

Technical Notes

These technical notes discuss the sources and methods used to compile the indicators included in this edition of Selected World Development Indicators. The notes follow the order in which the indicators appear in the tables. For the first time the Selected World Development Indicators uses terminology in line with the 1993 System of National Accounts (SNA). For example, in the 1993 SNA *gross national income* replaces *gross national product*. See the technical notes for tables 1 and 3 for other examples.

Sources

The data published in the Selected World Development Indicators are taken from *World Development Indicators 2001*. Where possible, however, revisions reported since the closing date of that edition have been incorporated. In addition, newly released estimates of population and gross national income (GNI) per capita for 2000 are included in table 1.

The World Bank draws on a variety of sources for the statistics published in the *World Development Indicators*. Data on external debt are reported directly to the World Bank by developing member countries through the Debtor Reporting System. Other data are drawn mainly from the United Nations and its specialized agencies, from the International Monetary Fund (IMF), and from country reports to the World Bank. Bank staff estimates are also used to improve currentness or consistency. For most countries, national accounts estimates are obtained from member governments through World Bank economic missions. In some instances these are adjusted by staff to ensure conformity with international definitions and concepts. Most social data from national sources are drawn from regular administrative files, special surveys, or periodic censuses.

For more detailed notes about the data, please refer to the World Bank's *World Development Indicators 2001*.

Data consistency and reliability

Considerable effort has been made to standardize the data, but full comparability cannot be assured, and care must be taken in interpreting the indicators. Many factors affect data availability, comparability, and reliability: statistical systems in many developing economies are still weak; statistical methods, coverage, practices, and definitions differ widely;

and cross-country and intertemporal comparisons involve complex technical and conceptual problems that cannot be unequivocally resolved. For these reasons, although the data are drawn from the sources thought to be most authoritative, they should be construed only as indicating trends and characterizing major differences among economies rather than offering precise quantitative measures of those differences. Also, national statistical agencies tend to revise their historical data, particularly for recent years. Thus, data of different vintages may be published in different editions of World Bank publications. Readers are advised not to compile such data from different editions. Consistent time series are available from the *World Development Indicators 2001* CD-ROM.

Ratios and growth rates

For ease of reference, the tables usually show ratios and rates of growth rather than the simple underlying values. Values in their original form are available from the *World Development Indicators 2001* CD-ROM. Unless otherwise noted, growth rates are computed using the least-squares regression method (see *Statistical methods* below). Because this method takes into account all available observations during a period, the resulting growth rates reflect general trends that are not unduly influenced by exceptional values. To exclude the effects of inflation, constant price economic indicators are used in calculating growth rates. Data in italics are for a year or period other than that specified in the column heading—up to two years before or after for economic indicators and up to three years for social indicators, because the latter tend to be collected less regularly and change less dramatically over short periods.

Constant price series

An economy's growth is measured by the increase in value added produced by the individuals and enterprises operating in that economy. Thus, measuring real growth requires estimates of GDP and its components valued in constant prices. The World Bank collects constant price national accounts series in national currencies and recorded in the country's original base year. To obtain comparable series of constant price data, it rescales GDP and value added by in-

dustrial origin to a common reference year, currently 1995. This process gives rise to a discrepancy between the rescaled GDP and the sum of the rescaled components. Because allocating the discrepancy would give rise to distortions in the growth rate, it is left unallocated.

Summary measures

The summary measures for regions and income groups, presented at the end of most tables, are calculated by simple addition when they are expressed in levels. Aggregate growth rates and ratios are usually computed as weighted averages. The summary measures for social indicators are weighted by population or subgroups of population, except for infant mortality, which is weighted by the number of births. See the notes on specific indicators for more information.

For summary measures that cover many years, calculations are based on a uniform group of economies so that the composition of the aggregate does not change over time. Group measures are compiled only if the data available for a given year account for at least two-thirds of the full group, as defined for the 1995 benchmark year. As long as this criterion is met, economies for which data are missing are assumed to behave like those that provide estimates. Readers should keep in mind that the summary measures are estimates of representative aggregates for each topic and that nothing meaningful can be deduced about behavior at the country level by working back from group indicators. In addition, the estimation process may result in discrepancies between subgroup and overall totals.

Table 1. Key indicators of development

Population is based on the de facto definition, which counts all residents, regardless of legal status or citizenship, except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of the country of origin.

