**The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988**

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# THE PENN WORLD TABLE (MARK 5): AN EXPANDED SET OF INTERNATIONAL COMPARISONS, 1950–1988*

ROBERT SUMMERS AND ALAN HESTON

The Penn World Table displays a set of national accounts economic time series covering many countries. Its expenditure entries are denominated in a common set of prices in a common currency so that *real* quantity comparisons can be made, both between countries and over time. It also provides information about relative prices within and between countries, as well as demographic data and capital stock estimates. This updated, revised, and expanded Mark 5 version of the table includes more countries, years, and variables of interest to economic researchers. The Table is available on personal computer diskettes and through BITNET.

## I. INTRODUCTION

The Penn World Table displays a set of national accounts economic time series covering a large number of countries. Its unique feature is that its expenditure entries are denominated in a common set of prices in a common currency so that *real* international quantity comparisons can be made both between countries and over time. In addition, it presents data on relative prices, within and between countries, and demographic data and capital stock estimates as well.

The standard national accounts archives of the various international organizations, following the United Nations "System of National Accounts" (SNA), allow only intertemporal comparisons within countries. The Penn World Table is an attempt to get closer to a System of *Real* National Accounts (S*R*NA) that makes possible interspatial comparisons as well. The successive versions of the table, Mark 1–Mark 4 and now Mark 5 (henceforth PWT1 to PWT5), represent a series of steps leading to such an S*R*NA.[1]

*The authors acknowledge with gratitude the support of the National Science Foundation and the Agency for International Development in carrying out this research. The reactions of innumerable correspondents and callers to earlier versions of the Penn World Table, invited and uninvited, have been invaluable. Improvements in this new version reflect the many suggestions and some corrections that have been received. Users of Mark 5 are encouraged to call attention to any anomalies they encounter. The research assistance of Bettina Aten, Joseph Berger, and Joon Haeng Lee was indispensable in handling the many data sets entering into the large data table produced here.

1. Penn World Table (Mark 1): Summers, Kravis, and Heston [1980]
   Penn World Table (Mark 2): Never published but used in Kravis, Heston, and Summers [1982]
   Penn World Table (Mark 3): Summers and Heston [1984]
   Penn World Table (Mark 4): Summers and Heston [1988].



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PWT5 is *very* large. Only a small excerpt from it appears below, but computer-readable versions can be obtained from NLRB Publications, 1050 Massachusetts Avenue, Cambridge, MA 02138. An ASCII file on IBM-format floppy disks can be ordered for $3 (domestic) or $4 (foreign). The file is available without charge via BITNET or Internet electronic mail in response to natural language requests to NBER@HARVARDA.HARVARD.EDU.

This paper describing PWT5 is organized as follows: its underpinning, the set of benchmark studies of the United Nations International Comparison Program (ICP),[2] is discussed in Section II. These ICP studies give empirical cross sections of comparisons for each of four years—1970, 1975, 1980, and 1985—for groups of countries varying in number between 16 and 60. PWT5 itself is obtained by extrapolating these cross-section comparisons interspatially to many additional countries and then intertemporally to other years. (The precise coverage of PWT5—countries, dates, variables—and a description of its evolution are given in Appendix A.1 and A.2) The extrapolation procedures used to estimate PWT5's 1950–1988 time series are laid out in Section III. Section IV, concentrating on PWT5 itself, describes the table's contents, and reviews the differences between it and its earlier versions. Readers interested in the detailed procedures followed in implementing Sections III and IV will find a full description in Appendix B. (To conserve *Journal* space, Appendix B has been placed on the first of the computer diskettes that contain the full data table.) Section V presents a sampling of estimates from the 1988 segment of PWT5, an illustration of what can be learned about the world income distribution from the table, and, quite importantly, a set of caveats about the use of the table. The paper closes in Section VI with brief remarks about future prospects for a System of *Real* National Accounts.

2. The ICP's work has been reported in five phases:
Phase 1: Exploratory, covering ten countries in 1970 Kravis, Kenessey, Heston, and Summers [1975]
Phase 2: 1970 and 1973, covering sixteen countries Kravis, Heston, and Summers [1978a]
Phase 3: 1975, covering 34 countries Kravis, Heston, and Summers [1982]
Phase 4: 1980, covering 60 countries [United Nations and Eurostat, 1986]
Phase 5: 1985, covering 56 countries as of March 1990, but still incomplete OECD [1988]; Eurostat [1989]; Economic Commission for Europe [1988]; and unpublished working papers.

