Technical Notes

These technical notes discuss the sources and methods used to compile the 120 indicators included in the 1996 Selected World Development Indicators. Notes on specific indicators are arranged by table heading and, within each table, by order of appearance of the indicator.

The 133 economies included in the main tables are listed in ascending order of GNP per capita. A separate table (Table 1a) shows basic indicators for seventy-six economies that have sparse data or have populations of fewer than 1 million.

Sources

Indicators published here are based on data compiled by the World Bank from a variety of sources. 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 (U.N.) and 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 staff to ensure conformity with international definitions and concepts, consistency, and currentness. 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 table and with the indicator notes below.

Data consistency and reliability

Considerable effort has been made to standardize the data, but full comparability cannot be ensured, 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 among countries; and cross-country and cross-time 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 from the *World*Data 1995 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.

Ratios and growth rates

For ease of reference, only ratios and rates of growth are usually shown. Absolute values are generally available from other World Bank publications, notably the 1995 edition of the *World Tables* and *World*Data 1995 CD-ROM.* Most growth rates are calculated for two periods, 1980–90 and 1990–94, and are computed, unless otherwise noted, by using the least-squares regression method. (See notes on statistical methods below.) Because this method takes into account all available observations in 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 years or periods other than those specified—up to two years on either side of 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 of time.

Constant price series

To facilitate international comparisons and include 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 the 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 gross domestic product (GDP) by industrial origin are individually rescaled and summed to provide the rescaled GDP. In this process a rescaling deviation may occur between the constant price GDP by industrial origin and the constant price GDP by expenditure. Such rescaling deviations are absorbed under the heading *private consumption, etc.* on the assumption that GDP by industrial origin is a more reliable estimate than GDP by expenditure. Independently 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 in 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 notes on specific indicators for more information.

For summary measures that cover many years, the calculation is based on the same country composition over time. The methodology permits group measures to be compiled only if the country data available for a given year account for at least two-thirds of the full group, as defined by the 1987 benchmarks. As long as that criterion is met, missing reporters are assumed to behave like those that provide estimates. Readers should keep in mind that the goal of the summary measures is to provide representative aggregates for each topic, despite myriad problems with country data, 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.

Total population estimates are for mid-1994. See the Key table and notes to Table 4 for additional information on the definition and sources of population estimates.

Area data come from the Food and Agriculture Organization (FAO). Area is the total surface area, measured in square kilometers, comprising land area and inland waters.

GNP per capita: Gross national product (GNP) in U.S. dollars is calculated using the *World Bank Atlas* method, which is described in the section on statistical methods at the end of these notes.

GNP measures the total domestic and foreign value added claimed by residents. It comprises GDP (see Table 12) plus net factor income from abroad, which is the income residents receive from abroad for factor services (labor and capital) less similar payments made to nonresidents who contribute to the domestic economy. GNP per capita is calculated using the resident population in the corresponding year.

GNP per capita is a useful measure of average economic productivity but does not, by itself, measure welfare or success in development. It does not distinguish between the aims and ultimate uses of a given product, nor does it say whether a product merely offsets some natural or other obstacle, or harms or contributes to general welfare. More generally, GNP does not deal adequately with environmental costs and benefits, particularly those associated with natural resource use. The World Bank has joined with others to see how national accounts might provide insights into these issues. "Satellite" accounts that delve into practical and conceptual difficulties (such as assigning a meaningful economic value to resources that markets do not yet perceive as "scarce" and allocating costs that are essentially global within a framework that is national) have been included in the 1993 revision of the *System of National Accounts* (SNA). This will provide a framework within which national accountants can consider environmental factors in estimating alternative measures of income.

In estimating GNP per capita, the World Bank recognizes that perfect cross-country comparability of GNP per capita estimates cannot be achieved. Beyond the classic, strictly intractable, index number problem, two obstacles stand in the way. One concerns the GNP and population estimates themselves. There are differences in national accounting and demographic reporting systems and in the coverage and reliability of underlying statistical information among various countries. The other obstacle is the use of official exchange rates for converting GNP data expressed in different national currencies to a common denomination—conventionally the U.S. dollar—to compare them across countries.