Average annual population growth rate is the exponential rate of change for the period (see the section on statistical methods below).

Population density is midyear population divided by land area. Land area is a country's total area excluding areas under inland bodies of water and coastal waterways. Density is calculated using the most recently available data on land area.

Gross national income (GNI—formerly gross national product or GNP), the broadest measure of national income, measures total value added from domestic and foreign sources claimed by residents. GNI comprises gross domestic product (GDP) plus net receipts of primary income from foreign sources. Data are converted from national currency to current U.S. dollars using the World Bank Atlas method. This involves using a three-year average of exchange rates to smooth the effects of transitory exchange rate fluctuations. (See the section on statistical methods below for further discussion of the Atlas method.)

GNI per capita is GNI divided by midyear population. It is converted into current U.S. dollars by the Atlas method. The World Bank uses GNI per capita in U.S. dollars to clas-

sify economies for analytical purposes and to determine borrowing eligibility.

PPP Gross national income, which is GNI converted into international dollars using purchasing power parity (PPP) conversion factors, is included because nominal exchange rates do not always reflect international differences in relative prices. At the PPP rate, one international dollar has the same purchasing power over domestic GNI that the U.S. dollar has over U.S. GNI. PPP rates allow a standard comparison of real price levels between countries, just as conventional price indexes allow comparison of real values over time. The PPP conversion factors used here are derived from the most recent round of price surveys conducted by the International Comparison Programme, a joint project of the World Bank and the regional economic commissions of the United Nations. This round of surveys, completed in 1996 and covering 118 countries, is based on a 1993 reference year. Estimates for countries not included in the survey are derived from statistical models using available data.

PPP GNI per capita is PPP GNI divided by midyear population.

Gross domestic product (GDP) per capita growth is based on GDP measured in constant prices. Growth in GDP is considered a broad measure of the growth of an economy. GDP in constant prices can be estimated by measuring the total quantity of goods and services produced in a period, valuing them at an agreed set of base year prices, and subtracting the cost of intermediate inputs, also in constant prices. See the section on statistical methods for details of the least-squares growth rate.

Life expectancy at birth is the number of years a newborn infant would live if patterns of mortality prevailing at its birth were to stay the same throughout its life.

Under-5 mortality rate is the probability that a child born in the indicated year will die before reaching age 5, if the child is subject to current age specific mortality rates. The probability is expressed as a rate per 1,000.

Age specific mortality data such as infant and child mortality rates, along with life expectancy at birth, are probably the best general indicators of a community's current health status and are often cited as overall measures of a population's welfare or quality of life. The main sources of mortality data are vital registration systems and direct or indirect estimates based on sample surveys or censuses. Because civil registers with relatively complete vital registration systems are fairly uncommon in developing countries, estimates must be obtained from sample surveys or derived by applying indirect estimation techniques to registration, census, or survey data. Indirect estimates rely on estimated actuarial ("life") tables, which may be inappropriate for the population concerned. Because life expectancy at birth is constructed using infant mortality data and model life tables, similar reliability issues may arise for this indicator. Life expectancy at birth and age specific mortality rates are generally estimates based on the most recently available census or survey; see the Primary data documentation table in *World Development Indicators 2001*.

Adult illiteracy rate is the percentage of persons aged 15 and above who cannot, with understanding, read and write a short, simple statement about their everyday life. Measuring literacy using such a definition requires census or sample survey measurements under controlled conditions. In practice, many countries estimate the number of illiterate adults from self-reported data or from estimates of school completion rates. Because of these differences in method, comparisons across countries—and even over time within countries—should be made with caution.

Carbon dioxide emissions (CO₂) measures those emissions stemming from the burning of fossil fuels and the manufacture of cement. These include carbon dioxide produced during consumption of solid, liquid, and gas fuels and from gas flaring.

The Carbon Dioxide Information Analysis Center (CDIAC), sponsored by the U.S. Department of Energy, calculates annual anthropogenic emissions of CO₂. These calculations are derived from data on fossil fuel consumption, based on the World Energy Data Set maintained by the UNSD, and from data on world cement manufacturing, based on the Cement Manufacturing Data Set maintained by the U.S. Bureau of Mines. Each year the CDIAC recalculates the entire time series from 1950 to the present, incorporating its most recent findings and the latest corrections to its database. Estimates exclude fuels supplied to ships and aircraft engaged in international transportation because of the difficulty of apportioning these fuels among the countries benefiting from that transport.