## II. The ICP Benchmark Comparisons

The Penn World Table is derived from the benchmark studies of the ICP, which so far cover the years 1970, 1975, 1980, and 1985. A description of the ICP's procedures is presented here,[3] along with a brief survey of the salient ICP empirical findings. The methods have been modified in a number of ways since 1968 when the ICP was launched, but the fundamental framework has remained the same.

Basically, an ICP benchmark study is a pricing exercise. Prices of hundreds of identically specified goods and services prevailing in each participating country are collected and processed. The price comparisons that emerge are estimates of price parities for each country's currency at a number of aggregation levels, including an overall purchasing power parity (PPP). The price parities and PPPs are used to convert the countries' national currency expenditures to a common currency unit, thus making real quantity comparisons across countries possible.

### *A. Expenditure and Price Inputs*

The ICP divides up national final output, Gross Domestic Product (GDP), into about 150 detailed categories (approximately 110 consumption, 35 investment, and 5 government). All of a country's individual final output items are assigned to one or another of the categories. The ICP central office works with national data of two sorts from each participating country: national prices for between 400 and 700 particular items; and national expenditures for each of the 150 detailed categories.

For the prices to provide a meaningful basis for determining relative quantities, it is of the utmost importance that they refer to the same items, that is, of the same quantity and quality, from country to country. (It is not essential that each item be represented in every country; in fact, it is inevitable that all items will not be priced in every country.) To this end, specification manuals giving closely detailed technical descriptions of over 1,500 commodities, services, and labor inputs have been developed that cover the universe of all items priced in any country. In a typical benchmark study, experts from participating countries jointly discuss speci-

3. For a more detailed description, see Kravis, Heston, and Summers [1982], Chapter 3.

fications and in many cases visit outlets together to pin down the exact specification to be priced.

In some cases, comparisons require professionals, as in construction where architects or quantity surveyors are used. As methods have evolved, construction price comparisons are built up from costs of components of structures that can be weighted according to the particular type of building being compared. For some categories, like house rents, the country price comparisons draw on hedonic regressions.[4] This makes possible rent estimates for finely specified housing units (e.g., a country's rent for an apartment in a twenty-year old multistoried building, of 120 square meters, with central heating, and one bathroom). Admittedly, this is still a crude basis for comparing rentals, but it has the merit of holding constant some of the more obvious housing characteristics.[5]

Rent comparisons derived from the hedonic regressions still contain a lot of noise, but they probably are free from systematic biases. Observe that location effects on rentals are ignored, but it is unclear how even in principle such an important effect should be treated.

Generally speaking, pricing services is harder than pricing commodities because of the greater difficulties encountered in holding service qualities constant. And in some service areas, primarily general government, medical care, and education, the ICP must deal with the particularly thorny problem of somehow valuing services that are not priced in the market. (The ICP's standard reference to such services as "comparison resistant" indicates how seriously they are taken.) Of course, national income accountants have the same concerns, and the problems are no less formidable in a time-to-time context over a decade or more. As in the national income accounting case, most ICP price parities for these categories are obtained on the basis of input comparisons. The problems that such an approach poses in the national accounts are well-known; the equivalent problems plaguing the ICP have been discussed at length elsewhere. The nature of the difficulties will be reviewed briefly at the end of the next section.

Countries typically provide prices for at least 400 items, which are then grouped by detailed category. For each category, a country's item prices are expressed as ratios of the corresponding item prices of a numeraire country, the United States in the ICP,

4. Hedonic regressions are also used in comparing automobile prices.

5. See Kravis, Heston, and Summers [1982], Chapter 5, for a detailed description of the character and treatment of ICP service price comparisons.

and then averaged. This country average is a detailed category price parity denominated in the country's national currency expressed relative to the U. S. dollar, of the form $p_{ij}/p_{i,\mathrm{US}}$, (e.g., francs per dollar for fresh vegetables). The averaging procedure, involving a specialized multiple regression, is designed to allow for the fact that every item $i$ is not priced in every country. (Incidentally, the item prices provided are final product prices including taxes and subsidies. They are the prices imbedded in the expenditures in the national accounts so that division of expenditures by the prices yields the underlying quantities.)

Thus, the first step in the ICP procedure is to compare item prices within each detailed category of expenditure in such a way as to get for each country 150 price parities expressing the average category national prices relative to the corresponding national prices in the United States.

