

# Results and Empirical Analysis, ICP 2005

YURI DIKHANOV AND FREDERIC A. VOGEL

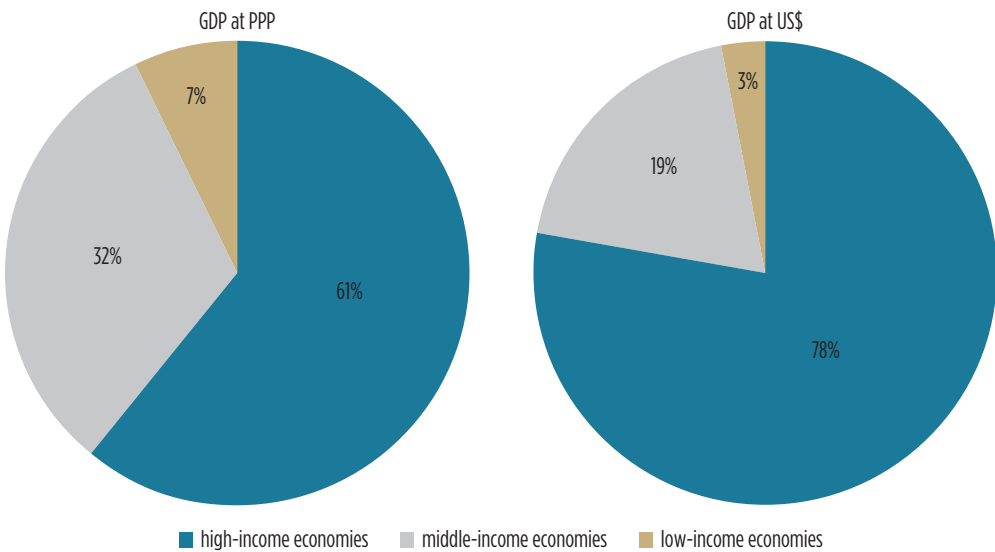
The 2005 results of the International Comparison Program (ICP) brought with them a new understanding of the size and composition of the world economy. The values of the gross domestic product (GDP) and its aggregates were estimated on a common currency basis, corrected for differences in price levels and unaffected by transitory movements in exchange rates.

This chapter provides a bird's-eye view of the global economy based on the 2005 ICP results. In addition, it presents an empirical analysis of the impact of the concepts and methods used on the final results. For example, earlier chapters reviewed extensively the basic concepts such as fixity and additivity. This chapter examines the impact of these concepts on the final results. It also presents different aggregation methodologies, their strengths and weaknesses, and the choices made for the 2005 and 2011 comparisons.

## Bird's-Eye View of the Global Economy

The four figures in this section provide an overview of the world economy using purchasing power parity (PPP) measures of GDP, as described in *Global Purchasing Power Parities and Real Expenditures: 2005 International Comparison Program* (World Bank 2008).

Figure 19.1 shows the distribution of the world GDP among low-, middle-, and high-income countries when using PPPs and exchange rates.<sup>1</sup> The world share of GDP for middle-income economies increases from 19 to 32 percent of the world economy when using PPPs to convert the national GDPs to a common currency instead of exchange rates. The share of the world economy held by low-income economies more than doubles using PPPs, but the striking disparity is that 35 percent of the world population produces 7 percent of the global GDP. Only 17 percent of the world population produces 61 percent of the global GDP.

**FIGURE 19.1** World Shares: GDP at PPP versus GDP at U.S. Dollars

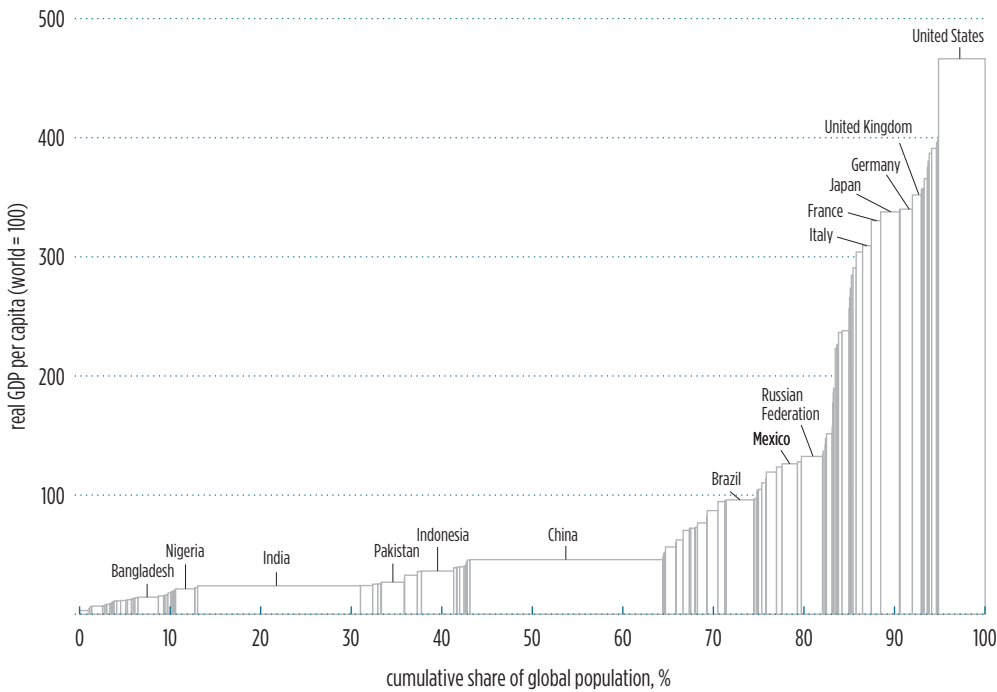
Source: World Bank 2008.

According to the 2005 ICP PPP estimates of GDP, the United States remains the largest economy, with 22.5 percent of the total, followed by China and Japan, with 9.7 and 7.0 percent, respectively. The 12 largest economies together account for two-thirds of the global GDP and include Brazil, China, India, Mexico, and the Russian Federation. These five low- or middle-income countries collectively account for almost 22 percent of the global economy.

There are also interesting results by region. The African economy is dominated by the Arab Republic of Egypt, Morocco, Nigeria, South Africa, and Sudan, which account for two-thirds of the region's GDP.<sup>2</sup> Brazil accounts for one-half of the South American economy. Russia accounts for three-fourths of the GDP of the Commonwealth of Independent States (CIS), China and India account for two-thirds of the Asia-Pacific's GDP, and Saudi Arabia is the largest country in Western Asia.

Figure 19.2 shows the distribution of global GDP by country or economy. The economies are arranged in the order of GDP per capita along the horizontal axis and presented as rectangles whose length along the horizontal scale corresponds to share of the world population. The vertical scale shows the PPP-based index of GDP per capita, which is each economy's GDP per capita as a percentage of the world average (world = 100). Each economy's GDP is thus represented by the rectangular area or the product of population and GDP per capita for direct comparison across economies.

In figure 19.2, the economies are arranged in increasing order of GDP per capita. The intersection of the 100 percent line with the rectangles illustrates that about three-fourths of the world population is in economies below the world average for per capita GDP. Both China and India have GDP per capita below the world average; however, they have the second- and fifth-largest economies because, combined, they account for 40 percent of the world population. The United States, with the sixth-largest GDP per capita, is at the right. The remaining countries are indicated by the dark lines because of their small populations.

**FIGURE 19.2** Distribution of Global GDP by Country

Source: World Bank 2008.

Note: Countries are in the order of increasing real GDP per capita. The area of each rectangle corresponds to the share in global GDP of the corresponding country. The economies with the highest GDP per capita—Luxembourg, Qatar, Norway, Brunei Darussalam, and Kuwait—are not visible in this figure because together they account for less than 1 percent of the world economy in total and a much smaller share of the world population. The United States is the sixth-largest economy in GDP per capita.

Figure 19.3 provides another view of GDP per capita across countries, this time plotted against the price level indexes (US = 100). Recall that the price level index (PLI) is the ratio of the PPP to a corresponding exchange rate and is used to compare price levels between economies. Figure 19.3 is a multidimensional comparison of the PLI with per capita GDP scaled to the size of the economy. The country spheres are color-coded by ICP region.<sup>3</sup> The PPPs and exchange rates are expressed through the PLI; the per capita expenditures reflect each country's affluence and the size of the sphere its GDP. An important observation is that, in general, price levels increase as countries become more developed. Another observation is that the relationship between price levels and GDP per capita is not uniform for individual countries, especially at the higher income levels. For example, the PLI for Iceland is about 60 percent higher than that for the United States, whereas Iceland's GDP per capita is below the U.S. level.

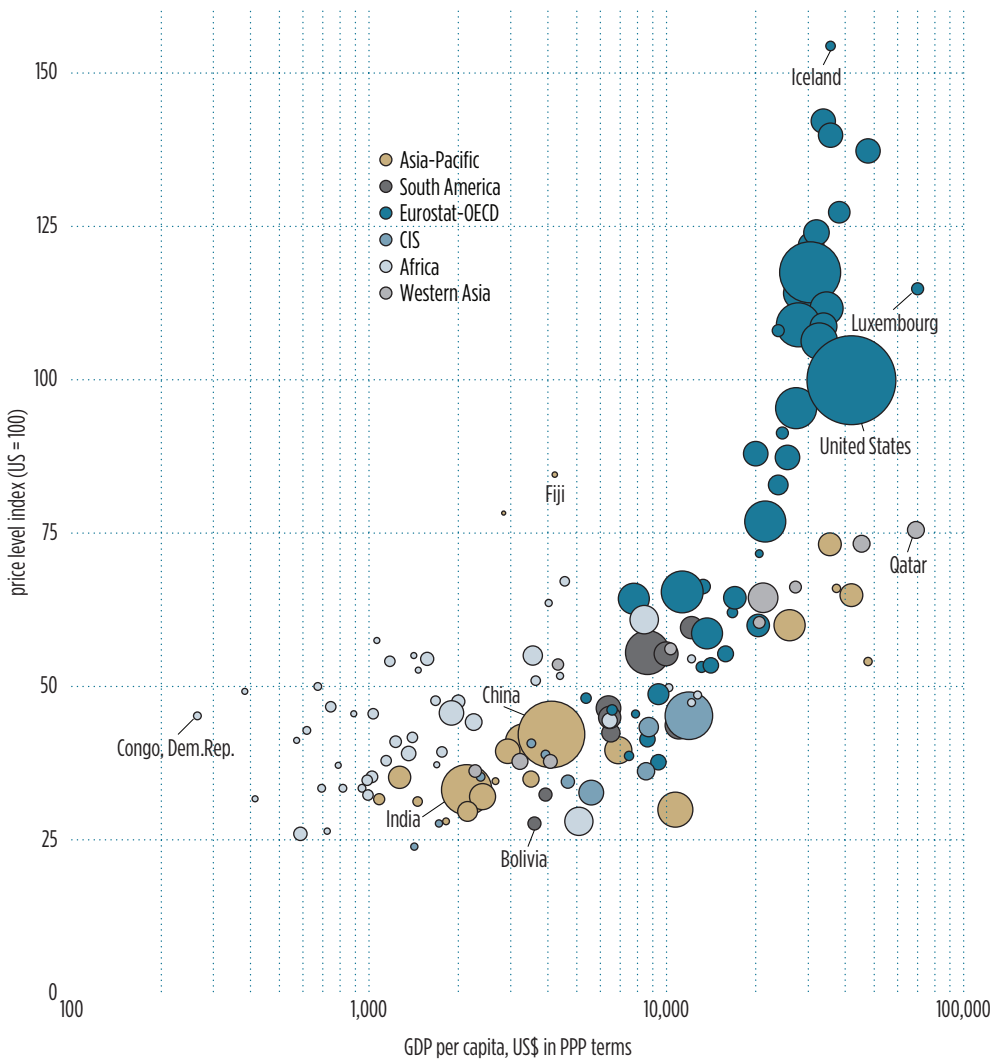
Regressing the log PLIs on log per capita GDP in nominal terms, we can estimate the static Balassa-Samuelson effect (or the static Penn effect)<sup>4</sup> for the 2005 ICP comparison:

$$\ln(PLI_i) = -0.0774 + 0.2131 \ln(Y_i) + \hat{\varepsilon}_i$$

(0.0359)    (0.0115)

$R^2 = 0.7045$ ; standard error of regression (MSE) = 0.2341.

**FIGURE 19.3** Price Level Index versus GDP Per Capita (US = 100)

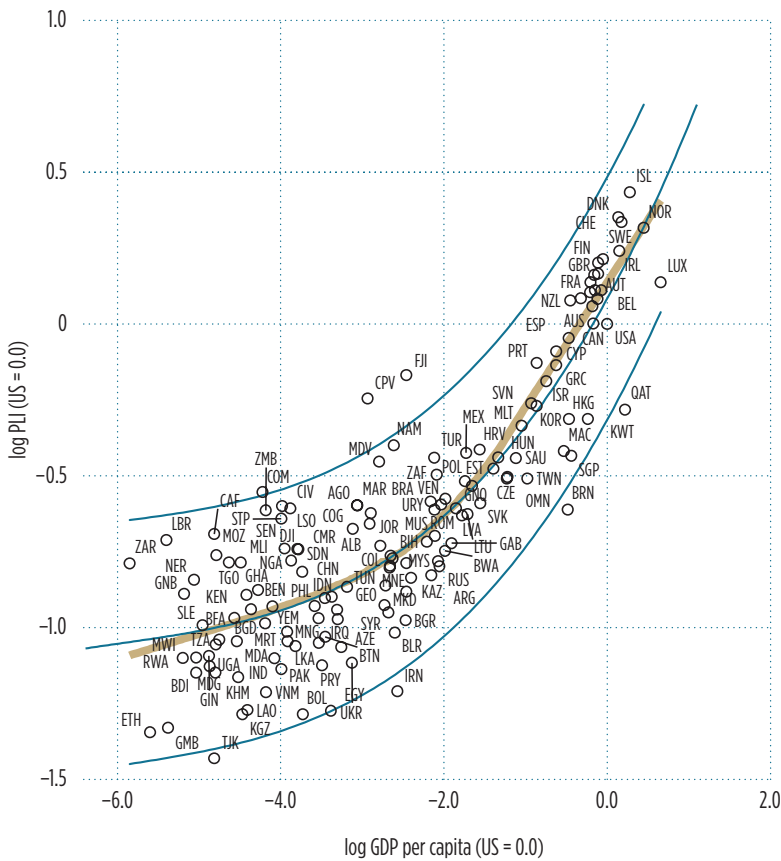


Source: World Bank 2008.