Table 2. Poverty and income distribution

Survey year is the year in which the underlying data were collected.

Rural population below the national poverty line is the percentage of the rural population living below the rural poverty line determined by national authorities. **Urban population below the national poverty line** is the percentage of the urban population living below the urban poverty line determined by national authorities. **Total population below the national poverty line** is the percentage of the total population living below the national poverty line. National estimates are based on population weighted subgroup estimates from household surveys.

Population below \$1 PPP a day and \$2 PPP a day are the percentages of the population living on less than \$1.08 a day and \$2.15 a day at 1993 international prices (equivalent to \$1 and \$2 in 1985 prices adjusted for purchasing power parity). Poverty rates are comparable across countries, but as a result of revisions in PPP exchange rates, they cannot be compared with poverty rates reported in previous editions for individual countries.

Poverty gap at \$1 PPP a day and Poverty gap at \$2 PPP a day is the mean shortfall below the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.

International comparisons of poverty data entail both conceptual and practical problems. Different countries have

different definitions of poverty, and consistent comparisons between countries can be difficult. Local poverty lines tend to have higher purchasing power in rich countries, where more generous standards are used than in poor countries. Is it reasonable to treat two people with the same standard of living—in terms of their command over commodities—differently because one happens to live in a better-off country? Can we hold the real value of the poverty line constant across countries, just as we do when making comparisons over time?

Poverty measures based on an international poverty line attempt to do this. The \$1 a day standard, measured in 1985 international prices and adjusted to local currency using purchasing power parities (PPPs), was chosen for the World Bank's *World Development Report 1990: Poverty* because it is typical of the poverty lines in low-income countries. PPP exchange rates, such as those from the Penn World Tables or the World Bank, are used because they take into account the local prices of goods and services not traded internationally. But PPP rates were designed not for making international poverty comparisons but for comparing aggregates from national accounts. As a result, there is no certainty that an international poverty line measures the same degree of need or deprivation across countries.

Past editions of the *World Development Indicators* and the Selected World Development Indicators used PPPs from the Penn World Tables. Because the Penn World Tables updated to 1993 are not yet available, this year's edition (like last year's) uses 1993 consumption PPP estimates produced by the World Bank. The international poverty line, set at \$1 a day in 1985 PPP terms, has been recalculated in 1993 PPP terms at about \$1.08 a day. Any revisions in the PPP of a country to incorporate better price indexes can produce dramatically different poverty lines in local currency.

Problems also exist in comparing poverty measures within countries. For example, the cost of living is typically higher in urban than in rural areas. (Food staples, for example, tend to be more expensive in urban areas.) So the urban monetary poverty line should be higher than the rural poverty line. But it is not always clear that the difference between urban and rural poverty lines found in practice properly reflects the difference in the cost of living. In some countries the urban poverty line in common use has a higher real value—meaning that it allows the purchase of more commodities for consumption—than does the rural poverty line. Sometimes the difference has been so large as to imply that the incidence of poverty is greater in urban than in rural areas, even though the reverse is found when adjustments are made only for differences in the cost of living. As with international comparisons, when the real value of the poverty line varies, it is not clear how meaningful such urban-rural comparisons are.

The problems of making poverty comparisons do not end there. More issues arise in measuring household living standards. The choice between income and consumption as a welfare indicator is one issue. Income is generally more difficult to measure accurately, and consumption accords better with the idea of the standard of living than does income, which can vary over time even if the standard of living does not. But consumption data are not always available, and

when they are not there is little choice but to use income. There are still other problems. Household survey questionnaires can differ widely, for example, in the number of distinct categories of consumer goods they identify. Survey quality varies, and even similar surveys may not be strictly comparable.

Comparisons across countries at different levels of development also pose a potential problem, because of differences in the relative importance of consumption of nonmarket goods. The local market value of all consumption in kind (including consumption from own production, particularly important in underdeveloped rural economies) should be included in the measure of total consumption expenditure. Similarly, the imputed profit from production of nonmarket goods should be included in income. This is not always done, though such omissions were a far bigger problem in surveys before the 1980s. Most survey data now include valuations for consumption or income from own production. Nonetheless, valuation methods vary. For example, some surveys use the price in the nearest market, while others use the average farm gate selling price.