Recognizing that these shortcomings affect the comparability of the GNP per capita estimates, the World Bank has introduced several improvements in the estimation procedures. Through its regular review of member countries' national accounts, the Bank systematically evaluates the GNP estimates, focusing on the coverage and concepts employed and, where appropriate, making adjustments to improve comparability. As part of the review

process, World Bank staff make estimates of GNP (and sometimes of population).

The World Bank also 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 applies to only a small number of countries. Using either the official or the alternative conversion factor, GNP per capita is calculated using the *World Bank Atlas* method. Because of unresolved problems associated with the availability of comparable data and the determination of conversion factors, information on GNP per capita is not shown for some economies.

Some sixty low- and middle-income economies suffered declining real GNP per capita during the late 1980s and early 1990s. In addition, significant fluctuations in currency values and the terms of trade and the time lag between exchange rate movements and domestic price adjustments have affected relative income levels. For this reason, the levels and ranking of GNP per capita estimates, calculated by the *Atlas* method, have sometimes changed in ways not necessarily related to the relative domestic growth performance of the economies.

Purchasing power parity (PPP) estimates of GNP per capita: the U. N. International Comparison Programme (ICP) has developed measures of GDP on an internationally comparable scale, using purchasing power parities instead of exchange rates as conversion factors. The PPP conversion factor is defined as the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as one dollar would buy in the United States.

The ICP collects average domestic prices of representative products included in each participating country's national accounts through special price surveys and derives its PPP in relation to the average international prices that are implicitly derived from the prices of all participating countries. In Table 1, the most recent ICP estimates are expressed in GNP terms rather than in GDP terms to make them consistent with *World Bank Atlas*–based estimates.

Information on the ICP has been published in a number of other reports. The most recent report is for 1993, part of which has already been published by the Organisation for Economic Co-operation and Development (OECD). To obtain the estimates shown here, several sets of data were employed. The data include (a) results of the ICP for 1993 for OECD, Eastern Europe, and FSU countries extrapolated backward to 1987; (b) results for 1985 for non-OECD countries, extrapolated to 1987; (c) the latest available results for either 1980 or 1975 extrapolated to 1987 for countries that participated in the earlier phases only; (d) World Bank estimates for China, and (e) ICP estimates obtained by regression for the remaining countries. These estimates are expressed as an index (U.S.=100 in column 5). Economies whose 1987 estimates are based on regressions are footnoted.

This blend of extrapolated and regression-based 1987 figures was extrapolated to 1994, using World Bank estimates of real GNP per capita growth rates, and scaled up by inflation rates measured by SDR deflators. These estimates are expressed as an index (U.S.=100) in columns 5 and 6. Economies whose 1987 figures are extrapolated from another year or imputed by regression are footnoted accordingly. The adjustments do not take account of changes in the terms of trade.

The estimates of GNP per capita shown in column 8 are stated in *international dollars* by applying the PPP conversion factor to local currency GNP and then dividing by the midyear population. The international dollar, used as the common currency, is the unit of account that equalizes price levels in all participating countries. It has the same purchasing power over total GNP as the U.S. dollar in a given year, but purchasing power over subaggregates is determined by average international prices at that level rather than by U.S. relative prices.

For further details on ICP procedures, readers may consult the ICP Phase IV report, *World Comparisons of Purchasing Power and Real Product for 1980* (New York: United Nations, 1986). Readers interested in detailed ICP survey data for 1975, 1980, 1985, and 1990 may refer to *Purchasing Power of Currencies: Comparing National Incomes Using ICP Data* (World Bank, 1993).

Life expectancy at birth indicates 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. The data are from a variety of sources, including national statistical offices, demographic and health surveys, censuses, the U.N. Population Division, and the World Bank.

Adult illiteracy: see Table 7.

The summary measures for GNP per capita, life expectancy, and adult illiteracy in Table 1 are weighted by population.

Table 2. Macroeconomic indicators

The principal sources of the data in Table 2 are the IMF's *Government Finance Statistics* (GFS) and *International Financial Statistics* (IFS). Data on GNP, GDP, and total external debt come from the World Bank's data files.

Central government current deficit/surplus is defined as current revenue of the central government less current expenditure. Note that grants are excluded. This is a useful measure of the government's own fiscal capacity. The

overall deficit/surplus, including grants and the capital account, is shown in Table 14.

