest GDP per capita, such as Denmark, Iceland, Luxembourg, Norway, and Switzerland. In contrast, the PLI for collective government consumption is lowest in the Africa, Asia-Pacific, and South America regions.

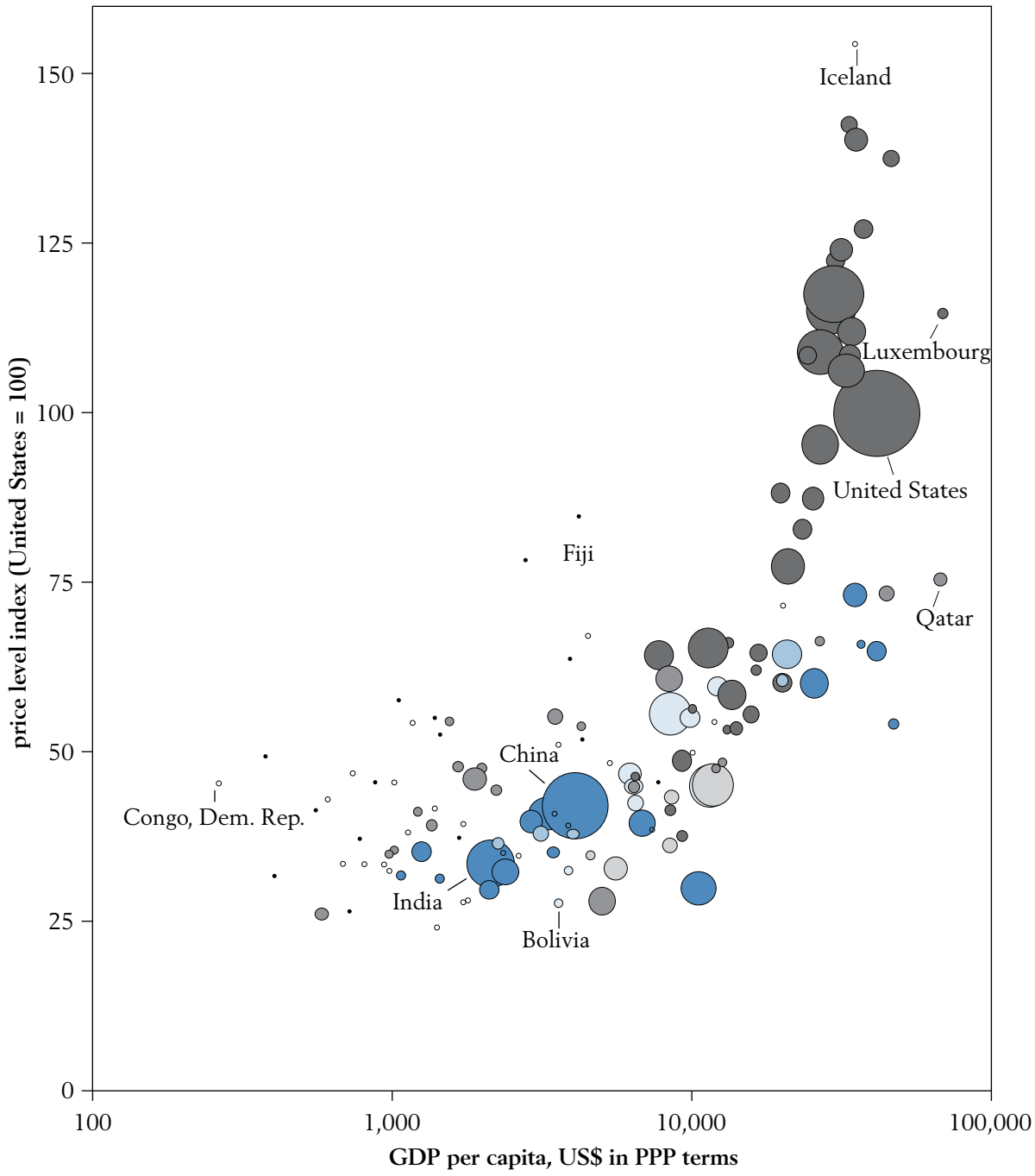
Figure 7 provides a more detailed view of price levels for additional categories of the GDP. It shows the differences in the PLI across countries using the coefficient of variation, which is the range in values of two-thirds of the countries. Machinery and equipment prices vary the least across countries, evidenced by the fact that those purchases in most countries are imported and thus have prices based on the exchange rate. The variation in price levels for health and education are the greatest, with education almost three times that of food.