Note: Economies are represented by spheres, the size of which is proportional to GDP in PPP terms. Country spheres and labels are color-coded by ICP region. See annex to chapter 10 for country codes.

This means that with each percent of increase in the nominal per capita GDP, the price level (PLI) increases by 0.2131 percent (in relative terms, versus the United States). As mentioned earlier, this relationship is not very strong. But using this formulation, we can predict the PLI or real GDP for a country with the standard error of estimate of 23.4 percent.<sup>5</sup>

It is possible to get a better fit when using a nonparametric regression. In particular, in figure 19.4 the LOESS (locally weighted polynomial regression) with Epanechnikov kernel was used (Cleveland and Devlin 1988). The LOESS fit (the thick line in beige) is contrasted with the cubic fit presented for comparison. It is clear from figure 19.4 that the relationship of log price level versus log income per capita at exchange rate is strongly nonlinear. The standard error for the LOESS regression is 0.18, still high, but significantly lower than for the linear formulation.

**FIGURE 19.4** Log Price Level Index (PLI) versus Log GDP Per Capita, at Exchange Rate

Note: See annex to chapter 10 for country/economy abbreviations.

## Impact of Methods Used to Apply Regional Fixity

Earlier chapters described in great detail the different methods and concepts involved in estimating PPPs. They pointed out that any properly defined multilateral process to estimate the PPPs between any two countries will be affected by the other countries in the comparison. The PPP between Mexico and Germany, for example, will depend on the other countries in the comparison. Chapter 10 described these sources of variability in considerable detail.

To eliminate influences from nonregional countries, the ICP follows this principle: first estimate PPPs at the regional level and then carry out the global aggregation in such a way that intraregional relativities for prices and real expenditures are retained. This is called *fixity*. The rationale for the fixity requirement is the following: because the countries within each region would utilize a common item list and are likely have more similar price and economic structures, it would make more sense to make comparisons among them than comparisons with out-of-region countries. Chapters 4–6 showed how these regional PPPs were estimated in the 2005 ICP, and then linked to other regions for the global

comparison. This linking was done in a way that ensured the fixity concept was met. The fixity concept thus defined ensures that the relative position (ratio of PLI or real expenditures) between any pair of countries in a region remains the same in both the regional and global comparisons. This concept also allows for different timing of preparation and publication of the regional results.

However, the composition of the ICP regions has moved from a mostly geographic base to a more organization-based distribution. In particular, the Eurostat-OECD region includes the Republic of Korea, Japan, Mexico, and Russia.<sup>6</sup> In addition, composition of the regions changes from one comparison to another: in 1993 China and India did not take part in the ICP, whereas in 2005 both countries were part of the Asia-Pacific region. At the same time, Japan and Korea were part of the Asia-Pacific region in 1993 but not in 2005.

This section compares the results derived by imposing fixity using the two-stage approach applied by the 2005 ICP with the results based on a one-stage global aggregation in which fixity is not imposed on the global GDP or aggregates. Regional fixity can be restored by distributing the sum of regional totals from the one-stage global aggregation to the respective countries in each region based on the regional aggregation.

The results are shown in table 19.1 for the six ICP regions and selected countries. Columns (1) and (4) show GDP per capita as a percentage of the world average and world shares, respectively,

**TABLE 19.1** GDP Per Capita Indexes and World Shares with Two-Stage and One-Stage Aggregations

|                    | GDP per capita indexes (world = 100) |                  |              | GDP world shares |                  |              |
|--------------------|--------------------------------------|------------------|--------------|------------------|------------------|--------------|
|                    | GEKS                                 |                  |              | GEKS             |                  |              |
|                    | Two-stage<br>(1)                     | One-stage<br>(2) | Ratio<br>(3) | Two-stage<br>(4) | One-stage<br>(5) | Ratio<br>(6) |
| Asia-Pacific       | 40.0                                 | 43.8             | 1.10         | 21.9             | 23.2             | 1.06         |
| South America      | 93.8                                 | 91.9             | 0.98         | 5.6              | 5.3              | 0.95         |
| Eurostat-OECD      | 295.3                                | 299.3            | 1.01         | 66.3             | 65.2             | 0.98         |
| CIS                | 102.5                                | 116.6            | 1.14         | 4.1              | 4.5              | 1.10         |
| Africa             | 24.8                                 | 26.8             | 1.08         | 3.3              | 3.2              | 0.96         |
| Western Asia       | 86.0                                 | 89.6             | 1.04         | 2.5              | 2.5              | 1.01         |
| World              | 8,971                                | 9,210            |              | 54,976           | 58,329           |              |
| China              | 45.6                                 | 50.4             | 1.11         | 9.70             | 10.42            | 1.07         |
| India              | 23.7                                 | 25.9             | 1.09         | 4.26             | 4.51             | 1.06         |
| Brazil             | 95.8                                 | 93.4             | 0.98         | 2.88             | 2.72             | 0.95         |
| Russian Federation | 132.2                                | 147.6            | 1.12         | 3.09             | 3.34             | 1.08         |
| Tajikistan         | 15.8                                 | 23.2             | 1.47         | 0.24             | 0.27             | 1.12         |
| South Africa       | 94.5                                 | 93.1             | 0.99         | 0.72             | 0.69             | 0.96         |
| Egypt, Arab Rep.   | 56.3                                 | 56.9             | 1.01         | 0.64             | 0.64             | 0.99         |
| United States      | 464.5                                | 452.5            | 0.97         | 22.51            | 21.2             | 0.94         |

Source: Estimated on the basis of ICP 2005 detailed inputs.

Note: GEKS = Gini-Éltető-Köves-Szulc. Summation of shares across regions greater than 100 because Russia and Egypt are included in two regions.

as published in World Bank (2008). They are based on the Gini-Éltető-Köves-Szulc (GEKS) aggregation method. The table also shows world GDP per capita and world GDP for the one-stage and two-stage cases.

The GEKS aggregation with fixity as implemented in 2005 is a two-stage process, as shown in chapter 10. As a preliminary step, the regional aggregation is carried out according to the regional methodology—that is, with the GEKS indexes, or, in the case of Africa, with the Iklé-Dikhanov-Balk (IDB) method. Sometimes, the regional aggregation is a multistage process itself, as in the Eurostat-OECD region.

The inputs for both the one-stage and two-stage global aggregations is the within-region basic heading PPPs and the between-region linking factors that convert the within-region PPPs to a set of transitive global basic heading PPPs. The two-stage method of aggregation to the GDP and each subcomponent is as follows:

- *Stage one.* Use the regional basic heading real expenditures as calculated by the regions to assemble the regional totals (super countries) at regional prices.
- *Stage two.* Use the GEKS method to conduct the global aggregation using the regional totals by basic heading and interregional linking factors at the level of GDP and its components.

After that process, the regional totals at the level of GDP and its components will be redistributed according to the regional results to ensure fixity.

An alternative (one-stage) global aggregation process is to compute the GEKS results directly at each level of aggregation using the full matrix of 129 basic heading PPPs for the 146 countries after they have been linked to a common global currency, without assembling the regional totals. After the global aggregation is computed, the GEKS results are normalized to have the same intra-regional relativities as in the regional comparison (i.e., fixity is applied in the same fashion as in the two-stage case).

The PPPs between any two countries in the one-stage aggregation are affected by countries from every region. All countries are treated equally in every stage of aggregation regardless of their economic size. Thus the PPP between, say, Brazil and India is computed directly rather than via the interregional linking factors. In addition, the PPPs between any two countries are affected by the indirect PPPs based on each of the remaining 144 countries as shown in chapter 10.

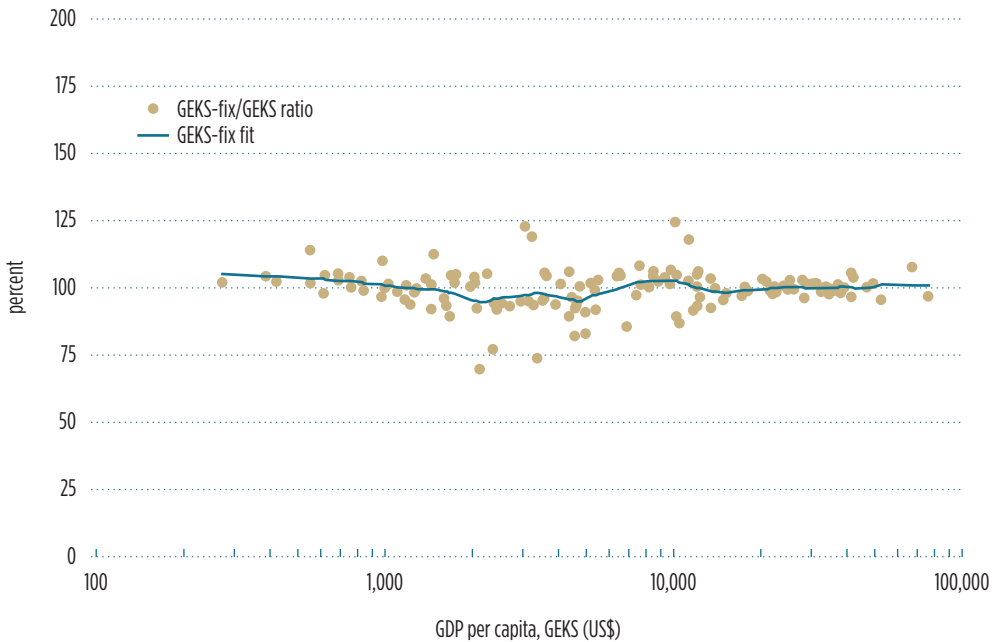
In this chapter, fixity has not been applied in the one-stage process—that is, the difference between the one- and two-stage processes under consideration here includes both effects of fixity and an extra stage in aggregation.

The one-stage global aggregation with no fixity imposed increases the per capita expenditures as a percentage of the global measure in the Asia-Pacific, CIS, and Africa regions, and more specifically in China, India, Russia, and Tajikistan.

Columns (4) and (5) show the world shares by region and country for the one- and two-stage cases. The U.S. real GDP share in the world decreases with the one-stage aggregation. However, as shown in column (6) the distribution of GDP across regions and countries changes considerably, clearly indicating that the choice of method has a significant effect.

The country shares of world GDP for China, India, and Russia become larger when the one-stage global GEKS aggregation without fixity is used, and, correspondingly, the relative price levels become lower. At the same time, the price levels for Brazil, South Africa, and Egypt become higher when the one-stage aggregation is used. Figure 19.5 plots the differences between the two methods for all the countries in the comparison. The regression line is based on the nonparametric

**FIGURE 19.5** Ratio of Two-Stage GEKS with Fixity to One-Stage GEKS without Fixity versus GEKS GDP Per Capita



Source: Estimated on the basis of ICP 2005 detailed inputs.

Note: GEKS = Gini-Éltető-Köves-Szulc.

LOESS procedure. Some countries (in particular, Tajikistan and the Kyrgyz Republic) exhibit very high deviations, which probably indicate the limitations of the methodology.

This effect should be taken into account when comparing the 2011 and 2005 ICP rounds, because the 2011 methodology of linking the regions will generate results for regions in their entirety closer to the one-stage calculation as presented here. For example, in the one-stage calculation the GDP level of the Asia-Pacific region is estimated as 10 percent higher than the official results, and at the same time the relative positions of India, China, and other Asian countries *within* the region would not change when fixity is applied. This means the positions of countries in Asia vis-à-vis the world move in accordance with the level change in that region.

## The GEKS Method and Additivity

Additivity is a desired statistical property for international comparisons. For example, the expenditures in national currency for each basic heading divided by the respective PPPs should add to the sum of the basic heading expenditures (in national currency) divided by the aggregated food PPP. The addition of major aggregate expenditures in PPP terms to GDP should equal the real expenditures obtained by dividing GDP expenditures in national currencies by the aggregated PPP for GDP.

Different methods can be used to average basic heading PPPs to aggregates of GDP and to GDP. In chapter 5 of this volume, Diewert describes the properties of the three primary



methods—GEKS, IDB, and Geary-Khamis (GK)—used to aggregate basic heading PPPs to the higher levels, including GDP. There, he examines the additive property and the economic approach to making multilateral comparisons.

The GEKS method does not provide results that are additive, whereas both the GK and IDB methods do satisfy that property. Diewert shows that GEKS satisfies the economic approach to index number theory, that it is one of the superlative multilateral methods, and that it satisfies some important axiomatic properties.

He also explains that additive methods are not consistent with economic utility across countries. Countries whose price vectors diverge widely from the “international or world” prices used in additive methods will produce quantity shares that are biased upward. In other words, the GDP shares in countries whose price vectors are out of line with the “international price” will be biased upward using additive methods.<sup>7</sup>

For these reasons, the method of choice for the global aggregation for the 2005 ICP and also for the 2011 ICP is the GEKS method, even though its results are not additive. The rest of this section briefly reviews the main aggregates and the impact of the lack of additivity.

The data in tables 19.2 and 19.3 are derived from table 4, real expenditures by aggregate and the GDP, in World Bank (2008). This table provides real expenditures separately for machinery and equipment, construction, and other products. Then, the respective PPPs for these aggregates are averaged to provide real expenditures for gross fixed capital formation (GFCF). The sum of the real expenditures for machinery and equipment, construction, and other products is not the same as the real expenditures for GFCF after the respective PPPs are aggregated, and therefore is not additive. A similar comparison can be made by adding real expenditures for aggregates making up actual individual consumption (AIC) and comparing that with AIC real expenditures and also at the level of GDP.

Table 19.2 shows the sum of the real expenditures for the aggregates making up GDP, AIC, and GFCF as the ratio of the real expenditures from the aggregated PPPs for the six regions and the world. The first column shows that the largest difference for GDP is 4 percent in the Asia-Pacific region; all others are essentially the same considering the statistical variability inherent in the methods. However, the differences become considerably larger for subaggregates of GDP. The sum of real expenditures for machinery and equipment, construction, and other products is 32 percent larger in the Asia-Pacific region than the aggregated value of gross fixed capital formation.

