

TECHNICAL NOTES

THESE TECHNICAL NOTES DISCUSS THE SOURCES AND methods used to compile the 124 indicators included in the 1997 Selected World Development Indicators. The notes are organized by table and, within each table, by indicator in order of appearance in the table.

The 133 economies covered in the main tables are listed in ascending order of gross national product (GNP) per capita. A separate table (Table 1a) shows basic indicators for an additional 76 economies that have sparse data or populations of fewer than 1 million.

Sources

The data in the Selected World Development Indicators are taken from *World Development Indicators 1997*. Except for a few corrections made to the data base after that volume went to press, they are identical in source and vintage to the data published there. Although some countries have produced revised statistical series since the publication of *World Development Indicators 1997*, those revisions are not included here. They will appear in the next edition of the *World Development Indicators*.

The World Bank draws on a variety of sources for the indicators 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, its specialized agencies, the International Monetary Fund (IMF), and 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 Bank 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 census inquiries. Citations of specific sources are included

in the Key and Primary Data Documentation table and in the notes below.

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 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 compare such data from different editions. Consistent time series are available on the *World Development Indicators 1997 CD-ROM*. In addition, data issues have yet to be resolved for the fifteen economies of the former Soviet Union: coverage is sparse, and the data are subject to more than the normal range of uncertainty.

Data in italics are for years or periods other than those specified: up to two years before or after the date shown 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.

Ratios and growth rates

For ease of reference, data are often presented as ratios or rates of growth. The underlying absolute data are available on the *World Development Indicators 1997 CD-ROM*.

Unless otherwise noted, period-average growth rates are computed using the least-squares regression method (see Statistical methods below). Because this method takes into account all available observations in a period, the resulting growth rates reflect general trends and are not unduly influenced by exceptional values. To exclude the effects of inflation, constant-price economic indicators are used in calculating growth rates.

Constant-price series

To facilitate international comparisons and capture the effects of changes in intersectoral relative prices for the national accounts aggregates, constant-price data for most economies are first partially rebased to three sequential base years and then "chain-linked" together and expressed in prices of a common base year, 1987. The year 1970 is the base year for the period from 1960 to 1975, 1980 for 1976 to 1982, and 1987 for 1983 and beyond.

During the chain-linking procedure, components of GDP by industrial origin are individually rescaled and summed to provide the rescaled GDP. In this process a rescaling deviation may occur between constant-price GDP as measured by industrial origin and constant-price GDP as measured by expenditure. Such rescaling deviations are absorbed in private consumption expenditures, on the assumption that GDP by industrial origin is the more reliable estimate. Independent of the rescaling, value added in the services sector also includes a statistical discrepancy as reported by the original source.

Summary measures

The summary measures across countries for regions and income groups, presented in the blue bands in the tables, are calculated by simple addition when they are expressed as levels. Growth rates and ratios are usually combined by a base-year value-weighting scheme. 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 changes in the composition of the aggregate do not produce spurious changes in the indicator. Group measures are compiled only if data are available for a given year for at least two-thirds of the full group, as defined by the 1987 benchmarks. As long as that criterion is met, countries with missing data are assumed to behave like those that provided 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

weighting process may result in discrepancies between subgroup and overall totals.

Table 1. Basic indicators

Basic indicators for economies with sparse data or with populations of fewer than 1 million are shown in Table 1a.

Population estimates for mid-1995 are based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Refugees not permanently settled in the country of asylum are generally considered to be part of the population of their country of origin.

Population estimates are derived from national censuses. Precensus and postcensus estimates are often based on interpolations or projections. The international comparability of population indicators is limited by differences in the concepts, definitions, data collection procedures, and estimation methods used by national statistical agencies and other organizations that collect the data. In addition, the frequency and quality of coverage of population censuses vary by country and region. For more information on the compilation of population data, see the notes to Table 4.

Surface area is measured in square kilometers and comprises land area and inland waters. Data on surface area come from the Food and Agriculture Organization (FAO) and are published in the FAO *Production Yearbook*.

Gross national product (GNP) per capita is the sum of gross value added by all resident producers, plus any taxes (less subsidies) that are not included in the valuation of output, plus net receipts of primary income (employee compensation and property income) from nonresident sources, divided by the midyear population and converted to U.S. dollars using the World Bank's Atlas method. This involves using a three-year average of exchange rates to smooth the effects of transitory exchange rate fluctuations. For further discussion of the Atlas method see Statistical methods below. The growth rate of GNP per capita is computed from GNP measured in constant 1987 prices using the least-squares growth rate method.

GNP per capita is estimated by World Bank staff based on national accounts data collected by World Bank staff during economic missions or reported by national statistical offices to other international organizations such as the Organization for Economic Cooperation and Development (OECD). For high-income OECD economies the data come from the OECD. GNP per capita in U.S. dollars is used by the World Bank to classify countries for analytical purposes and to determine eligibility for borrowing. For definitions of the income groups used in this book, see the table on Classification of Economies by Income and Region.

PPP estimates of GNP per capita are calculated by converting GNP to U.S. dollars using purchasing power parities (PPP) instead of exchange rates as conversion factors. The resulting estimates are expressed in international dollars, a unit of account that has the same purchasing power over total GNP as the U.S. dollar in a given year. The denominator is the midyear population estimate for the year shown.

Relative prices of goods and services not traded on international markets tend to vary substantially from one country to another, leading to large differences in the relative purchasing power of currencies and thus in welfare as measured by GNP per capita. The use of PPP conversion factors corrects for these differences and may therefore provide a better comparison of average income or consumption between economies. However, caution should be used in interpreting PPP-based indicators. PPP estimates employ price comparisons of comparable items, but not all items can be matched perfectly in quality across countries and over time. Services are particularly difficult to compare, in part because of differences in productivity. Many services—for example, government services—are not sold in markets in all countries, so they are compared using input prices (mostly wages). Because this approach ignores productivity differences, it may inflate estimates of real quantities in lower-income countries.