Whenever possible, consumption has been used as the welfare indicator for deciding who is poor. When only household income was available, average income has been adjusted to accord with either a survey-based estimate of mean consumption (when available) or an estimate based on consumption data from national accounts. This procedure adjusts only the mean, however; nothing can be done to correct for the difference in Lorenz (income distribution) curves between consumption and income.

Empirical Lorenz curves are weighted by household size, so they are based on percentiles of population, not households. In all cases the measures of poverty have been calculated from primary data sources (tabulations or household data) rather than existing estimates. Estimation from tabulations requires an interpolation method; the method chosen was Lorenz curves with flexible functional forms, which have proved reliable in past work.

Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of zero represents perfect equality, while an index of 100 implies perfect inequality.

Percentage share of income or consumption is the share that accrues to subgroups of population indicated by deciles or quintiles.

Inequality in the distribution of income is reflected in the percentage shares of either income or consumption accruing to segments of the population ranked by income or consumption levels. The segments ranked lowest by personal income receive the smallest share of total income. The Gini

index provides a convenient summary measure of the degree of inequality.

Data on personal or household income or consumption come from nationally representative household surveys. The data in the table refer to different years between 1985 and 1999. Footnotes to the survey year indicate whether the rankings are based on per capita income or consumption. Each distribution is based on percentiles of population—rather than of households—with households ranked by income or expenditure per person.

Where the original data from the household survey were available, they have been used to directly calculate the income (or consumption) shares by quintile. Otherwise, shares have been estimated from the best available grouped data.

The distribution indicators have been adjusted for household size, providing a more consistent measure of per capita income or consumption. No adjustment has been made for spatial differences in cost of living within countries, because the data needed for such calculations are generally unavailable. For further details on the estimation method for low- and middle-income economies see Ravallion and Chen (1996).

Because the underlying household surveys differ in method and in the type of data collected, the distribution indicators are not strictly comparable across countries. These problems are diminishing as survey methods improve and become more standardized, but achieving strict comparability is still impossible.

Two sources of noncomparability should be noted. First, the surveys can differ in many respects, including whether they use income or consumption expenditure as the living standard indicator. The distribution of income is typically more unequal than the distribution of consumption. In addition, the definitions of income used usually differ among surveys. Consumption is usually a better welfare indicator, particularly in developing countries. Second, households differ in size (number of members) and in the extent of income sharing among members. And individuals differ in age and consumption needs. Differences among countries in these respects may bias comparisons of distribution.

World Bank staff have made an effort to ensure that the data are as comparable as possible. Whenever possible, consumption has been used rather than income. The income distribution and Gini indexes for high-income countries are calculated directly from the Luxembourg Income Study database using an estimation method consistent with that applied for developing countries.

Table 3. Economic activity

Gross domestic product is gross value added, at purchasers' prices, by all resident producers in the economy plus any taxes and minus any subsidies not included in the value of the products. It is calculated without deducting for depreciation of fabricated assets or for depletion or degradation of natural resources. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. The industrial origin of value added is determined by the International Standard Industrial Classification (ISIC) revision 3. The World Bank conventionally uses the U.S.

dollar and applies the average official exchange rate reported by the International Monetary Fund for the year shown. An alternative conversion factor is applied if the official exchange rate is judged to diverge by an exceptionally large margin from the rate effectively applied to transactions in foreign currencies and traded products.

Gross domestic product average annual growth rate is calculated from constant price GDP data in local currency.

Agricultural productivity refers to the ratio of agricultural value added, measured in constant 1995 U.S. dollars, to the number of workers in agriculture.

Value added is the net output of an industry after adding up all out-puts and subtracting intermediate inputs. The industrial origin of value added is determined by the International Standard Industrial Classification (ISIC) revision 3.

Agriculture value added corresponds to ISIC divisions 1–5 and includes forestry and fishing.

Industry value added comprises mining, manufacturing, construction, electricity, water, and gas (ISIC divisions 10–45).

Services value added correspond to ISIC divisions 50–99.