**TABLE 19.2** Effect of GEKS on Additivity Shown by Sum of Individual Aggregates as a Ratio to Overall Aggregate for GDP, AIC, and GFCF, by Region

| Region        | Sum GDP/GDP | Sum AIC/AIC | Sum GFCF/GFCF |
|---------------|-------------|-------------|---------------|
| Asia-Pacific  | 1.04        | 1.21        | 1.32          |
| South America | 1.00        | 1.03        | 1.04          |
| Eurostat-OECD | 1.00        | 1.02        | 1.01          |
| CIS           | 0.99        | 1.16        | 1.07          |
| Africa        | 1.02        | 1.03        | 1.08          |
| Western Asia  | 1.01        | 1.14        | 1.08          |
| World         | 1.01        | 1.06        | 1.11          |

Source: ICP 2005.

Note: AIC = actual individual consumption; GFCF = gross fixed capital formation.

**TABLE 19.3** Effect of GEKS on Additivity as Shown by Sum of Individual Aggregates as a Ratio to Overall GDP, AIC, and GFCF, Asia-Pacific Region

|                      | Sum GDP/GDP | Sum AIC/AIC | Sum GFCF/GFCF |
|----------------------|-------------|-------------|---------------|
| Bangladesh           | 1.06        | 1.04        | 1.59          |
| Bhutan               | 1.17        | 1.33        | 1.71          |
| Brunei Darussalam    | 0.93        | 1.22        | 1.23          |
| Cambodia             | 1.07        | 1.41        | 1.28          |
| China                | 1.05        | 1.28        | 1.44          |
| Hong Kong SAR, China | 0.96        | 1.08        | 0.92          |
| Macao SAR, China     | 0.83        | 1.10        | 1.26          |
| Taiwan, China        | 1.04        | 1.22        | 0.93          |
| Fiji                 | 1.17        | 1.09        | 0.93          |
| India                | 1.05        | 1.20        | 1.14          |
| Indonesia            | 1.01        | 1.01        | 1.60          |
| Iran, Islamic Rep.   | 1.01        | 1.21        | 0.98          |
| Lao PDR              | 1.24        | 1.27        | 1.29          |
| Malaysia             | 0.94        | 1.11        | 0.96          |
| Maldives             | 1.28        | 1.88        | 0.96          |
| Mongolia             | 1.06        | 1.52        | 1.08          |
| Nepal                | 1.11        | 1.18        | 1.50          |
| Pakistan             | 1.10        | 1.14        | 1.22          |
| Philippines          | 1.04        | 1.09        | 1.17          |
| Singapore            | 0.92        | 1.10        | 0.97          |
| Sri Lanka            | 1.11        | 0.93        | 1.28          |
| Thailand             | 1.04        | 1.15        | 0.90          |
| Vietnam              | 1.08        | 1.66        | 1.52          |

Source: ICP 2005.

Note: AIC = actual individual consumption; GFCF = gross fixed capital formation.

Table 19.3 shows the same comparisons shown in table 19.2, but for countries in the Asia-Pacific region. It is obvious that the differences between the respective sums and the PPP aggregate are considerably larger at the country level. The main contributor to the differences for the capital formation aggregate is the construction category, in which real expenditures for some countries exceed the aggregated capital formation amount. Large differences are also shown for the actual individual consumption category. The differences become much smaller at the GDP level.

What are the consequences of the lack of additivity? First, the main purpose of the ICP is to obtain comparisons that are consistent with economic utility across countries. In addition, the GEKS treats countries symmetrically and equally in the aggregation, as shown in the examples in chapter 10. Therefore, the main consequence of the lack of additivity is that the PLIs and real expenditures for each component and aggregate of GDP must be considered separately and used to understand the comparisons across countries. They should not be used for within-country comparisons. Second, the most appropriate comparison for gross fixed capital formation is use

of the real expenditures for that aggregate and not the summation of the individual components. Therefore, the primary consequence of the lack of additivity is that analysis of the economic structure within countries is difficult. In other words, it is difficult to contrast the contribution of each GDP component and aggregates to GDP by country when, for example, answering the question what is the distribution of expenditures on health and education when viewed as a percentage of the GDP, in real terms?

The next section reviews the real GDP and main aggregates when different aggregation methods are used.

## GDP by Method of Aggregation

This section compares four methods used to estimate PPPs and thus the global real value of GDP. Chapters 4, 5, and 6 provide a complete review of these methods. However, a brief summary is presented here to provide context for the discussion of the methods.

The *GEKS method* was described earlier in this chapter in the discussion on fixity. The *GK method* is a global aggregation using the 129 basic heading expenditures and PPPs for the 146 countries. The real expenditures for each country based on the sum of the country's individual basic heading expenditures are weighted by an international price held constant across countries. The result is a set of real expenditures that are additive to the ICP. However, large countries will make larger contributions to determination of the international prices, which therefore will be more representative of the larger countries in the comparison.

The *IDB method* is a global aggregation using the  $129 \times 146$  matrices of basic heading PPPs and expenditures. Chapter 5 provides a detailed discussion of the properties of the IDB method, which also produces additive results. The method is very similar to the GK method except that international prices are determined in a way that reduces the effect of large countries, and, as a result, reduces the Gerschenkron effect.<sup>8</sup> The IDB method treats all countries equally, as does the GEKS.

Either or both methods will be of interest to those seeking a method that is additive across countries and commodity groups. Therefore, what follows reviews the results by method, beginning with table 19.4, which shows the real GDP by method of aggregation by ICP region and world.

**TABLE 19.4** Real GDP by Method of Aggregation by ICP Region and World

US\$ millions

| Region        | GEKS, two-stage | GEKS, one-stage | GK     | IDB    |
|---------------|-----------------|-----------------|--------|--------|
| Asia-Pacific  | 12,020.7        | 13,529.6        | 13,463 | 12,599 |
| South America | 3,078.1         | 3,103.4         | 2,975  | 2,771  |
| Eurostat-OECD | 36,469.0        | 38,033.5        | 37,134 | 36,788 |
| CIS           | 2,269.2         | 2,648.3         | 2,509  | 2,281  |
| Africa        | 1,835.6         | 1,877.0         | 1,998  | 1,702  |
| Western Asia  | 1,354.1         | 1,454.9         | 1,516  | 1,420  |
| World         | 54,975.6        | 58,329.0        | 57,457 | 55,579 |

Source: ICP 2005.

Note: GEKS = Gini-Éltetö-Köves-Szulc; GK = Geary-Khamis; IDB = Iklé-Dikhanov-Balk.

World Total after adjusting duplication of Russia in the Eurostat, OECD and CIS regions and Egypt in the Africa and Western Asia regions.

The numbers in table 19.4 are expressed in U.S. dollars, and thus the changes in world totals reflect the relative changes in the U.S. GDP share in the world. In other words, using the GK method the U.S. dollar is valued 4.5 percent less than when using the two-stage GEKS, and so forth.

The two GEKS aggregations are interesting because they simply show the effect of directly aggregating country PPPs across regions and the respective larger differences in price levels encountered. Also interesting is that the GEKS two-stage, GEKS one-stage, and IDB values are very similar, suggesting they are not statistically different.

The effect of the four methods on the size of the regional and country economies is now shown using their shares of the world economies. Table 19.5 shows the percentage of each region's real GDP of the world total for each aggregation method.

The GK versus GEKS (two-stage) method shows larger shares of the world for the Asia-Pacific, CIS, Africa, and Western Asia regions. The world shares are reduced for the South America and Eurostat-OECD regions. The effect of the large country weights on the international price for the GK was to raise the shares of the poorer regions and lower them in the higher-income countries.

It can be concluded, then, that the differences between methods at the regional level are not large because of the smoothing effect of having countries at various levels of development in each region—for example, Asia has some of the richest and the poorest countries in the world, and the Gerschenkron effect in the GK case would not be so distinct at the regional level. The general relationship between the GEKS and the additive methods shows that the IDB maintains additivity with little impact on the country shares for most regions.

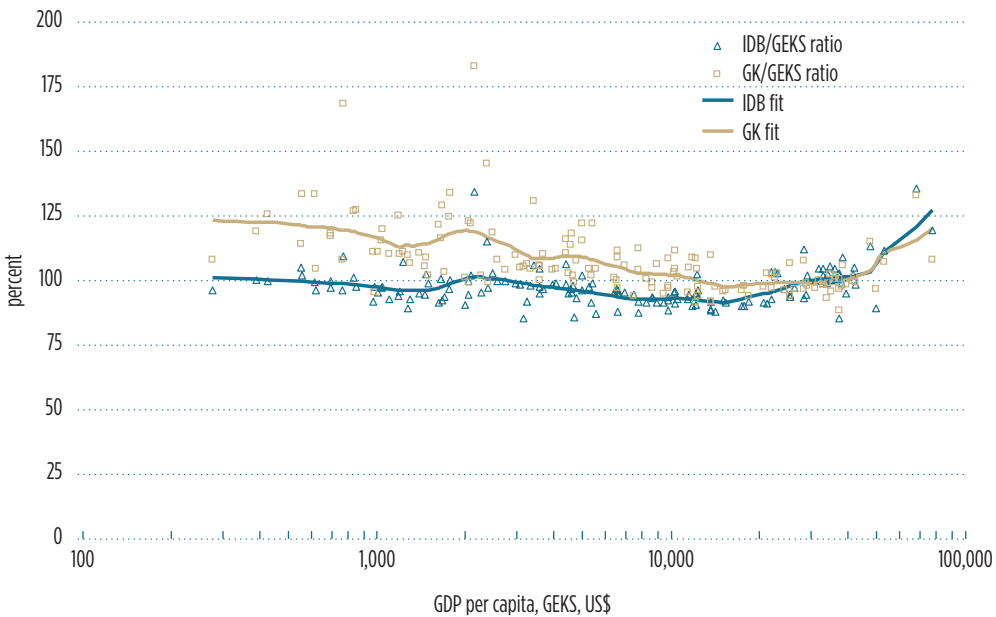
At the individual country level, the picture is quite different; the differences are much more pronounced. Figure 19.6 compares the different methods at the country level using GDP per capita. The GEKS one-stage GDP per capita for each country is in the denominator. The graph shows a scatter plot of the ratios of the GK and IDB measures of GDP to the GEKS one-stage estimates. Because the GK and IDB are one-stage methods, they are compared with the GEKS one-stage values. That comparison explicitly shows the greater bias inherent in the GK for countries with the lower GDP per capita and decreases as the per capita measure increases. It also has a larger number of outliers. The IDB/GEKS ratio is greater than 25 percent for only one country; otherwise, the ratios are evenly distributed around the regression line (nonparametric LOESS fit). The result is that the IDB method produces results similar to those produced by the GEKS method, and it gives additive results. The Gerschenkron effect is clearly visible in the GK case.

**TABLE 19.5** Real Gross Domestic Product by Method of Aggregation by ICP Region and World (shares, world = 100)

| Region        | GEKS, two-stage | GEKS, one-stage | GK     | IDB    |
|---------------|-----------------|-----------------|--------|--------|
| Asia-Pacific  | 21.87           | 23.20           | 23.43  | 22.67  |
| South America | 5.60            | 5.32            | 5.18   | 4.99   |
| Eurostat-OECD | 66.34           | 65.21           | 64.63  | 66.19  |
| CIS           | 4.13            | 4.54            | 4.37   | 4.10   |
| Africa        | 3.34            | 3.22            | 3.48   | 3.06   |
| Western Asia  | 2.46            | 2.49            | 2.64   | 2.55   |
| World         | 100.00          | 100.00          | 100.00 | 100.00 |

Source: ICP 2005.

Summation across regions greater than 100 because Russia and Egypt are included in two regions.

**FIGURE 19.6** GK/GEKS Ratio and IDB/GEKS Ratio versus GEKS GDP Per Capita by Country

Note: GEKS = Gini-Éltető-Köves-Szulc; GK = Geary-Khamis; IDB = Iklé-Dikhanov-Balk.

The next section is an overview of the structural information that can be gleaned using an additive method—in this case the IDB.

## Structure of the World GDP and Its Aggregates

The annex to this chapter presents the item shares resulting from the IDB aggregation, which are additive to the GDP for each country. Using this table, one can examine the distribution of the aggregates of the real GDP expenditures. Some examples follow.

Twelve percent of the world's GDP is for food and nonalcoholic beverages. Africa spends over a fourth of its GDP on these products, but the Eurostat-OECD spends only 10 percent. Many of the poorer countries spend over a third to a half of their GDP on food. The table shows that the expenditures on food decline as the size of the economy increases.

Health expenditures account for 6 percent of the world GDP, but with a smaller range: 3.8 percent in Western Asia and 6.4 percent in the Eurostat-OECD region. In only six countries are health expenditures 10 percent or more of GDP. A similar picture emerges for education expenditures, where the range is from 2.8 percent for the Eurostat-OECD countries to 6.6 percent for the CIS countries.

Government expenditures (individual and collective) account for 12 percent of the world GDP. Shares by region range from 29 percent for Africa to 12 percent for the Asia-Pacific. Eleven countries spend one-fourth or more of their GDP on government.

Construction accounts for 13 percent of the world GDP. The Asia-Pacific region leads the way, spending nearly a fourth of its GDP on construction. Only about 9 percent of the Eurostat-OECD

region's GDP is spent on construction. However, this region has the largest share of machinery and equipment expenditures (11 percent), compared with 8 percent for the Asia-Pacific region. This implies that there is a labor productivity factor in which more labor is used in Asia and more equipment is used in the Eurostat-OECD region to achieve a given level of construction.

It is left to the reader to review the distributions at the country level, especially by economic size, where it is clear that countries with rapid growth have large shares for investment.

## Conclusion

This chapter provides an overview of the results of the 2005 ICP, as well as an analysis to clarify the concepts of fixity and additivity. It then compares the different methods of estimating PPPs that incorporate these concepts.