The source of PPP data is the International Comparison Programme (ICP), coordinated by the U.N. Statistical Division. The World Bank collects detailed ICP benchmark data from regional sources, establishes global consistency across the regional data sets, and computes regression-based estimates for nonbenchmark countries. For detailed information on the regional sources and compilation of benchmark data see World Bank 1993. For information on how regression-based PPP estimates are derived see Ahmad 1992.

The percentage of people living on less than \$1 a day (PPP) at 1985 international (purchasing power parity) prices is a widely used measure of poverty. A person is said to be poor if he or she lives in a household whose total income or consumption per person is less than the poverty line. Although it is impossible to create an indicator of poverty that is strictly comparable across countries, the use of a standard, international poverty line helps to reduce comparability problems in several ways. In estimating living standards, nationally representative surveys have been used, conducted either by national statistical offices or by private agencies under government or international agency supervision. Whenever possible, consumption has been used as the welfare indicator for deciding who is poor. The measure of consumption is generally comprehensive, including that from own production as well as all food and nonfood goods purchased. When only household incomes

are available, the average level of 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.

Poverty measures are prepared by the Poverty and Human Resources Division of the World Bank's Policy Research Department. International poverty lines are based on primary household survey data obtained from government statistical agencies and World Bank country departments. The poverty measures are based on the most recent PPP estimates, from the latest version of the Penn World Tables (Mark 5.6a).

Life expectancy at birth is the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. Estimates of life expectancy are derived from vital registration systems or, in their absence, from demographic and household surveys using models to obtain age-specific mortality rates.

Adult illiteracy is the proportion of adults age 15 and above who cannot, with understanding, read and write a short, simple statement on their everyday life. Literacy and illiteracy are difficult both to define and to measure. The definition here is based on the concept of "functional" literacy. To measure 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. Because of these problems, comparisons across countries—and even over time for one country—should be made with caution. Data on illiteracy rates are supplied by UNESCO (United Nations Educational, Scientific, and Cultural Organization) and published in its *Statistical Yearbook*.

Table 2. Macroeconomic indicators

Central government current deficit/surplus is defined as current revenue of the central government less current expenditure. Grants are not included in revenue. This is a useful measure of the government's own fiscal capacity. The overall deficit or surplus, including grants and the capital account, is shown in Table 14. The data come from the IMF's *Government Finance Statistics Yearbook*.

Money and quasi money comprise most liabilities of a country's monetary institutions to residents other than the central government. This definition of the money supply is sometimes referred to as M2. Money comprises currency held outside banks and demand deposits other than those of the central government. Quasi money comprises time and savings deposits and similar bank accounts that the issuer can exchange for money with little, if any, delay or penalty, and foreign currency deposits of residents other than those of the central government. Where

nonmonetary financial institutions are important issuers of quasi-monetary liabilities, their liabilities may be included in quasi money.

The source of data on the money supply is the IMF's *International Financial Statistics*. Money and quasi money are the sum of IFS lines 34 and 35.

The *average annual nominal growth rate* of the money supply is calculated from year-end figures using the least-squares method. The average of the year-end figures for the specified year and the previous year is used to calculate the *average outstanding as a percentage of GDP*.

Nominal interest rates of banks show the deposit rate paid by commercial or similar banks for demand, time, or savings deposits and the lending rate charged by these banks on loans to prime customers. The data are of limited international comparability, partly because coverage and definitions vary. Interest rates are expressed in nominal terms; therefore much of the variation among countries stems from differences in inflation. The data come from *International Financial Statistics*, lines 60l and 60p.

Average annual inflation is measured by the rate of change in the GDP implicit deflator. The implicit deflator is calculated by dividing annual GDP at current prices by the corresponding value of GDP at constant prices, both in national currency. The least-squares method is used to calculate the growth rate of the GDP deflator for the period.

The GDP implicit deflator is the broadest-based measure of inflation, showing price movements for all goods and services produced in the economy, but like all price indexes it is subject to conceptual and practical limitations. Deflators for developing economies are estimated from national accounts data collected by the World Bank. Data for high-income economies are derived from data provided by the OECD.

Current account balance is the sum of net exports of goods, services, and income and net current transfers. Capital transfers are excluded. (See also Table 16.) The data come from the IMF's *International Financial Statistics* and from estimates provided by World Bank country teams.

Gross international reserves comprises holdings of monetary gold, special drawing rights (SDRs), the reserve position of members with the IMF, and holdings of foreign exchange under the control of monetary authorities. Gross international reserves in U.S. dollars are shown in Table 16. Reserve holdings as months of import coverage are calculated as the ratio of gross international reserves to the current U.S. dollar value of imports of goods and services, multiplied by 12.

The summary measures in this table are computed as the ratio of group aggregates for gross international reserves and total imports of goods and services in current dollars.

Net present value of external debt is the value of short-term debt plus the discounted sum of all debt service payments due over the life of existing loans, at current prices. The debt figures are converted into U.S. dollars from currencies of repayment at end-of-year official exchange rates. To calculate the ratio of debt to GNP, GNP is converted at official exchange rates or, in exceptional cases, by an alternative, single-year conversion factor determined by World Bank staff. (See also the notes to Tables 12 and 17.)

Table 3. External economic indicators

Net barter terms of trade measures the relative movement of export prices against that of import prices. Calculated as the ratio of a country's average export price index to its average import price index, this indicator shows changes relative to a base year (1987). The data come from the U.N. Conference on Trade and Development (UNCTAD) data base, the IMF's *International Financial Statistics*, and World Bank staff estimates. (See also Table 15.)

Trade is measured as the ratio of the sum of exports and imports of goods and services to the current value of GDP. The trade-GDP ratio is a commonly used measure of the openness of an economy or its integration with the global economy. The data come from the World Bank's national accounts data files.