Figure 8 shows the percent difference between real and nominal expenditure for the same categories included in figure 7. The first thing to note is that education and health, which show the greatest variation in price levels across countries, were also the two categories showing the greatest difference between nominal and real expenditures, followed by construction. All represent nontradable categories more influenced by lower costs of labor and materials. The reason that there is little difference between the nominal and real expenditures for items such as food and clothing, for example, is because the high price levels in the Eurostat-OECD offset the effect of the lower prices in the other regions when viewing the results at the global level. The same reason applies to the machinery, transport, and restaurant categories.

Figure 5 PLI vs. GDP per Capita

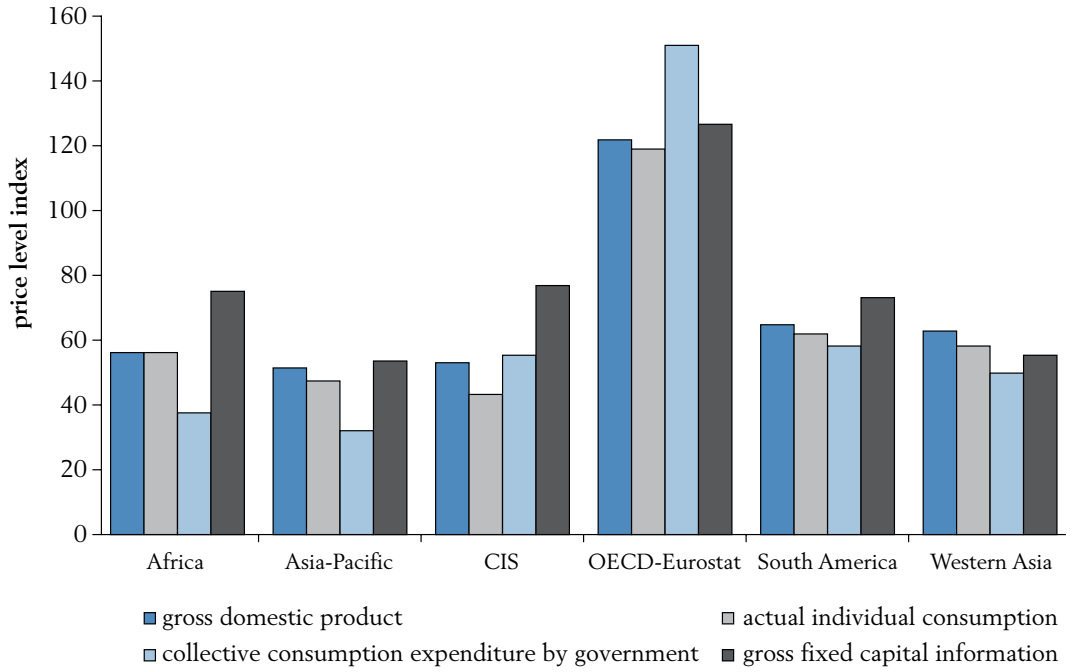
(United States = 100)

Economies are presented by spheres, the size of which is proportional to GDP in PPP terms. Country spheres are color-coded by ICP region.



Source: 2005 ICP.

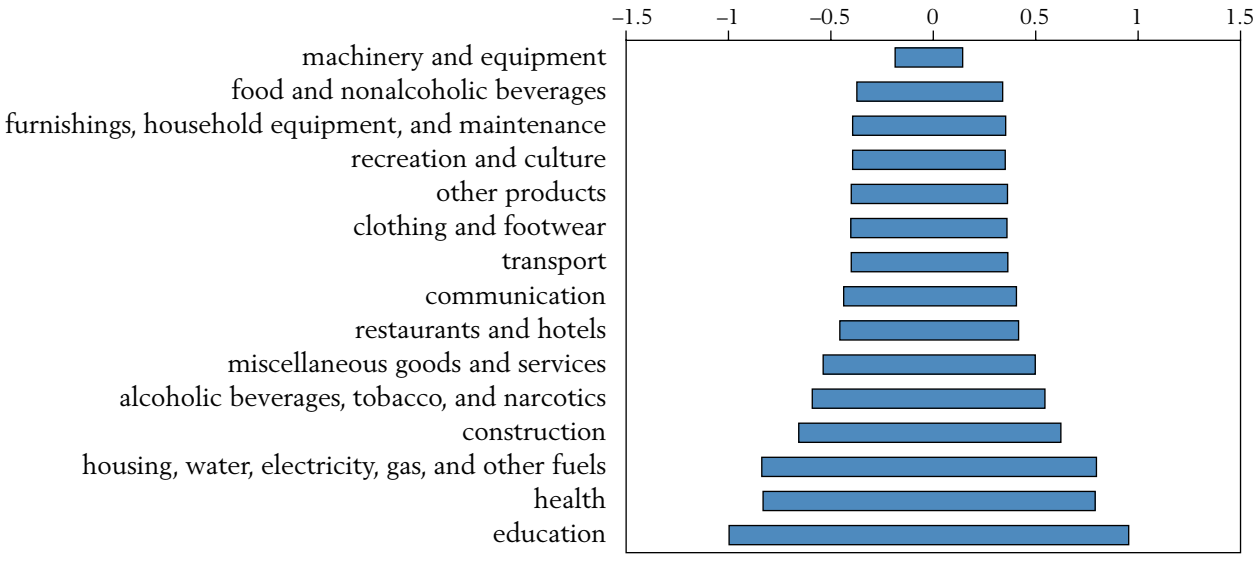
Figure 6 PLI, GDP Components by Regions



Source: 2005 ICP.