A conclusion from this analysis is that the ICP results are very robust. Although different methods of estimation provide somewhat different answers, the results are within the range of statistical variability. And although the IDB method does have a residual Gerschenkron effect, its results are close to those produced by the GEKS method, but it provides additivity, which is important for structural analysis. It is also shown that regional fixity may have a significant effect on the results.



## ANNEX

## Real Expenditure Item Shares at World Average Prices

percent

| Economy              | Gross domestic product | Actual individual consumption | Food and nonalcoholic beverages | Alcoholic beverages, tobacco, and narcotics | Clothing and footwear | Housing, water, electricity, gas, and other fuels | Furnishings, household equipment, and maintenance | Health     | Transport  | Communication | Recreation and culture |
|----------------------|------------------------|-------------------------------|---------------------------------|---|-----------------------|---|---|------------|------------|---------------|------------------------|
| Bangladesh           | 100.0                  | 71.8                          | 41.1                            | 1.8   | 4.2                   | 7.8   | 2.7   | 3.0        | 2.2        | 0.3           | 0.5                    |
| Bhutan               | 100.0                  | 42.9                          | 16.6                            | 1.0   | 2.9                   | 5.1   | 2.1   | 6.4        | 0.7        | 0.2           | 1.4                    |
| Brunei Darussalam    | 100.0                  | 28.9                          | 6.1                             | 0.1   | 1.4                   | 2.2   | 1.1   | 1.4        | 5.8        | 1.7           | 2.4                    |
| Cambodia             | 100.0                  | 82.6                          | 38.6                            | 2.7   | 1.5                   | 6.0   | 1.3   | 10.4       | 4.6        | 0.2           | 2.0                    |
| China                | 100.0                  | 40.0                          | 10.6                            | 0.5   | 1.8                   | 4.2   | 1.4   | 4.5        | 1.6        | 2.7           | 2.2                    |
| Hong Kong SAR, China | 100.0                  | 56.3                          | 6.0                             | 0.3   | 8.5                   | 5.0   | 3.4   | 3.5        | 3.1        | 2.8           | 9.1                    |
| Macao SAR, China     | 100.0                  | 28.4                          | 4.5                             | 0.3   | 2.0                   | 2.6   | 0.5   | 2.1        | 2.5        | 2.0           | 5.1                    |
| Taiwan, China        | 100.0                  | 65.1                          | 8.8                             | 1.4   | 3.3                   | 5.5   | 3.3   | 8.1        | 6.5        | 3.8           | 7.2                    |
| Fiji                 | 100.0                  | 90.8                          | 30.9                            | 2.2   | 3.5                   | 9.8   | 11.0  | 5.9        | 8.8        | 0.8           | 5.0                    |
| India                | 100.0                  | 66.3                          | 23.6                            | 0.7   | 4.3                   | 6.2   | 1.4   | 9.0        | 7.8        | 1.2           | 1.2                    |
| Indonesia            | 100.0                  | 68.8                          | 32.1                            | 0.8   | 3.5                   | 8.9   | 2.0   | 1.8        | 4.0        | 0.9           | 1.3                    |
| Iran, Islamic Rep.   | 100.0                  | 65.8                          | 9.7                             | 0.4   | 3.8                   | 12.5  | 2.7   | 6.7        | 6.3        | 14.9          | 1.6                    |
| Lao PDR              | 100.0                  | 57.0                          | 25.7                            | 2.0   | 0.9                   | 9.5   | 1.4   | 3.0        | 3.0        | 0.2           | 1.6                    |
| Malaysia             | 100.0                  | 51.2                          | 10.3                            | 0.4   | 1.4                   | 4.8   | 2.7   | 2.6        | 8.2        | 3.2           | 2.5                    |
| Maldives             | 100.0                  | 53.0                          | 14.4                            | 1.2   | 2.3                   | 4.5   | 2.2   | 7.4        | 1.5        | 2.8           | 2.1                    |
| Mongolia             | 100.0                  | 59.8                          | 22.2                            | 1.1   | 6.2                   | 5.3   | 1.9   | 5.5        | 3.3        | 1.2           | 1.8                    |
| Nepal                | 100.0                  | 77.9                          | 43.2                            | 1.2   | 5.2                   | 6.4   | 1.7   | 9.2        | 1.8        | 0.2           | 0.8                    |
| Pakistan             | 100.0                  | 81.1                          | 34.7                            | 0.5   | 7.1                   | 11.8  | 1.8   | 8.2        | 4.0        | 2.4           | 2.2                    |
| Philippines          | 100.0                  | 73.1                          | 35.8                            | 2.2   | 1.7                   | 6.8   | 1.4   | 2.3        | 4.0        | 2.4           | 0.8                    |
| Singapore            | 100.0                  | 38.1                          | 3.9                             | 0.3   | 1.6                   | 3.2   | 2.5   | 3.0        | 5.4        | 1.9           | 6.2                    |
| Sri Lanka            | 100.0                  | 75.3                          | 26.9                            | 1.4   | 9.6                   | 6.5   | 4.1   | 2.9        | 13.1       | 0.6           | 2.2                    |
| Thailand             | 100.0                  | 63.6                          | 11.0                            | 1.9   | 4.8                   | 5.2   | 3.4   | 5.5        | 9.3        | 0.9           | 3.7                    |
| Vietnam              | 100.0                  | 57.3                          | 18.2                            | 0.9   | 2.0                   | 5.3   | 2.1   | 8.0        | 2.7        | 0.6           | 2.6                    |
| <b>Asia-Pacific</b>  | <b>100.0</b>           | <b>54.1</b>                   | <b>16.1</b>                     | <b>0.7</b>                                  | <b>3.1</b>            | <b>5.9</b>  | <b>1.8</b>  | <b>5.6</b> | <b>4.2</b> | <b>3.0</b>    | <b>2.4</b>             |
| Argentina            | 100.0                  | 70.2                          | 20.8                            | 3.0   | 3.0                   | 9.6   | 2.8   | 5.9        | 6.5        | 3.8           | 3.6                    |
| Bolivia              | 100.0                  | 80.5                          | 23.0                            | 1.0   | 1.9                   | 9.6   | 3.6   | 6.1        | 15.7       | 1.3           | 0.7                    |
| Brazil               | 100.0                  | 68.6                          | 15.6                            | 2.8   | 2.6                   | 8.3   | 3.5   | 7.1        | 7.6        | 3.0           | 2.5                    |
| Chile                | 100.0                  | 60.2                          | 13.5                            | 1.9   | 4.6                   | 8.9   | 3.9   | 4.7        | 8.6        | 1.4           | 2.7                    |
| Colombia             | 100.0                  | 70.2                          | 18.2                            | 3.2   | 2.9                   | 12.4  | 3.4   | 6.5        | 6.6        | 2.0           | 2.0                    |
| Ecuador              | 100.0                  | 68.6                          | 20.6                            | 1.7   | 4.4                   | 6.9   | 5.0   | 4.7        | 10.8       | 3.3           | 3.0                    |
| Paraguay             | 100.0                  | 84.2                          | 35.9                            | 2.1   | 4.9                   | 11.4  | 3.5   | 3.4        | 6.6        | 2.3           | 3.4                    |
| Peru                 | 100.0                  | 69.5                          | 22.6                            | 1.3   | 4.8                   | 6.8   | 3.1   | 3.2        | 6.6        | 1.7           | 2.8                    |
| Uruguay              | 100.0                  | 77.7                          | 20.6                            | 3.1   | 4.0                   | 11.7  | 4.7   | 6.6        | 9.7        | 2.9           | 3.4                    |
| Venezuela, RB        | 100.0                  | 57.7                          | 16.1                            | 2.9   | 1.7                   | 8.0   | 2.4   | 3.7        | 7.2        | 3.2           | 1.8                    |



| Education  | Restaurants and hotels | Miscellaneous goods and services | Net purchases abroad | Private individual consumption | Individual consumption by government | General government | Gross fixed capital formation | Machinery and equipment | Construction | Other products | Stocks   | Net exports |
|------------|------------------------|----------------------------------|----------------------|--------------------------------|--------------------------------------|--------------------|-------------------------------|-------------------------|--------------|----------------|----------|-------------|
| 4.6        | 1.2                    | 2.2                              | 0.0                  | 70.4                           | 1.3                                  | 2.7                | 29.8                          | 3.6                     | 25.9         | 0.3            | 0        | -4          |
| 2.5        | 0.0                    | 3.9                              | 0.0                  | 32.8                           | 10.3                                 | 8.7                | 58.2                          | 5.9                     | 51.5         | 0.8            | 0        | -10         |
| 3.4        | 1.5                    | 1.8                              | 0.0                  | 24.4                           | 4.3                                  | 16.0               | 13.8                          | 3.6                     | 9.3          | 0.9            | 0        | 41          |
| 9.4        | 2.9                    | 3.0                              | 0.0                  | 74.5                           | 9.4                                  | 6.5                | 11.6                          | 3.1                     | 8.4          | 0.1            | 0        | -1          |
| 3.3        | 1.6                    | 5.6                              | 0.0                  | 34.7                           | 6.5                                  | 8.6                | 46.9                          | 8.0                     | 36.6         | 2.4            | 1        | 3           |
| 1.7        | 5.4                    | 7.6                              | 0.0                  | 54.1                           | 2.1                                  | 3.7                | 26.7                          | 15.1                    | 10.4         | 1.3            | 0        | 14          |
| 1.4        | 3.4                    | 2.0                              | 0.0                  | 25.5                           | 2.5                                  | 3.4                | 29.6                          | 7.6                     | 21.5         | 0.5            | 1        | 38          |
| 4.1        | 5.6                    | 7.4                              | 0.0                  | 61.2                           | 3.5                                  | 8.0                | 22.8                          | 11.8                    | 9.0          | 2.0            | 0        | 4           |
| 5.8        | 2.3                    | 4.8                              | 0.0                  | 84.0                           | 6.6                                  | 8.4                | 32.7                          | 16.4                    | 11.7         | 4.6            | 2        | -34         |
| 4.1        | 0.9                    | 6.1                              | 0.0                  | 62.4                           | 3.4                                  | 4.9                | 26.4                          | 9.8                     | 16.0         | 0.6            | 4        | -2          |
| 4.9        | 4.7                    | 4.0                              | 0.0                  | 66.1                           | 2.6                                  | 3.6                | 24.8                          | 2.6                     | 21.5         | 0.6            | 0        | 3           |
| 2.5        | 0.5                    | 4.2                              | 0.0                  | 61.2                           | 3.7                                  | 5.5                | 15.5                          | 7.3                     | 7.7          | 0.5            | 11       | 2           |
| 7.0        | 1.3                    | 1.3                              | 0.0                  | 51.0                           | 6.4                                  | 16.1               | 30.4                          | 5.5                     | 19.5         | 5.5            | 2        | -5          |
| 4.2        | 3.8                    | 7.4                              | 0.0                  | 44.9                           | 6.3                                  | 7.0                | 25.3                          | 12.2                    | 12.4         | 0.7            | 0        | 17          |
| 11.9       | 0.5                    | 2.3                              | 0.0                  | 42.8                           | 10.5                                 | 16.1               | 56.6                          | 21.8                    | 20.6         | 14.2           | 0        | -26         |
| 9.8        | 0.2                    | 1.3                              | 0.0                  | 48.4                           | 13.0                                 | 6.6                | 29.8                          | 8.4                     | 15.2         | 6.3            | 6        | -3          |
| 3.8        | 1.3                    | 3.0                              | 0.0                  | 75.5                           | 2.3                                  | 3.6                | 21.7                          | 1.7                     | 16.2         | 3.8            | 6        | -9          |
| 4.8        | 0.3                    | 3.4                              | 0.0                  | 77.5                           | 3.3                                  | 5.0                | 16.3                          | 4.8                     | 10.3         | 1.1            | 1        | -4          |
| 6.2        | 2.3                    | 7.3                              | 0.0                  | 70.5                           | 2.5                                  | 4.2                | 14.8                          | 4.3                     | 9.3          | 1.2            | 11       | -3          |
| 2.0        | 3.4                    | 4.7                              | 0.0                  | 35.5                           | 2.4                                  | 7.0                | 29.2                          | 14.5                    | 14.1         | 0.7            | -4       | 30          |
| 2.6        | 0.9                    | 4.4                              | 0.0                  | 68.2                           | 7.6                                  | 6.0                | 21.9                          | 5.8                     | 15.6         | 0.5            | 3        | -6          |
| 4.8        | 9.7                    | 3.2                              | 0.0                  | 58.1                           | 5.4                                  | 5.0                | 29.7                          | 16.2                    | 13.4         | 0.2            | 3        | -1          |
| 10.0       | 3.3                    | 1.7                              | 0.0                  | 50.6                           | 8.1                                  | 6.9                | 35.6                          | 5.3                     | 27.9         | 2.5            | 2        | -2          |
| <b>3.8</b> | <b>2.2</b>             | <b>5.4</b>                       | <b>0.0</b>           | <b>49.5</b>                    | <b>4.9</b>                           | <b>6.7</b>         | <b>34.4</b>                   | <b>8.4</b>              | <b>24.4</b>  | <b>1.5</b>     | <b>3</b> | <b>2</b>    |
| 2.2        | 3.8                    | 5.2                              | 0.0                  | 67.3                           | 2.9                                  | 5.5                | 20.7                          | 7.0                     | 13.1         | 0.6            | -1       | 4           |
| 10.3       | 5.3                    | 1.9                              | 0.0                  | 68.0                           | 12.5                                 | 7.2                | 9.6                           | 2.6                     | 6.6          | 0.5            | 1        | 2           |
| 3.6        | 3.4                    | 8.5                              | 0.0                  | 62.4                           | 6.2                                  | 10.9               | 17.4                          | 7.6                     | 8.4          | 1.4            | 0        | 3           |
| 2.6        | 2.0                    | 5.2                              | 0.0                  | 56.9                           | 3.2                                  | 5.0                | 24.1                          | 9.0                     | 14.9         | 0.2            | 2        | 9           |
| 3.4        | 5.8                    | 3.7                              | 0.0                  | 64.3                           | 5.8                                  | 9.0                | 20.9                          | 5.5                     | 14.5         | 0.9            | 1        | -1          |
| 3.5        | 2.0                    | 2.7                              | 0.0                  | 64.0                           | 4.6                                  | 5.1                | 25.1                          | 6.8                     | 17.8         | 0.5            | 3        | -1          |
| 3.7        | 3.1                    | 3.6                              | 0.0                  | 80.5                           | 3.6                                  | 4.1                | 14.8                          | 5.0                     | 9.6          | 0.2            | 0        | -3          |
| 3.1        | 5.5                    | 8.0                              | 0.0                  | 67.1                           | 2.5                                  | 4.9                | 22.0                          | 3.8                     | 16.4         | 1.8            | 0        | 4           |
| 2.5        | 3.3                    | 5.2                              | 0.0                  | 74.4                           | 3.3                                  | 5.1                | 14.8                          | 6.3                     | 8.0          | 0.5            | 0        | 2           |
| 3.1        | 4.7                    | 3.2                              | 0.0                  | 53.8                           | 3.9                                  | 4.9                | 16.4                          | 7.0                     | 8.6          | 0.8            | 3        | 18          |