Money, broadly defined, comes from the IFS. Broadly defined money comprises most liabilities of a country's monetary institutions to residents other than the central government. For most countries, broadly defined money is the sum of money (IFS line 34) and quasi-money (IFS line 35). Money comprises the economy's means of payment: currency 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 resident sectors other than those of the central government. Where nonmonetary financial institutions are important issuers of quasi-monetary liabilities, these are often included in the measure of broadly defined money. The *average annual nominal growth rate of broadly defined money* 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 of broadly defined money outstanding as a percentage of GDP.*

The *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 the banks on loans to prime customers. The data are of limited international comparability, partly because coverage and definitions vary. Interest rates (and growth rates for broadly defined money) are expressed in nominal terms; therefore, much of the variation among countries stems from differences in inflation.

The *average annual rate of 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 then used to calculate the growth rate of the GDP deflator for the period. This measure of inflation, like any other, has limitations but is the most broadly based measure, showing annual price movements for all goods and services produced in an economy.

The *current account balance before official transfers* is the sum of net exports of goods, services, and private transfers. Net official transfers are excluded. See also Table 16.

Gross international reserves comprise 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. 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 *net present value of total external debt* is the discounted sum of all debt service payments due over the life of existing loans in current prices. To estimate the ratio to GNP, the debt figures are converted into U.S. dollars from currencies of repayment at end-of-year official exchange rates, and GNP is converted from national currencies to U.S. dollars by applying the conversion procedure described in the technical note for Table 12.

The summary measures are computed from group aggregates for gross international reserves and total imports of goods and services in current dollars.

Table 3. External economic indicators

Data in this table reflect a country's openness to international markets and its potential vulnerability to changes in export prices, international interest rates, and the availability of private capital flows and official development assistance.

The *terms of trade*, or the net barter terms of trade, measure the relative movement of export prices against that of import prices. Calculated as the ratio of a country's index of average export prices to its average import price index, this indicator shows changes over a base year in the level of export prices as a percentage of import prices. The terms of trade index numbers are shown for 1985 and 1994, where 1987 = 100. The data come from the U.N. Conference on Trade and Development (UNCTAD) data base and the IMF's *International Financial Statistics.* See also Table 15.

The *export concentration index* is taken from UNCTAD's *Handbook of International Trade and Development Statistics.* The index measures the degree to which a country's exports are concentrated in, or diversified among, SITC (Revision 2) three-digit level commodities. The index is calculated using the Hirschman or Herfindahl methodology: the shares of exports in each commodity are squared summed; the index is the square root of the sum, normalized to a range of zero to one (maximum concentration). An interesting interpretation is that the inverse of the index represents the equivalent number of commodities, each having equal-sized shares, that the country trades. There are 239 commodities identified at the three-digit level in the SITC Revision 2.

Aggregate net resource flows are the sum of net flows on long-term debt (excluding use of IMF credit), plus official grants (excluding technical assistance), net foreign direct investment, and net portfolio equity flows. Total net flows on long-term debt are disbursements less the repayment of principal on public, publicly guaranteed, and private nonguaranteed 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.

Net private capital flows consist of private debt and nondebt flows. Private debt flows include commercial bank

lending, bonds, and other private credits; nondebt private flows are net foreign direct investment and portfolio investment.

Official development assistance (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. In order to qualify as ODA, each 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.

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

Table 4. Population and labor force

Population and labor force data provide a basic profile of the demographic trends in a country.

Population estimates for mid-1994 are from a variety of sources, including the U.N. Population Division, national statistical offices, and World Bank country departments. (See also the notes in the Key table.) The World Bank uses the de facto definition of a country's population, which counts all residents regardless of legal status or citizenship. Note, however, that refugees not permanently settled in the country of asylum are generally considered to be part of the population of their country of origin.

The *average annual growth rate* of population is computed from end-point data using an exponential growth model. See the section on statistical methods for more information.

Age structure of the population shows the proportion of the total population between the ages of fifteen and sixty-four inclusively.

Total labor force estimates are derived by applying participation rates from the International Labour Office (ILO) to the population estimates. They cover the so-called economically active population, a restrictive concept that includes the armed forces and the unemployed but excludes homemakers and other unpaid caregivers.