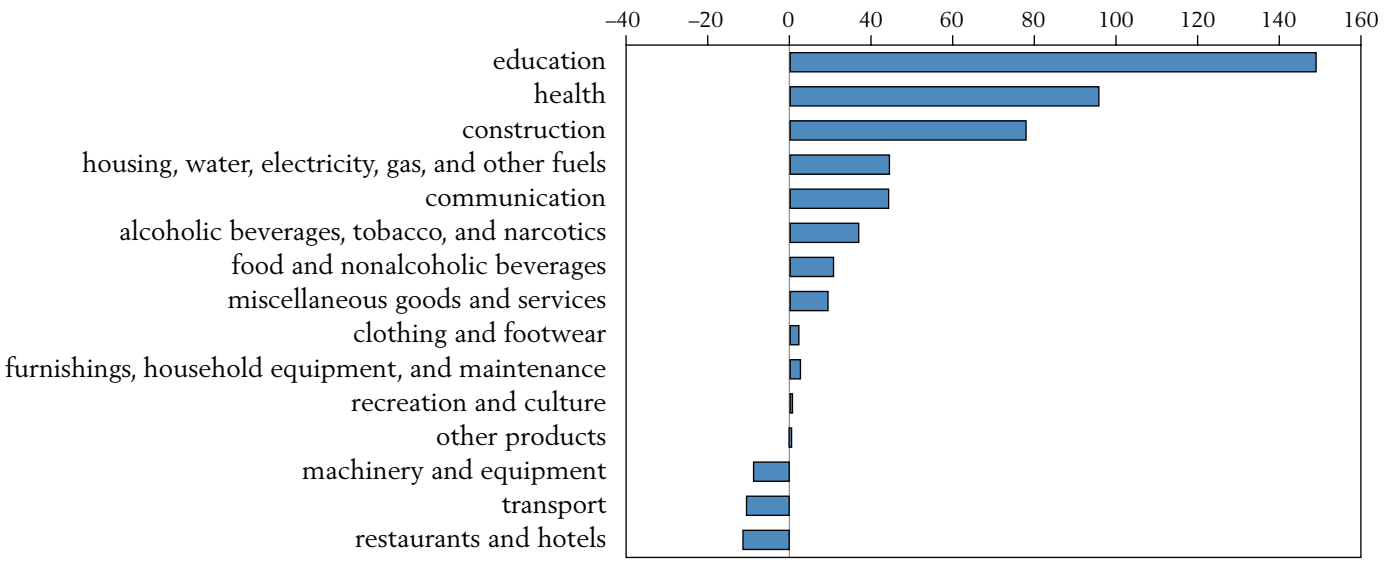
Figure 7 Cross-country differences in prices level indexes, by product groups

(coefficient of variation)



Source: WDI.

Figure 8 Percent Difference Between Global Real and Nominal per Capita Expenditures



Source: 2005 ICP.

About the Data

The purchasing power parities and the derived indicators in this report are the product of a joint effort by national statistical offices, regional coordinators, and the global office. PPPs cannot be computed in isolation by a single economy. However, each economy is responsible for submitting official estimates of 2005 gross domestic product and its components, population counts, and average exchange rates. The regional coordinators worked with the national statistical offices to review the national accounts data to ensure that they conformed to the standards of the *System of National Accounts, 1993*. Similar reviews were conducted for population and exchange rate data.

The tables of global results reflect the data for GDP, population, and exchange rates shown in the regional publications. In some cases, these data differ from those published elsewhere by the World Bank or by other international organizations. One reason is that the international organizations may not have the most current information or they may publish numbers based upon their own expert analysis.

Reference Periods

The reference period for household consumption including housing and government was 2005. Data for equipment and construction were collected mostly in the second half of 2006, with some Africa countries continuing into first quarter 2007. The data were taken "as is" because of the lack of quarterly deflators to calibrate them to 2005.