(continued)

| Economy                | Gross domestic product | Actual individual consumption | Food and nonalcoholic beverages | Alcoholic beverages, tobacco, and narcotics | Clothing and footwear | Housing, water, electricity, gas, and other fuels | Furnishings, household equipment, and maintenance | Health     | Transport  | Communication | Recreation and culture |
|------------------------|------------------------|-------------------------------|---------------------------------|---|-----------------------|---|---|------------|------------|---------------|------------------------|
| <b>South America</b>   | <b>100.0</b>           | <b>67.9</b>                   | <b>17.3</b>                     | <b>2.7</b>                                  | <b>3.0</b>            | <b>8.8</b>  | <b>3.3</b>  | <b>6.1</b> | <b>7.5</b> | <b>2.8</b>    | <b>2.6</b>             |
| Albania                | 100.0                  | 87.4                          | 22.9                            | 4.3   | 3.1                   | 15.5  | 4.7   | 8.4        | 8.8        | 2.5           | 4.8                    |
| Australia              | 100.0                  | 64.3                          | 7.8                             | 1.8   | 3.2                   | 8.6   | 4.3   | 5.0        | 9.9        | 1.6           | 7.4                    |
| Austria                | 100.0                  | 64.4                          | 8.5                             | 2.0   | 4.7                   | 9.3   | 5.5   | 4.7        | 8.7        | 1.9           | 7.4                    |
| Belgium                | 100.0                  | 63.1                          | 9.3                             | 2.3   | 3.4                   | 7.6   | 3.3   | 5.6        | 9.4        | 1.3           | 5.4                    |
| Bosnia and Herzegovina | 100.0                  | 109.5                         | 33.9                            | 7.1   | 3.9                   | 19.6  | 7.7   | 7.5        | 6.3        | 3.2           | 4.5                    |
| Bulgaria               | 100.0                  | 81.3                          | 17.6                            | 2.6   | 1.9                   | 16.4  | 2.7   | 6.8        | 10.5       | 2.3           | 4.3                    |
| Canada                 | 100.0                  | 64.9                          | 6.7                             | 1.6   | 2.8                   | 10.3  | 3.8   | 4.4        | 11.9       | 1.4           | 6.8                    |
| Croatia                | 100.0                  | 71.2                          | 20.1                            | 2.9   | 3.5                   | 16.2  | 6.6   | 7.5        | 6.8        | 2.6           | 6.4                    |
| Cyprus                 | 100.0                  | 74.7                          | 15.3                            | 4.8   | 5.8                   | 11.9  | 5.2   | 3.8        | 13.2       | 3.8           | 6.8                    |
| Czech Republic         | 100.0                  | 63.6                          | 11.0                            | 4.3   | 2.0                   | 11.6  | 2.6   | 6.5        | 5.7        | 1.2           | 7.5                    |
| Denmark                | 100.0                  | 58.5                          | 7.2                             | 2.2   | 3.2                   | 8.2   | 3.6   | 4.5        | 6.6        | 1.9           | 6.2                    |
| Estonia                | 100.0                  | 69.0                          | 13.9                            | 5.6   | 3.6                   | 9.8   | 3.9   | 5.1        | 7.6        | 1.7           | 6.3                    |
| Finland                | 100.0                  | 60.6                          | 8.8                             | 2.4   | 2.9                   | 8.3   | 3.5   | 5.5        | 7.1        | 2.4           | 6.4                    |
| France                 | 100.0                  | 74.3                          | 11.8                            | 2.1   | 4.3                   | 9.9   | 4.4   | 7.1        | 11.1       | 1.9           | 7.1                    |
| Germany                | 100.0                  | 68.3                          | 9.4                             | 2.4   | 3.6                   | 8.6   | 4.8   | 6.6        | 9.7        | 1.7           | 5.7                    |
| Greece                 | 100.0                  | 72.8                          | 8.5                             | 3.3   | 5.3                   | 12.4  | 3.6   | 10.0       | 4.3        | 1.4           | 3.6                    |
| Hungary                | 100.0                  | 72.5                          | 12.6                            | 5.1   | 1.8                   | 11.9  | 4.3   | 7.4        | 8.0        | 2.1           | 5.7                    |
| Iceland                | 100.0                  | 90.9                          | 9.9                             | 2.1   | 3.3                   | 10.0  | 5.3   | 7.1        | 16.5       | 2.5           | 8.7                    |
| Ireland                | 100.0                  | 51.2                          | 3.5                             | 1.6   | 3.3                   | 5.5   | 3.8   | 3.9        | 7.1        | 1.7           | 4.1                    |
| Israel                 | 100.0                  | 66.4                          | 12.7                            | 1.3   | 2.6                   | 10.9  | 4.1   | 4.6        | 7.3        | 3.0           | 5.2                    |
| Italy                  | 100.0                  | 68.5                          | 11.4                            | 1.5   | 6.1                   | 9.0   | 5.1   | 5.8        | 9.9        | 2.0           | 4.5                    |
| Japan                  | 100.0                  | 65.1                          | 7.4                             | 2.3   | 2.0                   | 9.0   | 3.1   | 8.4        | 8.6        | 2.0           | 6.9                    |
| Korea, Rep.            | 100.0                  | 54.1                          | 6.4                             | 1.2   | 2.0                   | 6.2   | 2.6   | 6.2        | 6.2        | 4.2           | 3.5                    |
| Latvia                 | 100.0                  | 76.6                          | 17.3                            | 5.2   | 3.3                   | 13.1  | 2.4   | 5.8        | 6.7        | 1.7           | 6.3                    |
| Lithuania              | 100.0                  | 82.0                          | 22.7                            | 5.0   | 3.9                   | 11.5  | 3.9   | 7.0        | 8.6        | 1.8           | 5.3                    |
| Luxembourg             | 100.0                  | 43.5                          | 3.3                             | 3.2   | 1.2                   | 3.4   | 2.3   | 3.5        | 6.9        | 0.5           | 2.7                    |
| Macedonia, FYR         | 100.0                  | 86.4                          | 27.4                            | 3.0   | 3.8                   | 19.7  | 3.1   | 6.0        | 5.7        | 3.5           | 1.7                    |
| Malta                  | 100.0                  | 80.2                          | 16.4                            | 1.8   | 4.4                   | 11.5  | 6.2   | 6.0        | 10.0       | 3.3           | 8.6                    |
| Mexico                 | 100.0                  | 79.2                          | 23.2                            | 2.6   | 2.5                   | 7.9   | 6.4   | 3.2        | 14.8       | 1.0           | 2.2                    |
| Montenegro             | 100.0                  | 82.3                          | 26.0                            | 3.8   | 2.7                   | 17.3  | 2.9   | 6.2        | 4.0        | 4.7           | 2.2                    |
| Netherlands            | 100.0                  | 60.3                          | 8.8                             | 1.6   | 3.4                   | 6.7   | 3.8   | 4.5        | 5.9        | 2.6           | 6.1                    |
| New Zealand            | 100.0                  | 73.0                          | 11.3                            | 2.8   | 3.4                   | 10.0  | 4.5   | 4.4        | 13.8       | 2.0           | 9.5                    |
| Norway                 | 100.0                  | 44.3                          | 5.5                             | 1.0   | 2.2                   | 6.4   | 2.8   | 3.9        | 5.2        | 1.5           | 5.0                    |
| Poland                 | 100.0                  | 75.7                          | 17.6                            | 4.3   | 2.0                   | 16.7  | 2.8   | 6.4        | 4.4        | 1.5           | 4.8                    |
| Portugal               | 100.0                  | 82.5                          | 16.1                            | 2.8   | 6.5                   | 8.4   | 5.5   | 7.7        | 10.8       | 2.1           | 6.4                    |
| Romania                | 100.0                  | 81.5                          | 22.5                            | 3.9   | 2.2                   | 14.0  | 4.0   | 7.4        | 10.3       | 1.0           | 4.4                    |
| Russian Federation     | 100.0                  | 67.2                          | 18.0                            | 4.6   | 3.8                   | 8.8   | 2.1   | 5.5        | 6.6        | 1.9           | 3.6                    |
| Serbia                 | 100.0                  | 81.5                          | 20.5                            | 4.6   | 2.2                   | 18.6  | 2.9   | 6.5        | 4.9        | 4.7           | 3.4                    |
| Slovak Republic        | 100.0                  | 71.0                          | 13.4                            | 3.4   | 2.2                   | 15.6  | 3.2   | 6.5        | 4.4        | 1.4           | 6.1                    |
| Slovenia               | 100.0                  | 63.7                          | 10.6                            | 3.1   | 3.2                   | 9.4   | 3.9   | 5.7        | 10.0       | 2.5           | 6.0                    |
| Spain                  | 100.0                  | 73.5                          | 13.2                            | 2.3   | 4.5                   | 7.2   | 3.7   | 6.9        | 9.3        | 1.8           | 6.6                    |
| Sweden                 | 100.0                  | 61.0                          | 7.8                             | 1.6   | 3.0                   | 9.5   | 3.0   | 5.4        | 7.1        | 2.6           | 6.1                    |