Percentage of females in the total labor force is from ILO data. This indicator shows the extent to which women are "gainfully employed" in the formal sector. Labor force numbers in several developing countries reflect a significant underestimation of female participation rates.

The *structure of labor force* shows the share of the labor force engaged in agricultural and industrial activities. The agricultural labor force includes people engaged in farming, forestry, hunting, and fishing. The industrial labor force includes people working in the mining, manufacturing, construction, and electricity, water, and gas industries.

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

Table 5. Distribution of income or consumption

The table describes the distribution of income or consumption expenditures accruing to subgroups of the population in sixty-five low- and middle-income countries and twenty high-income countries. Because the subgroups are ranked by per capita income or expenditure or, in the case of high-income countries, by household income, the resulting shares indicate the extent to which the distribution of income or consumption expenditures in each country differs from strict equality.

Survey year is the year in which the underlying data were collected. The data sets refer to different years between 1985 and 1994 and are drawn from nationally representative household surveys.

The *Gini index* is a summary measure of the extent to which the actual distribution of income or consumption differs from a hypothetical uniform distribution in which each person or household receives an identical share. The Gini index has a maximum value of 100 percent, indicating that one person or household receives everything, and a minimum value of zero, indicating absolute equality. The Gini index is the most popular measure of inequality, but it is not a very discriminating indicator. For example, when the underlying Lorenz (income distribution) curves cross, countries with different income distributions may have the same index value. See the section on statistical methods for more information.

The following columns report the *percentage share of income or consumption* by quintiles and deciles of the population. Income distribution data for low- and middle-income countries have been compiled from two main sources: government statistical agencies and the World Bank. Where the original unit record data from the household survey were available, these have been used to calculate directly 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 countries have been adjusted for household size, thus providing a more consistent measure of income or consumption per capita. No adjustment has been made for spatial cost-of-living differences within countries, because the data needed for such calculations are not generally available. For further details on both the data and the estimation methodology for low- and middle-income countries, see Martin Ravallion and Shaohua Chen (1996).

The data for Australia, Canada, Israel, Italy, Norway, Sweden, Switzerland, and the United States are from the

Luxembourg Income Study data base (1990); those for France, Germany, Netherlands, Spain, and the United Kingdom are from the Statistical Office of the European Union. The data for Belgium, Denmark, Finland, Japan, and New Zealand come from the U.N., *National Accounts Statistics: Compendium of Income Distribution Statistics, 1985.* Data for other high-income countries come from national sources.

There are significant comparability problems across countries in the income distribution data presented here. The underlying household surveys are not fully comparable, although these problems are diminishing as survey methodologies both improve and become more standardized, particularly through the initiatives of the United Nations (under the Household Survey Capability Program) and the World Bank (under the Living Standard Measurement Study and the Social Dimensions of Adjustment Project for Sub-Saharan Africa). The following three sources of noncomparability ought to be noted. First, the surveys differ in the use of income or consumption expenditure as the living standard indicator. For thirty-nine of the sixty-five low- and middle-income countries, the data refer to consumption expenditure. Typically, income is more unequally distributed than consumption. Second, the surveys differ in the use of the household or the individual as their unit of observation. Further, household units differ in the number of household members and the extent of income sharing among members. Individuals differ in age and need for consumption. Where households are used as the observation unit, the quintiles refer to the percentage of households, rather than the percentage of persons. Third, the surveys differ according to whether the units of observation are ranked by household or income (or consumption) per capita. The footnotes to the table identify these differences for each country.

The international comparability of high-income country data is particularly limited, because the observation unit is 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, where household members are ranked by the average disposable income per adult-equivalent person. The estimates in the table, therefore, should be treated with considerable caution.

Table 6. Health

This table provides selected indicators of the prevailing health infrastructure and the health status of the population.

Access to health care is measured by the percentage of the population that can reach local health services by the usual means of transportation in no more than one hour. Note that facilities tend to be concentrated in urban areas. In some cases, rural areas may have a much lower level of access.