Effect of Methodology on Comparability

Three regions, Asia-Pacific, Africa, and Western Asia, applied a productivity adjustment to compute the government PPPs in their regions (described in appendix D). The productivity adjustment takes into account that more devel-

oped economies have more capital per worker, and thus higher output per worker, than do the poorer economies. The Eurostat-OECD, CIS, and South America regions did not adjust their government PPPs for productivity because there is less difference in capital-labor ratios among their economies. Productivity adjustments were not used in the ring comparison to link the regions. Housing PPPs were imputed in Asia-Pacific and Africa using the reference volume approach. South America and the CIS region used quantity and quality indicators to estimate housing PPPs; the Eurostat-OECD and Western Asia regions used a combination of rental data, as well as quantity and quality indicators. The regions were linked using quantity and quality indicators to mitigate the effect of the different methods used across the regions (see appendix F for more details).

Imputation of National Accounts Components

Some economies in Africa did not submit price data for one or more basic headings within government compensation, equipment, and construction, but they were able to provide data from their national accounts for all components of the GDP. To provide real GDPs for all economies, results for the missing categories were imputed using results from economies within each region providing full results. These economies were Angola, Burkina Faso, Comoros, Cape Verde, the Democratic Republic of Congo, Djibouti, Gabon, Guinea-Bissau, Guinea, Liberia, Lesotho, Maldives, Morocco, Mauritania, Namibia, Rwanda, São Tomé and Principe, Sudan, Swaziland, Togo, Uganda, and Zimbabwe. The imputation methods are described in appendix F.

Country Notes

China submitted prices for 11 administrative areas and the urban and rural components. The World Bank and the Asian Development Bank extrapolated these 11 city prices to the national level. (Details on the calculation of the national annual averages for China can be found in appendix E.)

Egypt participated in both the Africa and Western Asia ICP programs by providing prices for the products included in each comparison. Therefore, it was possible to compute PPPs for Egypt separately for Africa and Western Asia. Both regions included Egypt results in their regional reports. Egypt appears in the global report in both regions. The results for Egypt from each region were averaged by taking the geometric mean of the PPPs, allowing Egypt to be shown in each region with the same ranking in the world comparison.

CIS region. Russia participated in the price collection for both the CIS and OECD comparisons. As with Egypt, PPPs for Russia were computed separately for the OECD and CIS comparisons. However, the CIS region did not participate in the ring. Therefore, following past practices, the CIS region was linked to Eurostat-OECD, using Russia as a link. For comparison purposes, Russia is shown in both regions in the report. (See appendix F.)

Zimbabwe's official exchange rate indicates a severe misalignment with the rate at which transactions actually occur because of a very high inflation. Only PPP-based numbers are shown for that country.

Description of the Tables

The summary table provides GDP per capita in PPP and U.S. dollar terms; GDP total (in billions) in PPP and exchange rate terms; the GDP price level index; GDP per capita indexes for both the United States equal to 100 and the world equal to 100; PPPs for the U.S. dollar; exchange rates to the U.S. dollar; and total population in millions.

Tables 1 through 11 are based on index calculations, using the Èltetö, Köves, and Szulc (EKS) method. Although the EKS is considered the most appropriate method to compare the different aggregates of the GDP across economies, the expenditures by aggregate are not additive to higher levels of aggregation.

Table 1 presents PPPs for the expenditure on GDP and its major components (actual individual consumption, collective government consumption, and gross fixed capital formation) in national currency per U.S. dollar.

Table 2 shows the price level index expressed relative to the world average. A price level that exceeds 100 indicates that the level of prices in that economy are higher than the world average.

Table 3 shows the expenditures in national currencies converted to U.S. dollars at exchange rates (referred to as "nominal expenditures"), which reflect price and volume differences between economies. Values for stocks and net exports are included.

Table 4 presents real expenditures in U.S. dollars (referred to as "international dollars"), which are expenditures in national currencies converted using PPPs. Expendi-

tures so converted reflect only volume differences between economies.

Table 5 shows nominal expenditures per capita in U.S. dollars, computed using table 3 values divided by each economy's population.

Table 6 provides real (PPP-converted) expenditures per capita, obtained by dividing table 4 data by population.

Table 7 gives the index of nominal expenditures per capita (world = 100). This is the country per capita value as a measure of the world average.

Table 8 gives the index of real expenditures (PPP-converted) per capita (world = 100). This is the country per capita value as a ratio of the world average.

Table 9 gives the nominal expenditures of each economy or region as a share of the world total.

Table 10 gives the real (PPP-converted) expenditures of each economy or region as a share of the world total.

Table 11 provides the distribution of each economy's expenditures in nominal terms across the components of the GDP.

All tables present the results by region for the 146 economies that participated in the 2005 ICP comparison. Regional and global totals and averages are included, where relevant. Regional classifications are based on ICP regions, which differ from those used by other international programs.