Aggregate net resource flows is the sum of net flows of long-term debt (excluding use of IMF credits), official grants (excluding technical assistance), net foreign direct investment, and net portfolio equity flows. Total net flows of long-term debt are disbursements less repayments of principal on public, publicly guaranteed, and private non-guaranteed long-term debt. Official grants are transfers made by an official agency in cash or in kind, in respect of which no legal debt is incurred by the recipient. The data are taken from the World Bank's Debtor Reporting System and from the IMF's *International Financial Statistics*.

Net private capital flows consists of private debt and nondebt flows and bank and trade-related lending. Private debt flows include commercial bank lending, bonds, and other private credits. Nondebt private flows are made up of net foreign direct investment and portfolio investment. Foreign direct investment is investment made to acquire a lasting management interest in an enterprise operating in an economy other than that of the investor. It is the sum of net flows of equity capital, reinvested earnings, other long-term capital, and short-term capital as shown in the balance of payments. Portfolio investment flows include net non-debt-creating portfolio equity flows (the sum of country funds, depository receipts, and direct purchases of shares by foreign investors) and net portfolio debt flows (bond issues purchased by foreign investors).

The principal source of data on private capital flows is the World Bank's Debtor Reporting System. Additional

data come from *International Financial Statistics* and World Bank data files.

Aid comprises financial assistance classified as official development assistance (ODA) or official aid (OA) by the Development Assistance Committee (DAC) of the OECD. ODA comprises loans and grants made on concessional financial terms by all bilateral official agencies and multilateral sources to promote economic development and welfare. Net disbursements equal gross disbursements less payments to the originators of aid for amortization of past aid receipts. To qualify as ODA, a transaction must meet the following tests: it is administered with the promotion of the economic development and welfare of developing countries as its main objective, and it is concessional in character and conveys a grant element of at least 25 percent. OA comprises assistance provided on ODA-like terms to the countries of Eastern Europe, the former Soviet Union, and other economies on the DAC's "part II" list. The data on aid are provided by the DAC and published in its annual report, *Development Co-operation*. Data for GNP are World Bank estimates.

Summary measures for aid as a percentage of GNP are computed from the ratio of group totals for aid and for GNP in current U.S. dollars.

Table 4. Population and labor force

Population estimates for mid-1995 come from a variety of sources, including the U.N. Population Division, national statistical offices, and World Bank country departments. The World Bank uses the de facto definition of a country's population, which counts all residents regardless of legal status or citizenship. However, refugees not permanently settled in the country of asylum are generally considered to be part of the population of their country of origin.

The notes to Table 1 provide additional information about population estimates. The Key and Primary Data Documentation table lists the date of the most recent census or demographic survey.

Average annual growth rate of population is computed using the exponential end-point method. See the section on Statistical methods for more information.

Population aged 15-64 is the age group generally considered to be the most economically active. In many developing economies, however, many children under 15 work full or part time. And in some high-income economies many workers postpone retirement past age 65.

Total labor force comprises those people who meet the International Labour Organization's definition of the economically active population: all people who supply labor for the production of goods and services during a specified period. It includes both the employed and the unemployed. Although national practices vary in the treatment of such groups as the armed forces and seasonal or part-

time workers, in general the labor force includes the armed forces, the unemployed, and first-time job-seekers, but excludes homemakers and other unpaid caregivers and workers in the informal sector.

Average annual growth rate of the labor force is computed using the exponential end-point method. See the section on Statistical methods for more information.

Females as a percentage of the labor force shows the extent to which women are active in the labor force. Labor force estimates are derived by applying participation rates from the International Labour Organization to World Bank population estimates.

Agricultural labor force includes people engaged in farming, forestry, hunting, and fishing.

Industrial labor force includes people working in the mining, manufacturing, construction, and electricity, water, and gas industries.

Activity rates or labor force participation rates of the economically active population are compiled by the International Labour Organization from the latest national censuses or surveys and are published in its *Yearbook of Labour Statistics*. Labor force numbers in some developing countries reflect a significant underestimation of female participation rates. Estimates of the rural labor force may also fail to capture the extent of family and seasonal labor.

All summary measures are country data weighted by population or population subgroup.

Table 5. Distribution of income or consumption

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

The *Gini index* measures the extent to which the distribution of income (or, in some cases, consumption expenditures) 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, and is 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 perfect inequality.

Percentage share of income or consumption is the share that accrues to subgroups of population indicated by deciles or quintiles. Percentage shares by quintiles may not sum to 100 because of rounding.

Inequality in the distribution of income is reflected in the percentage share of income or consumption accruing to segments of the population ranked by income or consumption levels. The segments ranked lowest by personal or family income typically 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 sets refer to different years between 1985 and 1994. Footnotes to the survey year indicate whether the rankings are based on income or consumption per capita or, in the case of high-income economies, household income. 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 for low- and middle-income economies have been adjusted for household size, providing a more consistent measure of income or consumption per capita. No adjustment has been made for geographic differences in the 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 strict comparability is still impossible.

The following sources of noncomparability should be noted. First, the surveys differ as to whether they use income or consumption expenditure as the living standard indicator. For thirty-seven of the sixty-six low- and middle-income economies for which data are available, the data refer to consumption expenditure. Income is typically more unequally distributed than consumption. In addition, the definitions of income used in the surveys are usually very different from the economic definition of income (the maximum level of consumption consistent with keeping productive capacity unchanged). For these reasons, consumption is usually a much better measure. Second, the surveys differ as to whether they use the household or the individual as their unit of observation. Furthermore, household units differ in size and in the extent to which income is shared among members. Individuals differ in age and consumption needs. Where households are used as the observation unit, the deciles or quintiles refer to the percentage of households rather than of population. Third, the surveys differ according to whether they rank the units of observation by household or per capita income (or consumption).