Besides supplying item prices, the countries provide detailed data on the composition of its final output expenditures. Specifically, national currency expenditures $p_{ij}q_{ij}$ on each of the 150 detailed categories are furnished by each country. Clearly, these expenditure data bear on the problem of unmasking relative quantities in different countries, but only after they have been processed appropriately. Observe that the ratio of a country's expenditure in its own currency to the category price parity referred to above, $(p_{ij}q_{ij})/(p_{ij}/p_{i,\mathrm{US}})$, is equal to the quantity valued at the U. S. category price, $p_{i,\mathrm{US}}q_{ij}$. Such U. S. priced quantities for any category are directly comparable across countries. However, comparing country quantities at the category level is only a small part of the more general problem of country comparisons at various levels of aggregation. Much more must be done unless one is willing to use the prices of an arbitrarily chosen base country—in which case the United States would not merely be a numeraire—to reflect the tastes of all countries. Subsection II.B below describes just how detailed category expenditures and price parities are combined in the aggregation process the ICP uses. Price and quantity information is needed, and the ratio of expenditure to price parity plays the quantity role.

Before moving on, however, we return briefly to the treatment of comparison-resistant service categories. A price parity and information on quantity is needed for each category in carrying out the ICP aggregation. Normally, the price parity is obtained as an average of observed price ratios, and the quantity is derived as the ratio of the expenditure to the price parity. However, if prices

cannot be observed for a category (the unpriced-services circumstance), in some cases the price is taken to be the cost of producing a standardized unit of the product. An alternative approach also employed starts with observed relative quantities and then derives price parities as a ratio of expenditures to relative quantities. Where direct quantity information is available (e.g., number of hospital bed-days, number of school-years of elementary education, pension checks processed, etc.), this is a feasible approach, provided that appropriate quality adjustments can be made. Even if quantities are not directly observable, it is still possible to get direct estimates of quantities from information about input quantities if something is known about the production function. In many cases, it has been necessary to use just one grade of labor, to assume constant returns to scale, and to assume something about relative labor productivity across countries. (For example, the total quantity of elementary education of a country is taken to be proportional to the number of its elementary school teachers, appropriately standardized for training.)[6]

Progress has been made, slowly, in moving toward some inclusion of capital as an input in addition to labor, and standardizing the quality of inputs. This helps to reduce the dependence on implausible productivity assumptions about the inputs. However, one should not be in doubt about the relative quality of price parities of comparison-resistant services. Even with the ICP's careful and even subtle treatment of services, unpriced and priced, these are among the least reliable of all those estimated by the ICP.[7] This would be particularly worrisome if the potential errors are systematically related to income.

6. The real difficulty in carrying out these unpriced service comparisons is controlling adequately for quality. The difficulties of holding quality constant are not unique to services, of course, but they may be more pervasive here. In part, this can result from ambiguities in defining what constitutes a difference in quality. Consider a couple of education examples. Is the educational output of an elementary school greater, all other things equal, if its teachers universally had more schooling themselves? (Yes, if students learn more from teachers with more education; no, otherwise.) If two schools teach the same number of students but one has a larger teaching staff than the other, is that school's labor productivity lower, or is its output quality higher? (Is class size important in the learning process?) In the absence of objective measures of educational output, like achievement test scores, one must depend upon results of research on education production functions, not all of which are conclusive.

7. There is both a theoretical and empirical basis for believing that the price parities of the comparison-resistant service categories are closer to those of the priced service categories than to those of the commodity categories. This turns on relative productivities and relative factor costs in the various categories. An examination of how real GDP estimates would vary for alternative assumptions about productivity differentials in the various sectors [Kravis, Heston, and Sum-

*B. Aggregation of Category Expenditures and Price Parities*

A primary objective of the ICP is to estimate the relative GDPs and purchasing power parities over all of GDP of as many countries as possible. Equally important, however, is the development of a framework that makes possible relative quantity and PPP comparisons at lower levels of aggregation also.

The classical index number problem is normally not thought of in interspatial terms, but it is present in international as well as intertemporal comparisons. It is at the heart of any attempt to develop a two-dimensional (over time and across space) table of expenditure entries that are meant to be mutually comparable in a cardinal "utility" way. (In the jargon of the ICP, a slight variant of this is referred to as the goal of "matrix consistency.") This is not an appropriate place to review the ICP discussions about the possible use of a theoretically-based utility approach in aggregating country bundles of goods. The assumptions underlying such an approach at the level of consumption—common tastes everywhere, the nature of aggregation of individual economic agents within countries, econometric degrees-of-freedom problems arising from more goods than country observations, etc.—make a utility-based approach unattractive. Furthermore, neither the theory of investment nor the theory of social choice provides sufficient guidance for handling the estimation of as much as a third of national output. As useful as it would be to have estimates of $C$, $I$, and $G$ in real terms that are appropriately "consistent" over time or space, such numbers do not exist if all the natural economic constraints on such numbers are to be met.