Population with access to safe water is the percentage of the population with reasonable access to safe water supply (including treated surface waters or untreated but uncontaminated water, such as from springs, sanitary wells, and protected boreholes). In an urban area this may be a public fountain or standpost located not more than 200 meters away. In rural areas it 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 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 one year of age per thousand live births in a given year. The data are a combination of observed values and interpolated and projected estimates. A few countries, such as the economies of the former Soviet Union, employ an atypical definition of live births that reduces the reported infant mortality rate relative to the standard (World Health Organization) definition.

Prevalence of malnutrition measures the percentage of children under five with a deficiency or an excess of nutrients that interferes with their health and genetic potential for growth. Methods of assessment vary, but the most commonly used are the following: less than 80 percent of the standard weight for age; less than minus 2 standard deviations from the fiftieth percentile of the weight-for-age reference population; and the Gomez scale of malnutrition. Note that for a few countries the figures are for children three or four years of age and younger.

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 fifteen to forty-nine. A few countries use measures relating to other age groups, especially fifteen to forty-four. Data are mainly derived from demographic and health surveys, contraceptive prevalence surveys, and World Bank country data.

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* refers to 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 World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) using 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

The data in this table refer to a variety of years, generally not more than two years distant from those specified. The data are from the U.N. Educational, Scientific, and Cultural Organization (UNESCO).

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 six to eleven years, others use different age groups. For countries with universal primary education, the gross enrollment ratios may exceed 100 percent because some pupils are younger or older than the country's standard primary school age.

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

The *tertiary enrollment ratio* is calculated by dividing the number of pupils enrolled in all postsecondary schools and universities by the population in the twenty to twenty-four age group. Pupils attending vocational schools, adult education programs, two-year community colleges, and distant education centers (primarily correspondence courses) are included. The distribution of pupils across these different types of institutions varies among countries. The youth population—that is, twenty to twenty-four years—has been adopted by UNESCO as the denominator, because it represents an average tertiary level cohort, although people above and below this age group may be registered in tertiary institutions.

The 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. The data are based on enrollment records.

Adult illiteracy is defined here as the proportion of the population fifteen 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 in 1995 by UNESCO.

The summary enrollment measures in this table are computed from country enrollment rates weighted by population.

Table 8. Commercial energy use

The data on *commercial energy use* are primarily from International Energy Agency (IEA) and U.N. sources. 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.

Total energy use refers to domestic primary energy use before transformation to other end-use fuels (such as electricity or 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 upon total population estimates in the years shown.

GDP per kilogram of commercial energy use is the U.S. dollar estimate of GDP produced per kilogram of oil equivalent.

Net energy imports as a percent of consumption: both imports and consumption are measured in oil equivalents for the purpose of calculating their ratio. A negative sign indicates that the country is a net exporter.

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

CDIAC annually calculates emissions of CO_2 from the burning of fossil fuels and the manufacture of cement for most of the 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 United Nations Statistical Division and from data on world cement manufacture based on the Cement Manufacturing Data Set maintained by the United States 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, individual country estimates may have larger error bounds.

The summary measures of energy use are computed by aggregating the respective volumes for each of the years covered by the periods and applying the least-squares growth rate procedure. For energy consumption per capita, population weights are used to compute summary measures for the specified years.

The summary measures of CO_2 emissions are computed from group aggregates. For per capita estimates, aggregate emissions and population are used.

Table 9. Land use and urbanization

The data on *land use* are compiled by the World Resources Institute (WRI). The main source, however, is the Food and Agricultural 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 the data on land use reflect changes in data reporting procedures as well as actual land use changes, apparent trends should be interprered with caution. Most land use data are from 1993.

Cropland includes land under 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, but excludes 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, which is 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. The latter refers to residential, recreational, and industrial lands and areas covered by roads and other fabricated infrastructure.

Urban population as a percentage of total population and estimates of the population in *urban agglomerations* come from the U.N.'s *World Urbanization Prospects: The 1994 Revision.* Urban agglomerations are metropolitan areas with populations of 1 million or more. To compute the *growth rate of the urban population,* the U.N.'s ratio of urban to total population is first applied to the World Bank's estimates of total population (see 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 urban population.