Household final consumption expenditure (private consumption in previous editions) is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. It excludes purchases of dwellings but includes imputed rent for owner-occupied dwellings. It also includes payments and fees to governments to obtain permits and licenses. Here, household consumption expenditure includes the expenditures of nonprofit institutions serving households, even when reported separately by the country. In practice, household consumption expenditure may include any statistical discrepancy in the use of resources relative to the supply of resources.

General government final consumption expenditure (general government consumption in previous editions) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation.

Gross capital formation (gross domestic investment in previous editions) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of buildings, roads, railways, and the like, including commercial and industrial buildings, offices, schools, hospitals, and private dwellings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and “work in progress.” According to the 1993 SNA net acquisitions of valuables are also considered capital formation.

External balance of goods and services is exports of goods and services less imports of goods and services. Trade in goods and services comprise all transactions between residents of a country and the rest of the world involving a

change in ownership of general merchandise, goods sent for processing and repairs, non-monetary gold, and services.

The **GDP implicit deflator** reflects changes in prices for all final demand categories, such as government consumption, capital formation, and international trade, as well as the main component, private final consumption. It is derived as the ratio of current to constant price GDP. The GDP deflator may also be calculated explicitly as a Paasche price index in which the weights are the current period quantities of output.

National accounts indicators for most developing countries are collected from national statistical organizations and central banks by visiting and resident World Bank missions. Data for high-income economies come from the Organization for Economic Co-operation and Development data files.

Table 4. Trade, aid, and finance

Merchandise exports show the f.o.b. value of goods provided to the rest of the world valued in U.S. dollars.

Merchandise imports show the c.i.f. value of goods (the cost of the goods including insurance and freight) purchased from the rest of the world valued in U.S. dollars. Data on merchandise trade come from the World Trade Organization (WTO) in its annual report.

Manufactured exports comprise the commodities in Standard Industrial Trade Classification (SITC) sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods), excluding division 68.

High technology exports are products with high R&D intensity. They include high-technology products such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.

Current account balance is the sum of net exports of goods and services, net income, and net current transfers.

Net private capital flows consist of private debt and non-debt flows. Private debt flows include commercial bank lending, bonds, and other private credits; nondebt private flows are foreign direct investment and portfolio equity investment.

Foreign direct investment is net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, re-investment of earnings, other long-term capital, and short-term capital, as shown in the balance of payments. Data on the current account balance, private capital flows, and foreign direct investment are drawn from the IMF's *Balance of Payments Statistics Yearbook* and *International Financial Statistics*.

Official development assistance or official aid cover net concessional flows to developing countries, transition economies of Eastern Europe and the former Soviet Union and to certain advanced developing countries and territories as determined by the Development Assistance Committee (DAC) of the OECD. The flows are from members of the DAC, multilateral development agencies, and certain Arab countries. Data on aid are compiled by DAC and published in its annual statistical report, *Geographical Distribution of*

Financial Flows to Aid Recipients, and in the DAC chairman's annual report, *Development Co-operation*.

Total external debt is debt owed to nonresidents repayable in foreign currency, goods, or services. It is the sum of public, publicly guaranteed, and private non-guaranteed long-term debt, use of IMF credit, and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt.

Present value of debt is the sum of short-term external debt plus the discounted sum of total debt service payments due on public, publicly guaranteed, and private nonguaranteed long-term external debt over the life of existing loans.

The main sources of external debt information are reports to the World Bank through its Debtor Reporting System from member countries that have received World Bank loans. Additional information has been drawn from the files of the World Bank and the IMF. Summary tables of the external debt of developing countries are published annually in the World Bank's *Global Development Finance*.

Domestic credit provided by banking sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities, deposit money banks, and other banking institutions for which data are available (including institutions that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other banking institutions include savings and mortgage loan institutions and building and loan associations. Data are from the IMF's *International Finance Statistics*.

Statistical methods

This section describes the calculation of the least-squares growth rate, the exponential (endpoint) growth rate, and the World Bank's Atlas methodology for calculating the conversion factor used to estimate GNI and GNI per capita in U.S. dollars.

Least-squares growth rate

Least-squares growth rates are used wherever there is a sufficiently long time series to permit a reliable calculation. No growth rate is calculated if more than half the observations in a period are missing.