World Bank staff have made an effort to ensure that the data for low- and middle-income economies are as comparable as possible. Whenever possible, consumption

has been used rather than income. Households have been ranked by consumption or income per capita in forming the percentiles, and the percentiles are based on population, not households. The comparability of the data for high-income economies is more limited, because the unit of observation is usually a household unadjusted for size, and households are ranked according to total household income rather than income per household member. These data are presented pending the publication of improved data from the Luxembourg Income Study, which ranks households by the average disposable income per adult equivalent. The estimates in the table should therefore be treated with considerable caution.

Data on distribution for low- and middle-income economies are compiled by the Poverty and Human Resources Division of the World Bank's Policy Research Department, using primary household survey data obtained from government statistical agencies and World Bank country departments. Data for high-income economies are from national sources, supplemented by the Luxembourg Income Study 1990 data base, the Eurostat *Statistical Yearbook*, and the United Nations' *National Accounts Statistics: Compendium of Income Distribution Statistics* (1985).

Table 6. Health

Access to health care is measured by the share of the population for whom treatment of common diseases and injuries, including essential drugs on the national list, is available within one hour's walk or travel. Facilities tend to be concentrated in urban areas.

Access to safe water shows the percentage of the population with reasonable access to adequate amounts of safe water (including treated surface waters or untreated but uncontaminated water from sources such as springs, sanitary wells, and protected boreholes). In an urban area such a source may be a public fountain or standpost located not more than 200 meters away. In rural areas access implies that members of the household do not have to spend a disproportionate part of the day fetching water. The definition of safe water has changed over time.

Access to sanitation refers to the percentage of the population with at least adequate excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta.

The *infant mortality rate* is the number of deaths of infants under 1 year of age per thousand live births in a given year. The data are a combination of observed values and interpolated and projected estimates.

Prevalence of malnutrition is the percentage of children under age 5 whose weight for age is more than 2 standard deviations below the mean of the reference population. Weight for age is a composite indicator of weight for

height (wasting) and height for age (stunting). Although this indicator does not distinguish wasting from stunting, it is useful for comparisons with earlier surveys, as weight for age was the first anthropometric measure in general use. The reference population, adopted by the World Health Organization (WHO) in 1983, consists of children in the United States who are assumed to be well nourished. For some countries, if weight for age cannot be estimated, the prevalence assessment for the country was estimated from survey data by the WHO. This approach has minor effects on the estimated rates, which the WHO considers generally comparable across countries.

Contraceptive prevalence rate is the proportion of women who are practicing, or whose husbands are practicing, any form of contraception. Contraceptive usage is generally measured for married women age 15 to 49. A few countries use measures relating to other age groups, especially 15 to 44. Data are mainly derived from demographic, health, and contraceptive prevalence surveys.

The *total fertility rate* represents the number of children that would be born to a woman were she to live to the end of her childbearing years and bear children at each age in accordance with prevailing age-specific fertility rates. The data are a combination of observed, interpolated, and projected estimates.

The *maternal mortality ratio* is the number of female deaths that occur during pregnancy and childbirth per 100,000 live births. Because deaths during childbirth are defined more widely in some countries, to include complications of pregnancy or the period after childbirth or of abortion, and because many pregnant women die from lack of suitable health care, maternal mortality is difficult to measure consistently and reliably across countries. Clearly, many maternal deaths go unrecorded, particularly in countries with remote rural populations. This may account for some of the low estimates shown in the table, especially for several African countries. The data are drawn from diverse national sources. Where national administrative systems are weak, estimates are derived from demographic and health surveys using indirect estimation techniques or from other national sample surveys. For a number of developing countries, maternal mortality estimates are derived by the WHO and the United Nations Children's Fund (UNICEF) using statistical modeling techniques.

All summary measures, except for infant mortality, are weighted by population or by subgroups of the population. Infant mortality is weighted by the number of births.

Table 7. Education

Primary school enrollment data are estimates of the ratio of children of all ages enrolled in primary school to the country's population of primary school-age children. Although

many countries consider primary school age to be 6 to 11 years, others use different age groups. Gross enrollment ratios may exceed 100 percent because some pupils are younger or older than the country's standard primary school age.

Secondary school enrollment data are calculated in the same manner, and again the definition of secondary school age differs among countries. It is most commonly considered to be 12 to 17 years. Late entry of students as well as repetition and the phenomenon of "bunching" in final grades can influence these ratios.

Tertiary enrollment data are calculated by dividing the number of pupils enrolled in all postsecondary schools and universities by the population age 20 to 24, although people above and below this age group may be registered in tertiary institutions.

Percentage of cohort reaching grade 4 is the proportion of children starting primary school in 1980 and 1988 who continued to the fourth grade by 1983 and 1991, respectively. Figures in italics represent earlier or later cohorts.

Data on enrollment flows are compiled by UNESCO from reports by national authorities.

Adult illiteracy is defined as the proportion of the population age 15 years and older who cannot, with understanding, read and write a short, simple statement on their everyday life. This is only one of three widely accepted definitions, and its application is subject to qualifiers in a number of countries. The data are from the illiteracy estimates and projections prepared by UNESCO.

The summary enrollment measures in this table are weighted by population.

Table 8. Commercial energy use

Total energy use refers to domestic primary energy use before transformation to other end-use fuels (such as electricity and refined petroleum products) and is calculated as indigenous production plus imports and stock changes, minus exports and international marine bunkers. Energy consumption also includes products for nonenergy uses, mainly derived from petroleum. The use of firewood, dried animal excrement, and other traditional fuels, although substantial in some developing countries, is not taken into account, because reliable and comprehensive data are not available.

Energy use per capita is based on total population estimates in the years shown.

GDP per kilogram of commercial energy use is the U.S. dollar estimate of GDP produced (at constant 1987 prices) per kilogram of oil equivalent.

To calculate *net energy imports as a percentage of energy consumption*, both imports and consumption are measured in oil equivalents. A negative sign indicates that the country is a net exporter.