Table 10. Forests and water resources

This table provides information on the status of two important environmental resources. The data are drawn from sources cited in the the World Resources Institute's *World Resources 1994–95.* Perhaps even more than other data in this report, however, these data should be used with caution. Although they are indicative of major differences in resource endowments and uses among countries, true comparability is limited because of variation in data collection, statistical methods, definitions, and government resources. They have been chosen because they are available for most countries and reflect some general conditions of the environment.

Forest areas refer to natural stands of woody vegetation in which trees predominate. These estimates are derived from country statistics assembled by the FAO and the United Nations Economic Commission for Europe (UNECE). New assessments were published in 1993 for tropical countrie by FAO and for temperate zones by UNECE/FAO.

FAO and UNECE/FAO use different definitions in their assessments. The FAO defines natural forest in tropical countries as either a closed forest, where trees cover a high proportion of the ground with no continuous grass cover, or an open forest, which is defined as mixed forest and grasslands with at least 10 percent tree cover and a continuous grass layer on the forest floor. A tropical forest encompasses all stands, except plantations, and includes stands that have been degraded to some degree by agriculture, fire, logging, or acid precipitation. The UNECE/FAO 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. Plantation area is included under temperate country estimates of natural forest area. Some countries in this table also include other wooded land, defined as open woodland and scrub, shrub, and brushland.

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 fuel wood gathering, acid precipitation, or forest fires. The extent and percentage of total area shown refer to the average annual deforestation of natural forest area.

Nationally protected areas are 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. These 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. Total surface area is used to calculate the percentage of total area protected. (See Table 1.)

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 Département Hydrogéologie in Orléans, France, compiles water resource and withdrawal data from published documents, including national, United Nations, 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. These and other sources have been combined by the World Resources Institute to generate data for this table. Withdrawal data are for single years and vary from country to country between 1970 and 1994. Data for small countries and countries in arid and semiarid zones are less reliable than those for larger countries and countries with higher rainfall.

Total water resources include both internal renewable resources and, where noted, river flows from other countries. Estimates are from 1992. Annual internal renewable water resources refer to the average annual flow of rivers and aquifers generated from rainfall within the country. Withdrawals include those from nonrenewable aquifers and desalting plants but do not include losses from evaporation. Withdrawals can exceed 100 percent of renewable supplies when extractions from nonrenewable aquifers or desalting plants are considerable or if there is significant water reuse.

Total per capita water withdrawal is calculated by dividing a country's total withdrawal by its population in the year for which withdrawal estimates are available. For most countries, sectoral per capita withdrawal data are calculated using sectoral withdrawal percentages estimated for 1987 to 1992. *Domestic use* includes drinking water, municipal use or supply, and use for public services, commercial establishments, and homes. *Other withdrawals* are those for direct industrial use, including withdrawals for cooling thermoelectric plants and withdrawals for agriculture (irrigation and livestock production).

Tables 11, 12, and 13. Growth and structure of the economy

Table 11 shows the growth of gross domestic product (GDP) and its components. Table 12 shows the structure of GDP by industrial origin. Table 13 shows the corresponding structure of GDP by its uses.

Most of the definitions used 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.

World Bank staff review the quality of national accounts data and, in some instances, help 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, or subsistence agriculture.

GDP measures the total output of goods and services for final use produced by residents and nonresidents, regardless of the allocation to domestic and foreign claims. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. International comparability of the estimates is affected by differing country practices in valuation systems for reporting value added by production sectors. The SNA envisages estimates of GDP by industrial origin to be at either basic or producer prices, but many countries report such details at purchaser prices. As a practical solution, GDP estimates are shown at purchaser prices in Table 11 if the components are on this basis, and such instances are footnoted. In Table 13, GDP is measured in purchaser values for all countries.

In Table 11, growth rates are computed from partially rebased, chain-linked, 1987 constant price series in domestic currencies.

The *growth rate of exports of goods and nonfactor services* is based on national accounts data in constant prices.

In Table 12, 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 Table 12 does not use the three-year averaging technique applied to GNP per capita in Table 1.

Summary measures in Table 12 are computed from group aggregates of sectoral GDP in current U.S. dollars.

Agriculture covers forestry, hunting, and fishing, as well as cultivation of crops. 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 in Table 12), construction, and electricity, water, and gas. Value added in all other branches of economic activity, such as wholesale and retail trade, transportation, government, and personal services and including imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers, are included in *services*.