| Education | Restaurants and hotels | Miscellaneous goods and services | Net purchases abroad | Private individual consumption | Individual consumption by government | General government | Gross fixed capital formation | Machinery and equipment | Construction | Other products | Stocks | Net exports |
|-----------|------------------------|----------------------------------|----------------------|--------------------------------|--------------------------------------|--------------------|-------------------------------|-------------------------|--------------|----------------|--------|-------------|
| 3.3       | 3.8                    | 6.7                              | 0.0                  | 62.8                           | 5.1                                  | 8.4                | 18.9                          | 7.0                     | 10.7         | 1.1            | 0      | 5           |
| 4.6       | 4.9                    | 6.0                              | -3.1                 | 79.8                           | 8.3                                  | 7.1                | 35.5                          | 16.9                    | 17.0         | 1.6            | -4     | -26         |
| 3.6       | 5.2                    | 7.5                              | -0.9                 | 57.9                           | 4.6                                  | 9.4                | 29.8                          | 16.4                    | 11.1         | 2.4            | 0      | -4          |
| 2.4       | 7.6                    | 7.1                              | -4.6                 | 54.1                           | 5.0                                  | 4.6                | 22.6                          | 13.8                    | 7.5          | 1.3            | 1      | 8           |
| 2.5       | 2.6                    | 9.1                              | 1.7                  | 51.3                           | 6.0                                  | 4.9                | 25.2                          | 15.6                    | 7.4          | 2.3            | 1      | 6           |
| 5.7       | 6.8                    | 6.8                              | -3.4                 | 100.4                          | 8.3                                  | 8.8                | 25.5                          | 10.7                    | 14.1         | 0.6            | 0      | -44         |
| 6.4       | 8.8                    | 3.6                              | -2.6                 | 70.9                           | 11.0                                 | 9.4                | 19.8                          | 9.7                     | 9.6          | 0.4            | 3      | -14         |
| 2.5       | 3.8                    | 9.1                              | 0.5                  | 55.6                           | 5.9                                  | 5.6                | 23.0                          | 10.8                    | 10.7         | 1.5            | 1      | 6           |
| 4.2       | 4.9                    | 6.0                              | -16.3                | 61.5                           | 8.0                                  | 7.6                | 31.8                          | 13.5                    | 17.1         | 1.2            | 2      | -13         |
| 3.4       | 9.4                    | 9.8                              | -18.3                | 67.5                           | 4.8                                  | 7.7                | 22.1                          | 7.6                     | 14.0         | 0.5            | 1      | -5          |
| 3.6       | 4.3                    | 5.6                              | -2.3                 | 52.2                           | 8.7                                  | 9.5                | 23.0                          | 11.1                    | 10.8         | 1.1            | 1      | 3           |
| 3.0       | 2.1                    | 10.2                             | -0.2                 | 45.9                           | 9.1                                  | 5.9                | 25.6                          | 14.9                    | 6.4          | 4.2            | 1      | 9           |
| 5.1       | 4.4                    | 6.4                              | -4.2                 | 57.7                           | 9.5                                  | 7.2                | 28.7                          | 13.5                    | 14.6         | 0.6            | 4      | -9          |
| 2.8       | 3.0                    | 8.3                              | -0.3                 | 47.9                           | 8.2                                  | 5.8                | 21.5                          | 9.4                     | 9.4          | 2.7            | 2      | 10          |
| 2.6       | 3.7                    | 9.8                              | -0.9                 | 60.3                           | 8.1                                  | 5.4                | 21.9                          | 10.4                    | 9.4          | 2.2            | 1      | -2          |
| 1.5       | 3.3                    | 9.1                              | 2.1                  | 57.6                           | 4.3                                  | 5.1                | 19.2                          | 11.6                    | 6.2          | 1.4            | 0      | 8           |
| 8.5       | 8.9                    | 4.6                              | -4.2                 | 60.8                           | 9.6                                  | 13.0               | 21.7                          | 6.4                     | 14.4         | 1.3            | 0      | -6          |
| 4.0       | 3.1                    | 8.3                              | -1.5                 | 59.0                           | 10.1                                 | 7.3                | 20.7                          | 10.6                    | 9.0          | 1.1            | 1      | -2          |
| 4.5       | 4.2                    | 7.8                              | 9.8                  | 74.5                           | 10.3                                 | 7.1                | 48.7                          | 23.9                    | 21.8         | 3.1            | 0      | -47         |
| 2.6       | 6.4                    | 7.2                              | 0.6                  | 42.1                           | 5.3                                  | 3.7                | 22.9                          | 9.1                     | 12.7         | 1.1            | 0      | 22          |
| 5.1       | 2.6                    | 7.9                              | -0.5                 | 55.2                           | 8.8                                  | 11.1               | 21.0                          | 10.2                    | 9.1          | 1.6            | 1      | 0           |
| 1.9       | 6.3                    | 7.0                              | -1.7                 | 60.0                           | 5.4                                  | 6.0                | 25.6                          | 14.6                    | 8.3          | 2.6            | 0      | 0           |
| 1.9       | 4.3                    | 8.4                              | 0.8                  | 55.3                           | 5.5                                  | 6.1                | 26.1                          | 12.5                    | 9.9          | 3.7            | 0      | 2           |
| 2.9       | 3.2                    | 8.7                              | 0.9                  | 48.8                           | 3.0                                  | 6.2                | 35.2                          | 12.0                    | 20.9         | 2.3            | 2      | 3           |
| 6.1       | 3.4                    | 4.2                              | 1.2                  | 66.4                           | 9.1                                  | 9.2                | 27.9                          | 16.2                    | 11.0         | 0.7            | 4      | -18         |
| 5.3       | 2.1                    | 5.7                              | -0.9                 | 71.3                           | 10.2                                 | 6.0                | 18.2                          | 9.0                     | 8.5          | 0.7            | 2      | -9          |
| 1.4       | 2.1                    | 5.2                              | 8.1                  | 35.1                           | 3.6                                  | 3.8                | 18.7                          | 7.8                     | 8.6          | 2.3            | 2      | 32          |
| 4.3       | 3.2                    | 4.5                              | 0.7                  | 77.8                           | 8.2                                  | 9.8                | 15.6                          | 4.9                     | 10.3         | 0.4            | 3      | -15         |
| 3.3       | 11.7                   | 9.5                              | -12.4                | 70.1                           | 7.4                                  | 7.0                | 21.6                          | 8.6                     | 11.1         | 2.0            | 0      | -9          |
| 4.8       | 5.5                    | 5.9                              | -0.6                 | 74.0                           | 4.3                                  | 2.8                | 17.0                          | 8.8                     | 8.0          | 0.2            | 3      | -2          |
| 3.9       | 0.9                    | 6.4                              | 1.3                  | 73.2                           | 9.3                                  | 23.1               | 17.4                          | 6.9                     | 9.3          | 1.2            | -2     | -20         |
| 2.4       | 2.6                    | 12.2                             | 0.3                  | 48.0                           | 7.2                                  | 7.6                | 19.2                          | 9.7                     | 6.7          | 2.8            | 0      | 13          |
| 3.0       | 6.5                    | 6.6                              | -4.1                 | 62.8                           | 6.8                                  | 6.0                | 24.8                          | 14.1                    | 9.0          | 1.7            | 1      | -5          |
| 1.7       | 1.7                    | 5.6                              | 2.1                  | 35.3                           | 5.2                                  | 4.8                | 19.2                          | 9.6                     | 6.1          | 3.5            | 3      | 29          |
| 4.3       | 1.6                    | 9.6                              | -0.3                 | 65.6                           | 8.4                                  | 6.5                | 17.1                          | 7.7                     | 8.1          | 1.3            | 1      | 0           |
| 2.6       | 8.8                    | 9.5                              | -3.7                 | 71.4                           | 5.8                                  | 6.0                | 27.9                          | 9.9                     | 13.8         | 4.2            | 1      | -18         |
| 4.8       | 4.0                    | 3.2                              | -0.2                 | 70.3                           | 10.0                                 | 9.3                | 21.4                          | 10.4                    | 10.4         | 0.7            | 0      | -12         |
| 4.9       | 1.5                    | 4.7                              | 1.1                  | 56.3                           | 10.8                                 | 6.1                | 14.4                          | 5.8                     | 7.5          | 1.1            | 3      | 9           |
| 4.1       | 1.7                    | 7.9                              | -0.3                 | 70.1                           | 10.4                                 | 6.3                | 17.7                          | 8.2                     | 8.7          | 0.9            | 15     | -20         |
| 4.0       | 4.6                    | 6.2                              | -0.1                 | 61.7                           | 8.1                                  | 9.7                | 23.1                          | 12.5                    | 9.2          | 1.4            | 2      | -6          |
| 3.0       | 4.4                    | 6.4                              | -4.0                 | 54.6                           | 6.7                                  | 5.9                | 29.3                          | 13.5                    | 14.6         | 1.3            | 2      | -1          |
| 2.4       | 12.6                   | 8.1                              | -5.0                 | 64.1                           | 6.3                                  | 5.9                | 31.8                          | 12.0                    | 13.9         | 5.9            | 0      | -11         |
| 3.6       | 2.2                    | 9.5                              | -0.1                 | 45.1                           | 10.6                                 | 6.0                | 20.2                          | 13.5                    | 3.9          | 2.7            | 0      | 13          |

(continued)

| Economy                  | Gross domestic product | Actual individual consumption | Food and nonalcoholic beverages | Alcoholic beverages, tobacco, and narcotics | Clothing and footwear | Housing, water, electricity, gas, and other fuels | Furnishings, household equipment, and maintenance | Health     | Transport   | Communication | Recreation and culture |
|--------------------------|------------------------|-------------------------------|---------------------------------|---|-----------------------|---|---|------------|-------------|---------------|------------------------|
| Switzerland              | 100.0                  | 56.7                          | 7.9                             | 3.0   | 3.2                   | 7.0   | 3.2   | 4.4        | 6.3         | 1.8           | 5.9                    |
| Turkey                   | 100.0                  | 77.0                          | 19.8                            | 2.6   | 4.6                   | 20.9  | 5.7   | 2.0        | 6.7         | 2.3           | 1.7                    |
| United Kingdom           | 100.0                  | 82.0                          | 8.2                             | 1.7   | 5.0                   | 9.7   | 4.5   | 6.5        | 12.1        | 2.0           | 9.7                    |
| United States            | 100.0                  | 80.8                          | 8.0                             | 1.7   | 4.6                   | 8.3   | 4.9   | 6.7        | 16.9        | 1.3           | 8.1                    |
| <b>Eurostat-OECD</b>     | <b>100.0</b>           | <b>72.8</b>                   | <b>10.0</b>                     | <b>2.2</b>                                  | <b>3.9</b>            | <b>9.0</b>  | <b>4.3</b>  | <b>6.4</b> | <b>11.8</b> | <b>1.7</b>    | <b>6.6</b>             |
| Armenia                  | 100.0                  | 88.6                          | 42.9                            | 2.4   | 1.4                   | 19.8  | 0.9   | 5.6        | 2.6         | 0.6           | 1.0                    |
| Azerbaijan               | 100.0                  | 67.1                          | 32.8                            | 1.1   | 1.8                   | 9.2   | 2.1   | 5.3        | 4.4         | 0.5           | 1.2                    |
| Belarus                  | 100.0                  | 77.1                          | 24.2                            | 3.0   | 2.7                   | 13.8  | 1.7   | 7.9        | 3.7         | 4.9           | 2.3                    |
| Georgia                  | 100.0                  | 84.1                          | 23.5                            | 3.6   | 1.2                   | 15.6  | 1.6   | 8.3        | 10.3        | 2.0           | 3.8                    |
| Kazakhstan               | 100.0                  | 66.4                          | 13.7                            | 2.7   | 3.6                   | 9.3   | 1.5   | 7.6        | 6.8         | 0.7           | 2.9                    |
| Kyrgyz Republic          | 100.0                  | 93.5                          | 27.2                            | 5.9   | 2.8                   | 20.6  | 1.4   | 7.1        | 6.5         | 1.0           | 1.4                    |
| Moldova                  | 100.0                  | 101.2                         | 18.7                            | 7.5   | 1.9                   | 32.9  | 3.8   | 3.8        | 7.1         | 2.6           | 3.7                    |
| Russian Federation       | 100.0                  | 67.1                          | 17.8                            | 4.6   | 3.8                   | 8.8   | 2.1   | 5.5        | 6.7         | 1.9           | 3.7                    |
| Tajikistan               | 100.0                  | 91.0                          | 21.3                            | 0.3   | 1.2                   | 30.3  | 0.9   | 10.4       | 3.4         | 0.5           | 1.2                    |
| Ukraine                  | 100.0                  | 80.7                          | 24.0                            | 4.3   | 1.9                   | 14.5  | 1.6   | 6.9        | 7.1         | 1.8           | 3.2                    |
| <b>CIS</b>               | <b>100.0</b>           | <b>70.1</b>                   | <b>19.1</b>                     | <b>4.3</b>                                  | <b>3.4</b>            | <b>10.3</b>                                       | <b>1.9</b>  | <b>5.9</b> | <b>6.5</b>  | <b>1.9</b>    | <b>3.4</b>             |
| Angola                   | 100.0                  | 23.5                          | 8.5                             | 1.2   | 1.1                   | 3.7   | 1.3   | 1.2        | 1.0         | 0.1           | 0.4                    |
| Benin                    | 100.0                  | 77.7                          | 29.3                            | 1.7   | 7.8                   | 15.0  | 2.4   | 3.0        | 4.8         | 0.5           | 1.5                    |
| Botswana                 | 100.0                  | 26.9                          | 5.6                             | 2.3   | 1.8                   | 3.1   | 1.6   | 1.5        | 3.4         | 0.9           | 0.5                    |
| Burkina Faso             | 100.0                  | 73.0                          | 30.1                            | 5.8   | 3.5                   | 10.5  | 5.2   | 2.2        | 3.6         | 0.3           | 1.1                    |
| Burundi                  | 100.0                  | 68.4                          | 24.9                            | 2.6   | 3.4                   | 9.9   | 2.5   | 4.9        | 3.2         | 1.4           | 1.5                    |
| Cameroon                 | 100.0                  | 76.8                          | 33.1                            | 1.8   | 7.3                   | 9.1   | 7.3   | 1.7        | 4.7         | 0.4           | 1.0                    |
| Cape Verde               | 100.0                  | 91.7                          | 33.9                            | 1.7   | 2.9                   | 16.9  | 4.2   | 3.4        | 5.9         | 2.6           | 3.1                    |
| Central African Republic | 100.0                  | 93.9                          | 47.6                            | 8.5   | 8.1                   | 13.4  | 5.5   | 1.5        | 2.2         | 0.5           | 1.9                    |
| Chad                     | 100.0                  | 51.7                          | 18.1                            | 0.5   | 0.9                   | 4.2   | 2.5   | 2.6        | 7.4         | 0.2           | 2.2                    |
| Comoros                  | 100.0                  | 79.0                          | 53.9                            | 0.8   | 4.7                   | 10.8  | 0.2   | 1.9        | 0.5         | 0.6           | 0.5                    |
| Congo, Dem. Rep.         | 100.0                  | 55.9                          | 31.5                            | 1.1   | 3.8                   | 8.3   | 1.6   | 2.6        | 1.4         | 0.2           | 0.5                    |
| Congo, Rep.              | 100.0                  | 35.3                          | 10.9                            | 1.3   | 0.7                   | 5.7   | 1.0   | 2.4        | 1.9         | 0.8           | 0.6                    |
| Côte d'Ivoire            | 100.0                  | 77.7                          | 34.1                            | 2.6   | 3.0                   | 11.5  | 6.7   | 2.3        | 6.2         | 1.1           | 2.3                    |
| Djibouti                 | 100.0                  | 61.5                          | 18.0                            | 13.3  | 1.4                   | 9.3   | 3.2   | 2.3        | 3.3         | 0.2           | 0.3                    |
| Egypt, Arab Rep.         | 100.0                  | 72.9                          | 28.8                            | 1.8   | 5.3                   | 7.1   | 2.8   | 5.7        | 3.5         | 1.0           | 1.6                    |
| Equatorial Guinea        | 100.0                  | 30.1                          | 10.5                            | 1.1   | 1.1                   | 4.7   | 1.0   | 3.2        | 2.1         | 0.5           | 0.4                    |
| Ethiopia                 | 100.0                  | 80.5                          | 45.6                            | 0.5   | 3.8                   | 13.5  | 6.1   | 1.8        | 1.6         | 0.2           | 0.3                    |
| Gabon                    | 100.0                  | 30.7                          | 9.2                             | 0.7   | 1.4                   | 4.6   | 0.7   | 2.5        | 1.6         | 0.6           | 0.7                    |
| Gambia, The              | 100.0                  | 78.2                          | 18.3                            | 0.6   | 7.5                   | 7.4   | 2.3   | 7.3        | 1.2         | 1.1           | 4.2                    |
| Ghana                    | 100.0                  | 80.1                          | 30.1                            | 1.4   | 8.6                   | 12.2  | 4.5   | 5.8        | 3.8         | 0.2           | 2.2                    |
| Guinea                   | 100.0                  | 72.1                          | 23.2                            | 3.2   | 5.8                   | 7.7   | 6.7   | 7.6        | 4.0         | 0.1           | 1.3                    |
| Guinea-Bissau            | 100.0                  | 71.4                          | 36.2                            | 1.3   | 4.8                   | 13.2  | 4.1   | 2.4        | 3.2         | 0.1           | 2.4                    |
| Kenya                    | 100.0                  | 89.8                          | 29.5                            | 2.3   | 3.5                   | 11.8  | 4.6   | 8.8        | 7.5         | 1.0           | 4.8                    |
| Lesotho                  | 100.0                  | 120.9                         | 37.6                            | 3.6   | 14.0                  | 12.4  | 6.4   | 19.1       | 5.0         | 1.0           | 1.3                    |