Data on commercial energy use come primarily from the International Energy Agency and the U.N. *Energy Statistics Yearbook*. They refer to commercial forms of primary energy—petroleum (crude oil, natural gas liquids, and oil from unconventional sources), natural gas, solid fuels (coal, lignite, and other derived fuels), and primary electricity (nuclear, hydroelectric, geothermal, and other)—all converted into oil equivalents. For converting nuclear electricity into oil equivalents, a notional thermal efficiency of 33 percent is assumed; hydroelectric power is represented at 100 percent efficiency.

Carbon dioxide emissions measures industrial contributions to the carbon dioxide flux from solid fuels, liquid fuels, gas fuels, gas flaring, and cement manufacture. The data are based on several sources as reported by the World Resources Institute. The main source is the Carbon Dioxide Information Analysis Center (CDIAC), Environmental Science Division, Oak Ridge National Laboratory.

CDIAC annually calculates emissions of carbon dioxide from the burning of fossil fuels and the manufacture of cement for most countries of the world. These calculations are based on data on the net apparent consumption of fossil fuels from the World Energy Data Set maintained by the U.N. Statistical Division, and from data on world cement manufacture based on the Cement Manufacturing Data Set maintained by the U.S. Bureau of Mines. Emissions are calculated using global average fuel chemistry and usage. Estimates do not include bunker fuels used in international transport because of the difficulty of apportioning these fuels among the countries benefiting from that transport. Although the estimates of world emissions are probably within 10 percent of actual emissions, estimates for individual countries may have larger error bounds.

Summary measures for total energy use and carbon dioxide emissions are simple totals. The summary growth rates are computed from the group totals using the least-squares method. For energy consumption per capita and carbon dioxide emissions per capita, population weights are used to compute group averages.

Table 9. Land use and urbanization

Cropland includes land used to cultivate temporary and permanent crops, temporary meadows, market and kitchen gardens, and land that is temporarily fallow. Permanent crops are those that do not need to be replanted after each harvest, excluding land used to grow trees for wood or timber.

Permanent pasture is land used for five or more years for forage, including natural crops and cultivated crops. Only a few countries regularly report data on permanent pasture, as this category is difficult to assess because it includes wild land used for pasture.

Other land includes forest and woodland and the land under natural or planted stands of trees, as well as logged-over areas that will be forested in the near future. It also includes uncultivated land, grassland not used for pasture, wetlands, wastelands, and built-up areas. Built-up areas are residential, recreational, and industrial lands and areas covered by roads and other fabricated infrastructure.

Data on land use are from the Food and Agriculture Organization (FAO), which gathers these data from national agencies through annual questionnaires and national agricultural censuses. However, countries sometimes use different definitions of land use. The FAO often adjusts the definitions of land use categories and sometimes substantially revises earlier data. Because data on land use reflect changes in data reporting procedures as well as actual land use changes, apparent trends should be interpreted with caution. Most land use data are from 1994.

Urban population is the midyear population of areas defined as urban in each country. The definition varies slightly from country to country.

Population in urban agglomerations of 1 million or more is expressed as the percentage of a country's population living in metropolitan areas that in 1990 had a population of 1 million or more people.

Estimates of the urban population come from the United Nations' *World Urbanization Prospects: The 1994 Revision*. To compute the growth rate of the urban population, the United Nations' ratio of urban to total population is first applied to the World Bank's estimates of total population (Table 4). The resulting series of urban population estimates are also used to compute the population in urban agglomerations as a percentage of the urban population. Because the estimates in this table are based on different national definitions of what is urban, cross-country comparisons should be made with caution.

The summary measures for urban population as a percentage of total population are calculated from country percentages weighted by each country's share in the aggregate population. The other summary measures are weighted in the same fashion, using the urban population.

Table 10. Forest and water resources

Forest areas refers to natural stands of woody vegetation in which trees predominate.

Annual deforestation refers to the permanent conversion of forestland to other uses, including shifting cultivation, permanent agriculture, ranching, settlements, or infrastructure development. Deforested areas do not include areas logged but intended for regeneration or areas degraded by fuelwood gathering, acid precipitation, or forest fires. The extent and percentage of total area shown refer to the average annual deforestation of natural forest area.

Estimates of forest area are derived from country statistics assembled by the FAO and the United Nations Economic Commission for Europe (UNECE). In 1993 new assessments were published for tropical countries by the FAO and for temperate zones jointly by the UNECE and the FAO—but with different definitions. The FAO defines natural forest in tropical countries either as closed forest, where trees cover a large portion of the ground with no continuous grass cover, or as open forest, a mix of forest and grassland with at least 10 percent tree cover and a continuous grass layer on the forest floor. The UNECE-FAO assessment defines a forest as land where tree crowns cover more than 20 percent of the area. Also included are open forest formations; forest roads and firebreaks; small, temporarily cleared areas; young stands expected to achieve at least 20 percent crown cover on maturity; and windbreaks and shelter belts.

Nationally protected areas refers to areas of at least 1,000 hectares that fall into one of five management categories: scientific reserves and strict nature reserves; national parks of national or international significance (not materially affected by human activity); natural monuments and natural landscapes with some unique aspects; managed nature reserves and wildlife sanctuaries; and protected landscapes and seascapes (which may include cultural landscapes). This table does not include sites protected under local or provincial law or areas where consumptive uses of wildlife are allowed. The data are subject to variations in definition and in reporting to the organizations, such as the World Conservation Monitoring Centre, that compile and disseminate them.

Annual freshwater withdrawal refers to total water withdrawal, not counting evaporation losses from storage basins. Withdrawals also include water from desalination plants in countries where that source is a significant part of all water withdrawal. Withdrawal data are for single years between 1970 and 1995. Withdrawals can exceed 100 percent of renewable supplies when extractions from nonrenewable aquifers or desalination plants are considerable or if there is significant water reuse. Data are expressed as totals and as a percentage of total freshwater resources, which include both internal renewable resources and, where noted in the table, river flows from other countries. Internal renewable water resources include flows of rivers and groundwater from rainfall in the country.