In Table 13, *general government consumption* includes all current expenditures for purchases of goods and services by all levels of government, but excluding most government enterprises. Capital expenditure on national defense and security is 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 nonfactor services represent the value of all goods and nonfactor services provided to the rest of the world. This includes the value of merchandise, freight, insurance, travel, and other nonfactor services. The value of factor services, such as investment income, interest, and labor income, is excluded. Current transfers are also excluded.

The *resource balance* is the difference between exports of goods and nonfactor services and imports of goods and nonfactor services.

In calculating the summary measures for each indicator in Table 11, partially rebased, constant 1987, U.S. dollar values for each economy are calculated for each year of the periods covered; the values are aggregated across countries for each year; and the least-squares procedure is used to compute the growth rates. The average sectoral percentage shares in Tables 12 and 13 are computed from group aggregates of sectoral GDP in current U.S. dollars.

Table 14. Central government budget

The 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. The commentary that follows is intended mainly to place these data in the context of the broad range of indicators reported here.

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. Countries reporting budgetary data are footnoted.

Consequently, 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.

Total revenue is derived from tax and nontax sources. *Tax revenues* comprise compulsory, unrequited, nonrepayable receipts for public purposes. They include interest collected on tax arrears and penalties collected on nonpayment or late payment of taxes and are 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.

Central government expenditure comprises the expenditure 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 are classified separately. Defense is treated as a current expenditure.

Social services comprises expenditures on health, education, housing, welfare, social security, and community amenities. These categories also cover 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/surplus shown in Table 2.

Table 15. Exports and imports of merchandise

The main source of current trade values is the U.N. Conference on Trade and Development (UNCTAD) trade data base, supplemented by the data from the IMF's *International Financial Statistics* (IFS), 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.

Merchandise *exports* and *imports*, with some exceptions, cover 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, 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. For some countries, data for certain commodity categories are unavailable. *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).

Average annual growth rates of exports and imports are calculated from values in 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 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

The data for this table are based on IMF data files. World Bank staff also make estimates and, in rare instances, adjust coverage or classification to enhance international comparability. Definitions and concepts are based on the IMF's *Balance of Payments Manual, Fourth Edition* (1977). The IMF now uses the fifth edition to compile balance of payments data. As a result, some indicators shown here may differ from those published in recent IMF publications. Values are in U.S. dollars converted at official exchange rates.

Exports and imports of goods and services 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, nonfactor services, and factor services.

Net workers' remittances cover 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 may differ from national practices.

Other net private transfers comprise net unrequited private transfers other than workers' remittances.

The *current account balance before official transfers* is the sum of net exports of goods and services and net private transfers, but excludes net official transfers.

Gross international reserves comprise 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 data on holdings of international reserves are from IMF data files. The gold component of these reserves is valued at year-end (December 31) London prices: that is, $589.50 an ounce in 1980 and $383.25 an ounce in 1994. 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 1994 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 summary measures are computed from group aggregates for gross international reserves.

Table 17. External debt

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.

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 in effect at year-end. 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 distinctions between public and private nonguaranteed short-term debt.

Total external debt as a percentage of GNP and exports of goods and services (including workers' remittances) is calculated in U.S. dollars.

Total 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.

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 of 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 Organisation of Economic Co-operation and Development (OECD) countries for officially supported export credits. The rates are specified for the Group of Seven (G7) 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 by the most recent IBRD lending rate, and International Monetary Fund (IMF) loans are discounted by the Special Drawing Rights (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 the 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 summary measures are taken from the *1996 World Debt Tables*, Volume 1.

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. More specifically, 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 [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 "model" for the data, the least-squares estimate of the growth rate is consistent and efficient.

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. To obtain a growth rate for discrete periods comparable to the least-squares growth rate, take the antilog of the calculated growth rate and subtract 1.

The Gini index

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 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 while 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 adjusting them for differences in rates of inflation between the country and the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States.) The inflation rate for 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*:

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

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 (local currency) for year *t*;
p_t = GNP deflator for year *t*;
e_t = average annual exchange rate (national currency to the U.S. dollar) for year *t*;
N_t = midyear population for year *t*;
$p_t^{S\$}$ = SDR deflator in U.S. dollar terms for year *t*.