| Education  | Restaurants and hotels | Miscellaneous goods and services | Net purchases abroad | Private individual consumption | Individual consumption by government | General government | Gross fixed capital formation | Machinery and equipment | Construction | Other products | Stocks   | Net exports |
|------------|------------------------|----------------------------------|----------------------|--------------------------------|--------------------------------------|--------------------|-------------------------------|-------------------------|--------------|----------------|----------|-------------|
| 2.1        | 4.8                    | 8.7                              | -0.6                 | 51.4                           | 2.8                                  | 3.5                | 27.0                          | 18.8                    | 6.0          | 2.3            | 1        | 12          |
| 3.5        | 2.7                    | 4.5                              | 0.0                  | 72.6                           | 4.0                                  | 7.2                | 20.0                          | 11.4                    | 8.6          | 0.0            | 5        | -10         |
| 2.2        | 7.2                    | 12.5                             | 1.7                  | 68.9                           | 8.4                                  | 6.5                | 19.6                          | 11.0                    | 5.5          | 3.1            | 1        | -9          |
| 2.8        | 6.2                    | 11.3                             | 0.0                  | 77.0                           | 3.3                                  | 7.8                | 22.9                          | 10.9                    | 8.5          | 3.5            | 0        | -12         |
| <b>2.8</b> | <b>5.2</b>             | <b>9.3</b>                       | <b>0.0</b>           | <b>64.9</b>                    | <b>5.3</b>                           | <b>6.6</b>         | <b>22.9</b>                   | <b>11.2</b>             | <b>8.9</b>   | <b>2.7</b>     | <b>1</b> | <b>-3</b>   |
| 9.5        | 0.3                    | 1.4                              | 0.2                  | 80.3                           | 8.6                                  | 5.2                | 16.6                          | 1.9                     | 14.5         | 0.1            | -2       | -9          |
| 8.6        | 0.9                    | 1.1                              | -1.7                 | 53.6                           | 13.9                                 | 4.4                | 26.8                          | 14.2                    | 7.9          | 4.7            | -3       | 5           |
| 8.6        | 1.4                    | 2.6                              | 0.6                  | 59.8                           | 16.1                                 | 5.2                | 17.2                          | 7.5                     | 9.6          | 0.1            | 0        | 0           |
| 8.9        | 3.6                    | 0.9                              | 0.6                  | 76.1                           | 9.0                                  | 5.3                | 18.9                          | 7.7                     | 10.6         | 0.6            | 5        | -13         |
| 12.9       | 1.7                    | 2.7                              | -0.6                 | 57.2                           | 7.9                                  | 4.6                | 21.0                          | 6.7                     | 11.3         | 3.0            | 2        | 6           |
| 12.5       | 1.6                    | 3.5                              | -0.2                 | 75.5                           | 19.6                                 | 7.1                | 6.2                           | 1.8                     | 4.1          | 0.3            | 0        | -7          |
| 13.6       | 1.1                    | 3.2                              | 0.4                  | 87.8                           | 13.2                                 | 3.8                | 11.3                          | 1.8                     | 8.9          | 0.6            | 4        | -20         |
| 4.9        | 1.5                    | 4.7                              | 1.1                  | 56.3                           | 10.8                                 | 6.1                | 14.4                          | 5.9                     | 7.5          | 1.1            | 3        | 10          |
| 19.3       | 0.1                    | 0.7                              | 1.1                  | 60.7                           | 33.1                                 | 6.7                | 2.8                           | 1.4                     | 1.1          | 0.3            | 4        | -5          |
| 10.4       | 1.4                    | 4.1                              | -0.2                 | 65.8                           | 13.9                                 | 4.8                | 13.5                          | 5.7                     | 7.2          | 0.6            | 1        | 0           |
| <b>6.6</b> | <b>1.5</b>             | <b>4.3</b>                       | <b>0.8</b>           | <b>58.3</b>                    | <b>11.5</b>                          | <b>5.8</b>         | <b>14.9</b>                   | <b>6.0</b>              | <b>7.8</b>   | <b>1.2</b>     | <b>2</b> | <b>7</b>    |
| 1.4        | 0.6                    | 3.1                              | 0.0                  | 21.6                           | 1.9                                  | 12.4               | 38.2                          | 13.4                    | 24.8         | 0.0            | 0        | 26          |
| 4.1        | 5.3                    | 3.8                              | -1.5                 | 74.1                           | 3.6                                  | 10.1               | 19.8                          | 4.1                     | 15.4         | 0.3            | -1       | -6          |
| 4.8        | 0.0                    | 1.4                              | 0.0                  | 23.6                           | 3.4                                  | 19.2               | 24.4                          | 12.6                    | 11.2         | 0.5            | 18       | 11          |
| 4.2        | 3.5                    | 3.0                              | 0.0                  | 69.4                           | 3.6                                  | 20.1               | 17.5                          | 5.1                     | 10.6         | 1.8            | 1        | -11         |
| 10.1       | 1.6                    | 2.8                              | -0.4                 | 62.0                           | 6.4                                  | 17.0               | 18.2                          | 5.0                     | 12.5         | 0.7            | 2        | -5          |
| 3.7        | 4.2                    | 1.8                              | 0.8                  | 73.8                           | 3.0                                  | 7.9                | 14.4                          | 6.3                     | 8.0          | 0.2            | 2        | -1          |
| 9.2        | 2.7                    | 5.1                              | 0.0                  | 87.2                           | 4.5                                  | 8.1                | 48.3                          | 21.0                    | 26.5         | 0.9            | -1       | -47         |
| 4.4        | 1.9                    | 3.3                              | -5.1                 | 91.8                           | 2.1                                  | 7.6                | 7.2                           | 1.3                     | 4.7          | 1.1            | 0        | -9          |
| 11.4       | 0.2                    | 1.7                              | -0.1                 | 39.4                           | 12.3                                 | 25.0               | 14.2                          | 4.8                     | 6.3          | 3.1            | 4        | 5           |
| 4.7        | 0.0                    | 0.0                              | 0.5                  | 78.6                           | 0.4                                  | 23.6               | 11.5                          | 4.4                     | 6.5          | 0.6            | 2        | -16         |
| 2.3        | 0.7                    | 2.0                              | 0.0                  | 55.3                           | 0.6                                  | 15.8               | 26.6                          | 0.8                     | 20.1         | 5.7            | 1        | 0           |
| 6.1        | 2.7                    | 1.4                              | -0.3                 | 28.6                           | 6.6                                  | 11.1               | 11.7                          | 2.2                     | 9.4          | 0.1            | 0        | 42          |
| 2.3        | 1.1                    | 3.6                              | 1.0                  | 75.6                           | 2.1                                  | 9.1                | 5.5                           | 3.0                     | 2.2          | 0.2            | 2        | 5           |
| 6.3        | 1.4                    | 2.8                              | -0.4                 | 54.7                           | 6.8                                  | 21.9               | 17.1                          | 4.4                     | 11.9         | 0.8            | 0        | -1          |
| 9.8        | 1.7                    | 4.4                              | -0.7                 | 62.5                           | 10.4                                 | 14.6               | 12.8                          | 3.8                     | 8.7          | 0.3            | 1        | -1          |
| 2.3        | 1.1                    | 2.1                              | 0.0                  | 29.1                           | 1.0                                  | 5.8                | 26.3                          | 16.0                    | 6.4          | 3.9            | -1       | 38          |
| 2.2        | 1.9                    | 3.4                              | -0.4                 | 78.3                           | 2.2                                  | 11.3               | 17.0                          | 3.1                     | 13.6         | 0.3            | 0        | -9          |
| 4.3        | 0.7                    | 2.2                              | 1.5                  | 26.0                           | 4.8                                  | 11.5               | 26.8                          | 11.5                    | 10.8         | 4.5            | 0        | 31          |
| 24.9       | 0.3                    | 3.2                              | 0.0                  | 67.7                           | 10.5                                 | 31.4               | 10.6                          | 4.8                     | 4.8          | 1.0            | 4        | -24         |
| 6.8        | 0.0                    | 4.6                              | 0.0                  | 78.0                           | 2.1                                  | 6.3                | 28.4                          | 18.7                    | 8.6          | 1.2            | 0        | -15         |
| 7.6        | 1.5                    | 2.8                              | 0.6                  | 68.9                           | 3.1                                  | 5.5                | 22.8                          | 8.2                     | 13.4         | 1.2            | 2        | -2          |
| 3.1        | 0.3                    | 0.3                              | 0.0                  | 69.7                           | 1.7                                  | 29.5               | 15.1                          | 5.5                     | 9.0          | 0.6            | 4        | -21         |
| 9.0        | 5.2                    | 4.7                              | -2.9                 | 83.7                           | 6.1                                  | 7.0                | 14.5                          | 6.6                     | 7.8          | 0.1            | -2       | -9          |
| 15.6       | 0.2                    | 4.6                              | 0.1                  | 112.6                          | 8.3                                  | 7.4                | 25.6                          | 4.5                     | 21.1         | 0.0            | 0        | -54         |

(continued)

| Economy               | Gross domestic product | Actual individual consumption | Food and nonalcoholic beverages | Alcoholic beverages, tobacco, and narcotics | Clothing and footwear | Housing, water, electricity, gas, and other fuels | Furnishings, household equipment, and maintenance | Health     | Transport  | Communication | Recreation and culture |
|-----------------------|------------------------|-------------------------------|---------------------------------|---|-----------------------|---|---|------------|------------|---------------|------------------------|
| Liberia               | 100.0                  | 71.1                          | 15.7                            | 3.0   | 8.9                   | 8.8   | 3.3   | 4.6        | 0.9        | 1.1           | 1.1                    |
| Madagascar            | 100.0                  | 78.6                          | 38.2                            | 1.6   | 3.5                   | 13.2  | 3.1   | 3.0        | 1.5        | 0.3           | 0.5                    |
| Malawi                | 100.0                  | 74.0                          | 14.4                            | 1.2   | 2.3                   | 13.9  | 1.6   | 10.1       | 6.4        | 0.6           | 6.8                    |
| Mali                  | 100.0                  | 71.8                          | 31.8                            | 2.0   | 4.2                   | 9.1   | 4.3   | 3.1        | 5.8        | 0.4           | 2.1                    |
| Mauritania            | 100.0                  | 68.2                          | 36.5                            | 0.8   | 4.9                   | 8.0   | 2.7   | 3.9        | 2.7        | 0.4           | 0.7                    |
| Mauritius             | 100.0                  | 74.1                          | 20.6                            | 4.0   | 4.3                   | 14.4  | 4.8   | 4.4        | 5.9        | 2.6           | 3.7                    |
| Morocco               | 100.0                  | 63.7                          | 26.3                            | 1.3   | 3.5                   | 11.6  | 3.6   | 2.3        | 5.8        | 2.7           | 2.5                    |
| Mozambique            | 100.0                  | 81.0                          | 47.3                            | 2.0   | 4.3                   | 10.6  | 1.8   | 3.2        | 2.0        | 0.1           | 1.5                    |
| Namibia               | 100.0                  | 61.4                          | 19.1                            | 2.3   | 3.8                   | 6.9   | 3.6   | 7.1        | 6.4        | 0.4           | 1.8                    |
| Niger                 | 100.0                  | 77.7                          | 32.6                            | 2.0   | 7.8                   | 10.7  | 3.7   | 2.7        | 4.6        | 0.3           | 3.4                    |
| Nigeria               | 100.0                  | 71.0                          | 30.0                            | 0.7   | 4.9                   | 12.7  | 5.8   | 2.7        | 3.5        | 0.1           | 1.0                    |
| Rwanda                | 100.0                  | 74.0                          | 34.9                            | 7.9   | 1.9                   | 8.6   | 2.8   | 3.6        | 2.4        | 0.2           | 0.7                    |
| São Tomé and Príncipe | 100.0                  | 96.9                          | 49.7                            | 3.9   | 2.9                   | 11.7  | 3.2   | 6.1        | 7.4        | 0.7           | 1.3                    |
| Senegal               | 100.0                  | 80.7                          | 37.0                            | 3.1   | 4.7                   | 11.4  | 5.4   | 4.0        | 2.6        | 3.7           | 2.9                    |
| Sierra Leone          | 100.0                  | 89.8                          | 28.6                            | 2.8   | 7.9                   | 14.4  | 1.9   | 14.3       | 1.8        | 0.8           | 2.7                    |
| South Africa          | 100.0                  | 70.4                          | 16.8                            | 3.7   | 4.1                   | 8.3   | 4.0   | 6.5        | 11.2       | 1.3           | 3.1                    |
| Sudan                 | 100.0                  | 83.8                          | 42.6                            | 0.7   | 5.5                   | 12.6  | 6.0   | 2.1        | 6.3        | 0.1           | 3.1                    |
| Swaziland             | 100.0                  | 74.6                          | 30.7                            | 0.5   | 3.2                   | 7.7   | 4.3   | 14.1       | 4.3        | 0.6           | 1.9                    |
| Tanzania              | 100.0                  | 81.3                          | 54.6                            | 2.2   | 6.2                   | 7.2   | 3.1   | 1.7        | 2.6        | 0.0           | 0.8                    |
| Togo                  | 100.0                  | 102.1                         | 44.2                            | 4.6   | 4.9                   | 16.1  | 2.5   | 2.8        | 12.4       | 0.8           | 1.9                    |
| Tunisia               | 100.0                  | 66.9                          | 19.2                            | 2.5   | 3.9                   | 10.5  | 5.7   | 3.8        | 5.0        | 0.7           | 1.5                    |
| Uganda                | 100.0                  | 82.1                          | 31.1                            | 3.6   | 2.4                   | 16.5  | 3.9   | 5.0        | 3.2        | 0.5           | 1.7                    |
| Zambia                | 100.0                  | 76.0                          | 9.5                             | 0.1   | 4.7                   | 20.1  | 4.8   | 8.6        | 6.9        | 0.1           | 9.6                    |
| Zimbabwe              | 100.0                  | 80.0                          | 32.4                            | 3.0   | 10.1                  | 11.2  | 5.0   | 1.0        | 2.6        | 0.4           | 1.8                    |
| <b>Africa</b>         | <b>100.0</b>           | <b>70.5</b>                   | <b>26.6</b>                     | <b>2.1</b>                                  | <b>4.5</b>            | <b>9.6</b>  | <b>4.1</b>  | <b>4.5</b> | <b>5.5</b> | <b>0.9</b>    | <b>2.0</b>             |
| Bahrain               | 100.0                  | 48.7                          | 12.0                            | 0.3   | 3.7                   | 5.1   | 5.4   | 3.2        | 7.9        | 0.8           | 1.4                    |
| Egypt, Arab Rep.      | 100.0                  | 77.5                          | 30.7                            | 1.3   | 6.2                   | 10.5  | 2.5   | 5.1        | 7.7        | 0.7           | 3.7                    |
| Iraq                  | 100.0                  | 55.3                          | 17.9                            | 0.3   | 3.2                   | 4.0   | 6.8   | 9.6        | 6.1        | 0.8           | 0.6                    |
| Jordan                | 100.0                  | 91.0                          | 31.3                            | 2.6   | 6.0                   | 7.5   | 3.3   | 6.1        | 14.3       | 3.3           | 1.3                    |
| Kuwait                | 100.0                  | 33.8                          | 7.5                             | 0.1   | 2.3                   | 3.8   | 5.4   | 1.3        | 7.3        | 0.7           | 1.1                    |
| Lebanon               | 100.0                  | 81.5                          | 31.3                            | 1.7   | 3.5                   | 8.3   | 5.5   | 5.3        | 9.7        | 0.7           | 2.6                    |
| Oman                  | 100.0                  | 39.2                          | 11.3                            | 0.2   | 2.8                   | 2.9   | 2.4   | 1.4        | 7.7        | 1.1           | 0.9                    |
| Qatar                 | 100.0                  | 19.9                          | 3.7                             | 0.1   | 1.3                   | 1.2   | 1.5   | 1.2        | 6.7        | 0.8           | 0.6                    |
| Saudi Arabia          | 100.0                  | 35.0                          | 7.9                             | 0.2   | 2.8                   | 3.0   | 4.1   | 2.6        | 6.2        | 0.5           | 0.9                    |
| Syrian Arab Republic  | 100.0                  | 75.1                          | 35.2                            | 0.2   | 6.1                   | 11.6  | 2.6   | 6.5        | 3.3        | 0.3           | 1.1                    |
| Yemen, Rep.           | 100.0                  | 65.1                          | 25.9                            | 1.6   | 6.0                   | 8.4   | 2.2   | 3.6        | 5.3        | 0.2           | 0.9                    |
| <b>Western Asia</b>   | <b>100.0</b>           | <b>51.5</b>                   | <b>17.1</b>                     | <b>0.6</b>                                  | <b>3.9</b>            | <b>5.7</b>  | <b>3.7</b>  | <b>3.8</b> | <b>6.8</b> | <b>0.7</b>    | <b>1.6</b>             |
| <b>WORLD</b>          | <b>100</b>             | <b>68</b>                     | <b>12</b>                       | <b>2</b>                                    | <b>4</b>              | <b>8</b>  | <b>4</b>  | <b>6</b>   | <b>9</b>   | <b>2</b>      | <b>5</b>               |