Freshwater withdrawal per capita is calculated by dividing a country's total withdrawal by its population in the year for which withdrawal estimates are available. For most countries, data on sectoral withdrawal per capita are calculated using sectoral withdrawal percentages estimated for 1987 to 1995. *Domestic use* includes drinking water, municipal use or supply, and use for public services, com-

mercial establishments, and homes. *Other* withdrawals are those for direct industrial use, including withdrawals for cooling thermoelectric plants and for agriculture (irrigation and livestock production).

Data on annual freshwater withdrawal are subject to variation in collection and estimation methods but are indicative of the magnitude of water use in both total and per capita terms. These data, however, also hide what can be significant variations in total renewable water resources from one year to another. They also fail to distinguish the seasonal and geographic variations in water availability within a country. Because freshwater resources are based on long-term averages, their estimation explicitly excludes decade-long cycles of wet and dry. The data for water indicators were compiled by the World Resources Institute from various sources and published in *World Resources 1996–97*. The Département Hydrogéologie in Orléans, France, compiles water resource and withdrawal data from published documents, including national, U.N., and professional literature. The Institute of Geography at the National Academy of Sciences in Moscow also compiles global water data on the basis of published work and, where necessary, estimates water resources and consumption from models that use other data, such as area under irrigation, livestock populations, and precipitation. Data for small countries and countries in arid and semiarid zones are less reliable than those for larger countries and countries with more rainfall.

Table 11. Growth of the economy

Gross domestic product at purchasers' prices is the sum of the gross value added by all resident and nonresident producers in the economy plus any taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

The *GDP deflator* is calculated implicitly as the ratio of current-price GDP to constant-price GDP. The GDP deflator is the most broadly based measure of changes in the overall price level. (See also the note to Table 2.)

Agriculture comprises value added from forestry, hunting, and fishing as well as cultivation of crops and livestock production. In developing countries with high levels of subsistence farming, much agricultural production is either not exchanged or not exchanged for money. This increases the difficulty of measuring the contribution of agriculture to GDP and reduces the reliability and comparability of such numbers.

Industry comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas.

Manufacturing refers to industries belonging to divisions 15–37 in the International Standard Industrial Classification, Revision 2.

Services includes value added in all other branches of economic activity, such as wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies arising from rescaling.

Exports of goods and services represents the value of all goods and other market services provided to the world. Included is the value of merchandise, freight, insurance, travel, and other nonfactor services. Factor and property income (formerly called factor services), such as investment income, interest, and labor income, is excluded. Transfer payments are excluded from the calculation of GDP.

Growth rates of GDP and its components are calculated using constant-price data in the local currency. Regional and income group growth rates are calculated after converting local currencies to U.S. dollars using the World Bank's International Economics Department (IEC) conversion factor. Growth rates are estimated by fitting a linear trend line to the logarithmic annual values of the given variable using the least-squares growth rate method. This produces an average growth rate that corresponds to a model of periodic compound growth. The least-squares growth rate method and the IEC conversion factor are described in the section on Statistical methods.

In calculating the summary measures, constant 1987 U.S. dollar values for each indicator are calculated for each year of the periods covered, and the values are aggregated across countries for each year. The least-squares procedure is used to compute the aggregate growth rates.

Table 12. Structure of the economy: production

The definitions of GDP and its components are those of the U.N. System of National Accounts (SNA), Series F, No. 2, Version 3. Version 4 of the SNA was completed only in 1993, and it is likely that many countries will continue to use the recommendations of Version 3 for the next few years. Estimates are obtained from national sources, sometimes reaching the World Bank through other international agencies but more often collected by World Bank staff. For definitions of specific components, see the technical note to Table 11.

National accounts data for developing countries are collected from national statistical organizations and central banks by visiting and resident World Bank missions. Data for industrial countries come from OECD data files.

For information on the OECD national accounts series see OECD, *National Accounts, 1960–1994*, volumes 1 and 2. The complete set of national accounts time series is available on the *World Development Indicators CD-ROM*.

World Bank staff review the quality of national accounts data and, in some instances, adjust national series. Because of the sometimes limited capabilities of statistical offices and basic data problems, strict international comparability cannot be achieved, especially in economic activities that are difficult to measure, such as parallel market transactions, the informal sector, and subsistence agriculture.

The figures for GDP are U.S. dollar values converted from domestic currencies using single-year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used. Note that the table does not use the three-year averaging (“Atlas”) technique applied to GNP per capita in Table 1.

Summary measures are computed from group aggregates of sectoral GDP in current U.S. dollars.

Table 13. Structure of the economy: demand

General government consumption includes all current expenditures for purchases of goods and services by all levels of government, but excluding most government enterprises. Most capital expenditures on national defense and security are regarded as a general government consumption expenditure.

Private consumption is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased or received as income in kind by households and nonprofit institutions. It excludes purchases of dwellings but includes imputed rent for owner-occupied dwellings. In practice, it may include any statistical discrepancy in the use of resources.

Gross domestic investment consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories.

Gross domestic saving is calculated by deducting total consumption from GDP.

Exports of goods and services represents the value of all goods and other market services provided to the world. Included is the value of merchandise, freight, insurance, travel, and other nonfactor services. Factor and property income (formerly called factor services), such as investment income, interest, and labor income, is excluded. Transfer payments are excluded from the calculation of GDP.

Resource balance is the difference between exports of goods and services and imports of goods and services.

Summary measures in this table are computed from group aggregates of sectoral GDP in current U.S. dollars.

Table 14. Central government budget

Total revenue is derived from tax and nontax sources. *Tax revenue* comprises compulsory, unrequited, nonrepayable receipts for public purposes. It includes interest collected on tax arrears and penalties collected on nonpayment or late payment of taxes, and is shown net of refunds and other corrective transactions. *Nontax revenue* comprises receipts that are not compulsory, nonrepayable payments for public purposes, such as fines, administrative fees, or entrepreneurial income from government ownership of property. Proceeds of grants and borrowing, funds arising from the repayment of previous lending by governments, incurrence of liabilities, and proceeds from the sale of capital assets are not included.