The least-squares growth rate, r , is estimated by fitting a linear regression trendline to the logarithmic annual values of the variable in the relevant period. The regression equation takes the form

$$\ln X_t = a + bt,$$

which is equivalent to the logarithmic transformation of the compound growth equation,

$$X_t = X_0 (1 + r)^t.$$

In this equation, X is the variable, t is time, and $a = \log X_0$ and $b = \ln(1 + r)$ are the parameters to be estimated. If b^*

is the least-squares estimate of b , the average annual growth rate, r , is obtained as $[\exp(b^*) - 1]$ and is multiplied by 100 to express it as a percentage.

The calculated growth rate is an average rate that is representative of the available observations over the entire period. It does not necessarily match the actual growth rate between any two periods.

Exponential growth rate

The growth rate between two points in time for certain demographic data, notably labor force and population, is calculated from the equation

$$r = \ln(p_n/p_1)/n,$$

where p_n and p_1 are the last and first observations in the period, n is the number of years in the period, and $\ln$ is the natural logarithm operator. This growth rate is based on a model of continuous, exponential growth between two points in time. It does not take into account the intermediate values of the series. Note also that the exponential growth rate does not correspond to the annual rate of change measured at a one-year interval which is given by $(p_n - p_{n-1})/p_{n-1}$.

The Gini index

The Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of zero represents perfect equality, and an index of 100 percent implies perfect inequality.

World Bank Atlas method

In calculating GNI and GNI per capita in U.S. dollars for certain operational purposes, the World Bank uses a synthetic exchange rate commonly called the Atlas conversion factor. The purpose of the Atlas conversion factor is to reduce the impact of exchange rate fluctuations in the cross-country comparison of national incomes.

The Atlas conversion factor for any year is the average of a country's effective exchange rate with the G-5 countries (or alternative conversion factor) for that year and those for the two preceding years, after adjusting for differences in rates of inflation between the country and the G-5 countries. A country's effective exchange rate is an average of its exchange rates with a selection of other countries, usually weighted by the country's trade with those countries. The G-5 (Group of Five) countries are France, Germany, Japan, the United Kingdom, and the United States. A country's inflation rate is measured by its GNI deflator. The inflation rate for the G-5 countries is measured by changes in the SDR deflator. (Special drawing rights, or SDRs, are the International Monetary Fund's (IMF) unit of account.) The SDR deflator is

calculated as a weighted average of the G-5 countries' GDP deflators in SDR terms. The weights are determined by the amount of each currency included in one SDR unit. Weights vary over time because the currency composition of the SDR and the relative exchange rates for each currency both change. The SDR deflator is calculated in SDR terms first and then converted to U.S. dollars using the SDR-to-dollar Atlas conversion factor.

This three-year averaging smooths annual fluctuations in prices and exchange rates for each country. The Atlas conversion factor is then applied to a country's GNI. The resulting GNI in U.S. dollars is divided by the country's midyear population for the latest of the three years to derive its GNI per capita. When official exchange rates are deemed to be unreliable or unrepresentative during a period, an alternative estimate of the exchange rate is used in the Atlas formula (see below).

The following formulas describe the computation of the Atlas conversion factor for year t :

$$e_t^* = \frac{1}{3} \left[e_{t-2} \left(\frac{p_t}{p_{t-2}} \frac{p_t^{SS}}{p_{t-2}^{SS}} \right) + e_{t-1} \left(\frac{p_t}{p_{t-1}} \frac{p_t^{SS}}{p_{t-1}^{SS}} \right) + e_t \right]$$

and for calculating GNP per capita in U.S. dollars for year t :

$$Y_t^{\$} = (Y_t / N_t) / e_t^*$$

where e_t^* is the Atlas conversion factor (national currency to the U.S. dollar) for year t , e_t is the average annual exchange rate (national currency to the U.S. dollar) for year t , p_t is the GNI deflator for year t , p_t^{SS} is the SDR deflator in U.S. dollar terms for year t , $Y_t^{\$}$ is the Atlas GNI in U.S. dollars in year t , Y_t is current GNI (local currency) for year t , and N_t is the midyear population for year t .

Alternative conversion factors

The World Bank systematically assesses the appropriateness of official exchange rates as conversion factors. An alternative conversion factor is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate effectively applied to domestic transactions of foreign currencies and traded products. This is the case for only a small number of countries (see the *Primary data documentation* table in *World Development Indicators 2001*). Alternative conversion factors are used in the Atlas method and elsewhere in the Selected World Development Indicators as single-year conversion factors.