Source: ICP 2005.

| Education  | Restaurants and hotels | Miscellaneous goods and services | Net purchases abroad | Private individual consumption | Individual consumption by government | General government | Gross fixed capital formation | Machinery and equipment | Construction | Other products | Stocks   | Net exports |
|------------|------------------------|----------------------------------|----------------------|--------------------------------|--------------------------------------|--------------------|-------------------------------|-------------------------|--------------|----------------|----------|-------------|
| 17.9       | 0.4                    | 5.4                              | 0.0                  | 69.0                           | 2.1                                  | 8.3                | 20.4                          | 17.9                    | 2.4          | 0.0            | 15       | -15         |
| 12.7       | 1.1                    | 0.8                              | -0.9                 | 74.7                           | 3.9                                  | 13.2               | 17.1                          | 6.0                     | 10.7         | 0.5            | 2        | -11         |
| 7.9        | 1.4                    | 7.2                              | 0.2                  | 73.6                           | 0.4                                  | 10.2               | 26.0                          | 5.8                     | 20.1         | 0.0            | 2        | -12         |
| 5.4        | 1.5                    | 2.1                              | 0.0                  | 67.7                           | 4.1                                  | 16.9               | 12.2                          | 8.5                     | 3.7          | 0.0            | 7        | -8          |
| 4.4        | 0.5                    | 2.2                              | 0.5                  | 63.2                           | 5.0                                  | 18.0               | 53.0                          | 17.5                    | 34.1         | 1.5            | 6        | -46         |
| 6.5        | 2.6                    | 2.9                              | -2.5                 | 65.0                           | 9.1                                  | 10.6               | 20.6                          | 8.1                     | 12.5         | 0.0            | 1        | -7          |
| 3.7        | 3.4                    | 3.3                              | -6.4                 | 59.9                           | 3.8                                  | 9.2                | 32.6                          | 17.0                    | 13.4         | 2.1            | 2        | -8          |
| 5.7        | 0.3                    | 1.7                              | 0.4                  | 75.7                           | 5.3                                  | 9.8                | 19.6                          | 7.7                     | 11.9         | 0.0            | 2        | -12         |
| 7.5        | 1.6                    | 5.7                              | -4.7                 | 53.1                           | 8.2                                  | 14.2               | 27.9                          | 15.2                    | 11.4         | 1.3            | 2        | -5          |
| 2.9        | 3.7                    | 3.4                              | -0.1                 | 75.4                           | 2.3                                  | 13.5               | 18.9                          | 5.3                     | 13.1         | 0.5            | 2        | -12         |
| 5.5        | 0.4                    | 3.5                              | 0.0                  | 67.0                           | 4.0                                  | 8.2                | 11.4                          | 9.9                     | 1.5          | 0.0            | 0        | 9           |
| 8.1        | 1.2                    | 1.7                              | -0.1                 | 68.2                           | 5.8                                  | 18.0               | 18.3                          | 5.9                     | 12.4         | 0.0            | 1        | -11         |
| 6.6        | 1.1                    | 2.0                              | 0.5                  | 92.8                           | 4.1                                  | 17.0               | 18.1                          | 7.8                     | 9.0          | 1.3            | 2        | -34         |
| 3.5        | 0.7                    | 3.2                              | -1.6                 | 76.7                           | 3.9                                  | 8.2                | 23.9                          | 4.7                     | 18.3         | 0.8            | 3        | -16         |
| 9.8        | 0.7                    | 4.0                              | 0.0                  | 83.3                           | 6.5                                  | 18.4               | 10.7                          | 5.3                     | 5.2          | 0.2            | 0        | -19         |
| 4.8        | 1.5                    | 6.4                              | -1.4                 | 64.4                           | 6.0                                  | 9.8                | 19.5                          | 13.4                    | 6.1          | 0.0            | 2        | -1          |
| 1.2        | 0.1                    | 3.2                              | 0.4                  | 83.4                           | 0.4                                  | 5.9                | 16.4                          | 9.2                     | 7.2          | 0.0            | 4        | -10         |
| 4.7        | 0.4                    | 2.4                              | 0.0                  | 71.3                           | 3.3                                  | 8.1                | 20.7                          | 6.8                     | 12.7         | 1.2            | 1        | -5          |
| 1.4        | 0.0                    | 1.4                              | 0.0                  | 80.4                           | 0.9                                  | 6.6                | 20.1                          | 7.1                     | 12.5         | 0.4            | 0        | -8          |
| 7.3        | 2.2                    | 3.1                              | -0.8                 | 97.6                           | 4.5                                  | 11.2               | 13.4                          | 4.6                     | 8.1          | 0.6            | 1        | -27         |
| 2.8        | 11.8                   | 3.6                              | -3.9                 | 62.4                           | 4.5                                  | 9.2                | 24.8                          | 7.6                     | 16.6         | 0.7            | 0        | -1          |
| 10.7       | 2.1                    | 1.5                              | 0.0                  | 75.5                           | 6.7                                  | 10.4               | 17.3                          | 3.4                     | 13.8         | 0.0            | 0        | -10         |
| 7.6        | 0.0                    | 4.0                              | 0.0                  | 67.9                           | 8.1                                  | 12.4               | 24.6                          | 12.4                    | 12.2         | 0.0            | 1        | -14         |
| 11.6       | 0.2                    | 0.9                              | 0.0                  | 68.2                           | 11.8                                 | 18.1               | 11.8                          | 6.7                     | 5.1          | 0.0            | 1        | -11         |
| <b>5.9</b> | <b>1.9</b>             | <b>4.1</b>                       | <b>-1.0</b>          | <b>64.9</b>                    | <b>5.6</b>                           | <b>10.9</b>        | <b>18.2</b>                   | <b>8.9</b>              | <b>8.8</b>   | <b>0.5</b>     | <b>1</b> | <b>-1</b>   |
| 2.5        | 0.8                    | 2.7                              | 2.9                  | 45.6                           | 3.1                                  | 3.5                | 26.3                          | 7.2                     | 19.0         | 0.1            | 1        | 20          |
| 3.9        | 1.4                    | 4.5                              | -0.7                 | 73.8                           | 3.7                                  | 6.4                | 16.5                          | 4.7                     | 11.2         | 0.6            | 1        | -1          |
| 4.7        | 0.1                    | 1.2                              | 0.0                  | 45.7                           | 9.6                                  | 29.0               | 8.5                           | 4.9                     | 2.3          | 1.2            | 7        | 1           |
| 6.8        | 3.6                    | 4.7                              | 0.3                  | 83.1                           | 7.9                                  | 8.9                | 38.2                          | 14.2                    | 20.0         | 4.0            | 4        | -43         |
| 1.8        | 0.7                    | 1.8                              | 0.0                  | 31.3                           | 2.5                                  | 6.6                | 22.3                          | 3.5                     | 18.8         | 0.0            | 3        | 35          |
| 6.0        | 4.7                    | 4.9                              | -3.0                 | 78.0                           | 3.5                                  | 8.4                | 35.8                          | 6.2                     | 23.5         | 6.1            | 0        | -26         |
| 2.3        | 0.6                    | 4.9                              | 0.6                  | 36.2                           | 3.1                                  | 11.3               | 25.9                          | 13.5                    | 8.5          | 3.9            | 0        | 23          |
| 1.5        | 0.3                    | 1.0                              | 0.0                  | 17.8                           | 2.1                                  | 5.1                | 40.7                          | 21.1                    | 18.3         | 1.3            | 3        | 31          |
| 3.0        | 1.1                    | 1.7                              | 1.3                  | 30.3                           | 4.8                                  | 8.7                | 23.7                          | 10.4                    | 11.2         | 2.0            | 2        | 31          |
| 6.5        | 1.4                    | 0.3                              | 0.0                  | 68.2                           | 6.9                                  | 6.4                | 25.9                          | 9.5                     | 16.4         | 0.0            | -8       | 1           |
| 4.9        | 1.2                    | 5.0                              | -0.1                 | 59.5                           | 5.6                                  | 7.7                | 25.1                          | 5.4                     | 19.1         | 0.5            | 0        | 3           |
| <b>3.5</b> | <b>1.2</b>             | <b>2.6</b>                       | <b>0.3</b>           | <b>47.0</b>                    | <b>4.6</b>                           | <b>9.1</b>         | <b>22.5</b>                   | <b>8.4</b>              | <b>12.7</b>  | <b>1.4</b>     | <b>1</b> | <b>16</b>   |
| <b>3</b>   | <b>4</b>               | <b>8</b>                         | <b>0</b>             | <b>61</b>                      | <b>5</b>                             | <b>7</b>           | <b>25</b>                     | <b>10</b>               | <b>13</b>    | <b>2</b>       | <b>1</b> | <b>-1</b>   |

## NOTES

1. The World Bank classification is as follows: low-income countries: per capita income (using exchange rates) below \$905; middle-income countries: per capita income between \$905 and \$11,115; high-income countries: per capita income greater than \$11,115.
2. Algeria did not participate in the 2005 ICP.
3. The five geographic ICP regions in 2005 were Africa, Asia-Pacific, Commonwealth of Independent States (CIS), South America, and Western Asia. The Eurostat–Organisation for Economic Co-operation and Development (OECD) members constituted a sixth region.
4. The Balassa-Samuelson model (Balassa 1964; Samuelson 1964) explains higher price levels in more developed countries by their higher relative productivity in traded goods (versus nontraded). Bhagwati (1984) explains it with cheaper services (which are essentially wages) in poorer countries.
5. Reformulating the regression in log per capita GDP in PPP terms [ $\ln(Y_i^{PPP}) = \ln(Y_i) - \ln(PLI_i)$ ], we obtain an equivalent presentation:

$$\ln(Y_i^{PPP}) = -0.0774 + 0.7869 \ln(Y_i) + \hat{\varepsilon}_i$$

(0.0359)      (0.0115)

$R^2 = 0.9702$ ; standard error of regression (MSE) = 0.2341.

Note that the standard errors of the coefficients and MSE remained the same, and thus the predictive power of the regression. The formulation says that for each percent of increase in nominal per capita GDP, the real per capita GDP increases by 0.7869 percent and the PLI increases by 0.2131 percent (in relative terms, versus the United States).

6. Russia took part in two regional comparisons, Eurostat-OECD and CIS.
7. In the past, using the GK method, for example, would lead to increases in poorer countries' GDP. See the discussion about the IDB method in the next section.
8. The Gerschenkron effect in international comparisons is an upward bias in the GDP of countries with price structures dissimilar to the "international" price vector. Because the OECD countries greatly influence the international price structure in the GK formula, using the GK leads to an increase in the poorer countries' GDP. The IDB minimizes this bias by allowing all countries to have the same effect on the "international" price structure.

## REFERENCES

- Balassa, Bela. 1964. "The Purchasing Power Parity Doctrine: A Reappraisal." *Journal of Political Economy* 72 (6): 584–96.
- Bhagwati, J. 1984. "Why Are Services Cheaper in Poor Countries?" *Economic Journal* 94: 279–86.
- Cleveland, William S., and Susan J. Devlin. 1988. "Locally Weighted Regression: An Approach to Regression Analysis by Local Fitting." *Journal of the American Statistical Association* 83 (403): 596–610.
- Samuelson, Paul. 1964. "Theoretical Notes on Trade Problems." *Review of Economics and Statistics* 46 (2): 145–54.
- World Bank. 2008. *Global Purchasing Power Parities and Real Expenditures: 2005 International Comparison Program*. <http://siteresources.worldbank.org/ICPINT/Resources/icp-final.pdf>.