Total expenditure comprises expenditures by all government offices, departments, establishments, and other bodies that are agencies or instruments of the central authority of a country. It includes both *current* and *capital* (development) expenditures.

Defense comprises all expenditures, whether by defense or other departments, on the maintenance of military forces, including the purchase of military supplies and equipment, construction, recruiting, and training. Also in this category are closely related items such as military aid programs. Defense does not include expenditure on public order and safety, which is classified separately.

Social services comprises expenditures on health, education, housing, welfare, social security, and community amenities. It also covers compensation for loss of income to the sick and temporarily disabled; payments to the elderly, the permanently disabled, and the unemployed; family, maternity, and child allowances; and the cost of welfare services, such as care of the aged, the disabled, and children. Many expenditures relevant to environmental defense, such as pollution abatement, water supply, sanitary affairs, and refuse collection, are included indistinguishably in this category.

Overall deficit/surplus is defined as current and capital revenue and official grants received, less total expenditure and lending minus repayments. This is a broader concept than the current government deficit or surplus shown in Table 2.

Because of differences in coverage of available data, the individual components of central government expenditure and revenue shown may not be strictly comparable across all economies.

Inadequate statistical coverage of state, provincial, and local governments requires the use of central government data; this may seriously understate or distort the statistical

portrayal of the allocation of resources for various purposes, especially in countries where lower levels of government have considerable autonomy and are responsible for many economic and social services. In addition, "central government" can mean either of two accounting concepts: consolidated or budgetary. For most countries, central government finance data have been consolidated into one overall account, but for others only the budgetary central government accounts are available. Because budgetary accounts do not always include all central government units, the overall picture of central government activities is usually incomplete. The concept employed by the reporting country is noted in the Key and Primary Data Documentation table.

In general, the data presented, especially those for social services, are not comparable across countries. In many economies, private health and education services are substantial; in others, public services represent the major component of total expenditure but may be financed by lower levels of government. Caution should therefore be exercised in using the data for cross-country comparisons.

Data on central government revenues and expenditures are from the IMF's *Government Finance Statistics Yearbook* (1995) and IMF data files. The accounts of each country are reported using the system of common definitions and classifications found in the IMF's *A Manual on Government Finance Statistics* (1986). For complete and authoritative explanations of concepts, definitions, and data sources, see these IMF sources.

Table 15. Exports and imports of merchandise

Merchandise *exports* and *imports*, with some exceptions, covers international movements of goods across customs' borders; trade in services is not included. Exports are valued f.o.b. (free on board) and imports c.i.f. (cost plus insurance and freight) unless otherwise specified in the foregoing sources. These values are in current U.S. dollars.

The categorization of exports and imports follows the Standard International Trade Classification (SITC), Series M, No. 34, Revision 1. *Manufactures* are commodities classified in Sections 5 through 9, excluding Division 68 (nonferrous metals). *Food* commodities are those in SITC Sections 0, 1, and 4 and Division 22 (food and live animals, beverages and tobacco, animal and vegetable oils and fats, oilseeds, oil nuts, and oil kernels). *Fuels* are the commodities in SITC Section 3 (mineral fuels, lubricants, and related materials). For some countries, data for certain commodity categories are unavailable.

Average annual growth rates of exports and imports are calculated from values at constant prices, which are derived from current values deflated by the relevant price index. The World Bank uses the price indexes produced

by UNCTAD for low- and middle-income economies, and those presented in the IMF's *International Financial Statistics* for high-income economies. These growth rates can differ from those derived from national sources because national price indexes may use different base years and weighting procedures from those used by UNCTAD or the IMF.

The main source of current trade values is the UNCTAD trade data base, supplemented by the data from the IMF's *International Financial Statistics*, the U.N.'s Commodity Trade (COMTRADE) data base, and World Bank estimates. The shares in these tables are derived from trade values in current dollars reported in the UNCTAD trade data system, supplemented by data from the U.N. COMTRADE system.

The summary measures for the growth rates are calculated by aggregating the 1987 constant U.S. dollar price series for each year and then applying the least-squares growth rate procedure for the periods shown.

Table 16. Balance of payments

Exports and imports of goods, services, and income comprise all transactions involving a change of ownership of goods and services between residents of a country and the rest of the world, including merchandise, services, and income. Receipts of compensation to employees by, and investment income from, nonresident entities are treated as exports; payments to residents by nonresidents are treated as imports.

Net workers' remittances covers payments and receipts of income by migrants who are employed or expect to be employed for more than a year in their new economy, where they are considered residents. These remittances are classified as private unrequited transfers, whereas those derived from shorter-term stays are included in services as labor income. The distinction accords with internationally agreed guidelines, but some developing countries classify workers' remittances as a factor income receipt (hence a component of GNP). The World Bank adheres to international guidelines in defining GNP, and therefore its definitions may differ from national practices.

Other net transfers comprises net unrequited transfers other than workers' remittances.

The *current account balance* is the sum of net exports of goods and services and net transfers.

Gross international reserves comprises holdings of monetary gold, special drawing rights (SDRs), the reserve position of members in the IMF, and holdings of foreign exchange under the control of monetary authorities. The gold component of these reserves is valued at year-end (December 31) London prices (\$589.50 an ounce in 1980 and \$386.75 an ounce in 1995). Because of differences in

the definition of international reserves, in the valuation of gold, and in reserve management practices, the levels of reserve holdings published in national sources may not be strictly comparable. The reserve levels for 1980 and 1995 refer to the end of the year indicated and are in current U.S. dollars at prevailing exchange rates. See Table 2 for reserve holdings expressed as months of import coverage.

The data for this table are based upon IMF data files. World Bank staff also make estimates and, in rare instances, adjust coverage or classification to enhance comparability between the national accounts and the balance of payments. Definitions and concepts are based on the IMF's *Balance of Payments Manual, Fifth Edition* (1993). Values are in U.S. dollars converted at official exchange rates.

The summary measures are computed from group aggregates for gross international reserves.

Table 17. External debt

Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt. Long-term debt has three components: public, publicly guaranteed, and private nonguaranteed loans. Public loans are external obligations of public debtors, including the national government, its agencies, and autonomous public bodies. Publicly guaranteed loans are external obligations of private debtors that are guaranteed for repayment by a public entity. Private nonguaranteed loans are external obligations of private debtors that are not guaranteed for repayment by a public entity. Use of IMF credit denotes repurchase obligations to the IMF for all uses of IMF resources, excluding those resulting from drawings in the reserve tranche. It comprises purchases outstanding under the credit tranches, including enlarged access resources, and all special facilities (the buffer stock, compensatory financing, extended fund, and oil facilities), trust fund loans, and operations under the enhanced structural adjustment facilities. Use of IMF credit outstanding at year-end (a stock) is converted to U.S. dollars at the dollar-SDR exchange rate then in effect. Short-term debt is debt with an original maturity of one year or less. It includes interest arrears on long-term debt outstanding and disbursed that are due but not paid on a cumulative basis. Available data permit no distinction between public and private nonguaranteed short-term debt.

External debt as a percentage of GNP and of *exports of goods and services* are calculated in U.S. dollars. Workers' remittances are included in exports of goods and services.

Debt service as a percentage of exports of goods and services is the sum of principal repayments and interest payments on total external debt. It is one of several conventional

measures used to assess a country's ability to service debt. Workers' remittances are included in exports of goods and services.

The *ratio of present value to nominal value of debt* is the discounted value of future debt service payments divided by the face value of total external debt. The present value of external debt is the discounted sum of all debt service payments due over the life of existing loans. The present value can be higher or lower than the nominal value of debt. The determining factors for the present value being above or below par are the interest rates on loans and the discount rate used in the present value calculation. A loan with an interest rate higher than the discount rate yields a present value that is larger than the nominal value of debt; the opposite holds for loans with an interest rate lower than the discount rate.

The discount rates used to calculate the present value are interest rates charged by OECD countries for officially supported export credits. The rates are specified for the Group of Seven (G-7) currencies: British pounds, Canadian dollars, French francs, German marks, Italian lire, Japanese yen, and U.S. dollars. International Bank for Reconstruction and Development (IBRD) loans and International Development Association (IDA) credits are discounted at the most recent IBRD lending rate, and IMF loans are discounted at the SDR lending rate. For debt denominated in other currencies, discount rates are the average of interest rates on export credits charged by other OECD countries. For variable rate loans, for which future debt service payments cannot be precisely determined, debt service is calculated using the end-1994 rates for the base period specified for the loan.

Multilateral debt as a percentage of total external debt conveys information about the borrower's receipt of aid from the World Bank, regional development banks, and other multilateral and intergovernmental agencies. Excluded are loans from funds administered by an international organization on behalf of a single donor government.

The data on debt in this table come from the World Bank Debtor Reporting System, supplemented by World Bank estimates. The system is concerned solely with developing economies and does not collect data on external debt for other groups of borrowers or for economies that are not members of the World Bank. Debt is stated in U.S. dollars converted at official exchange rates. The data on debt include private nonguaranteed debt reported by thirty developing countries and complete or partial estimates for an additional twenty that do not report but for which this type of debt is known to be significant.

The summary measures are taken from the World Bank's *Global Development Finance 1997*.

Statistical methods

This section describes the calculation of the least-squares growth rate, the exponential (end-point) growth rate, the Gini index, and the World Bank's Atlas methodology for estimating the conversion factor used to estimate GNP and GNP per capita in U.S. dollars.

Least-squares growth rate

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

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

which is equivalent to the logarithmic transformation of the geometric growth rate equation:

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

In these equations, X is the variable, t is time, and $a = \log X_0$ and $b = \log(1 + r)$ are the parameters to be estimated. If b^* is the least-squares estimate of b , then the average annual growth rate, r , is obtained as $[\text{antilog}(b^*) - 1]$ 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 period. It does not necessarily match the actual growth rate between any two periods. Assuming that geometric growth is the appropriate way of modeling the data, the least-squares estimate of the growth rate is consistent and efficient.

Exponential end-point 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, respectively, 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. To obtain a growth rate for discrete periods comparable to the least-squares growth rate, one takes the antilog of the calculated growth rate and subtracts 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 econ-

omy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative percentage 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 presents perfect equality, whereas an index of 100 percent implies maximum inequality.

The World Bank employs a numerical analysis program, POVCAL, to estimate values of the Gini index; see Chen, Datt, and Ravallion 1992.

World Bank Atlas method

The Atlas conversion factor for any year is the average of a country's exchange rate (or alternative conversion factor) for that year and its exchange rates for the two preceding years, after adjustment for differences in rates of inflation between the country in question and the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States). The inflation rate for the G-5 countries is represented by changes in the SDR deflators. This three-year averaging smooths annual fluctuations in prices and exchange rates for each country. The Atlas conversion factor is applied to the country's GNP. The resulting GNP in U.S. dollars is divided by the midyear population for the latest of the three years to derive GNP per capita.

The following formulas describe the procedures for computing the 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:

Y_t = current GNP (in local currency) for year t ;

p_t = GNP deflator for year t ;

e_t = average annual exchange rate (units of national currency per U.S. dollar) for year t ;

N_t = midyear population for year t ;

p_t^{SS} = SDR deflator in U.S. dollar terms 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 Key and Primary Data Documentation table). Alternative conversion factors are used in the Atlas method and elsewhere in the *World Development Indicators* as single-year conversion factors.