In the benchmark studies to date, the method used to aggregate category price parities and national currency expenditures up to GDP or $C$, $I$, and $G$ has been based on a procedure originally suggested by Geary [1958].[8] The result for each benchmark is a set

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mers, 1982, Table 5-2, p. 140] shows that even though the real share of comparison-resistant services in total GDP is by no means trivial, particularly in low income countries, still the real GDP estimates are fairly insensitive.

8. The implementation of the Geary procedure in the ICP context is spelled out in Kravis, Heston, and Summers [1982], pp. 89–94.

In Geary's original formulation, comparisons of country aggregate outputs were developed from data sets for individual countries that contained the physical quantities and national prices of all goods produced. The ICP modified the method so it can be applied to national expenditures and price parities of detailed categories of goods. The solution of a large system of $[m + (n - 1)]$ linear equations is required, where $m$ is the number of detailed categories and $n$ is the number of countries. (In the 1980 benchmark study, $m = 150$, and $n = 60$.) Roughly speaking, Geary's idea was to combine two partial approaches. If all the country PPPs were

of expenditures denominated in a common currency, the international dollar, which make possible quantity comparisons across countries and expenditure headings that can be aggregated in a variety of ways. In this international dollar currency relative prices of individual goods are set at the (weighted) average of relative prices for the same goods in all countries, and the level of prices is normalized so that the GDP of the United States is the same in international dollars as in American dollars. A more symmetric treatment of relative prices would be to express them in terms of the world as a whole rather than a particular country, but this runs counter to the customary practice of using the United States as the country of reference. It should be emphasized that a benchmark study's international comparisons based on this approach are invariant under a change in base country. However, in developing intertemporal comparisons such as those developed in PWT5, the choice of base country does make a difference.

The four ICP benchmark studies were done at different times, using evolving procedures and different national income data sets. In preparing PWT5, the original four sets of ICP comparisons were reworked using a more uniform methodology and a World Bank national account data set of 1990 vintage.

### *C. Overview of the Empirical Findings of the ICP*

This discussion of the ICP so far has been concerned only with its use in the preparation of PWT5. The substantive importance of comparing countries' outputs, using ICP PPPs for aggregate comparisons and price parities at lower levels of aggregation, turns on the fact that country price structures are not all the same. The systematic variability of relative prices makes it critical in many analytical applications that differences in price structure be taken

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known, it would be an easy matter to find for any category the quantity-weighted average of all countries' relative prices for that category. On the other hand, if the average relative prices were known for all the categories, the PPP for any country could be obtained as the ratio of its total domestic expenditures to the total value of its quantities when priced at the average relative prices of the categories. Geary proposed that the subset of equations defining the first approach be thought of as the first part of a general system of equations, with both the average relative prices and the PPPs treated as unknowns; and similarly, that the subset of equations defined by the second approach, involving the same unknowns also be treated as being part of the general system. Even though the system is large, solving it for the average relative prices and PPPs is quite easy. The system has a very special structure (the matrix requiring inversion has two block diagonal submatrices) so the loss of significant figures is minimal.

into account. This does not mean, however, that PPP-based output comparisons are appropriate for every purpose. This important point will be returned to below in subsection V.C.

A description of two ICP findings of general interest will illustrate the kinds of insights provided by the benchmark studies.

1. *The Relationship Between the Exchange Rate and the Purchasing Power Parity*

The best known of the ICP empirical results is the documentation of the difference between a country's exchange rate and its purchasing power parity. The strong version of the Casselian Purchasing Power Parity Doctrine asserts that the equilibrium exchange rate at which the currencies of two countries will trade will be determined by the relative price levels of the countries. The evidence is unmistakable in each of the ICP benchmark studies that this does not hold. Not only do exchange rates differ significantly from corresponding PPPs, but they do so in a systematic way: the national price level of a country, defined as the ratio of its PPP to its exchange rate, is a rising function of the level of its income or stage of development. This fact has important international trade ramifications. Theoretical work on this goes back to Ricardo, Viner, Balassa, and Samuelson; and extensive recent empirical work is reported in Kravis and Lipsey [1983].

A practical consequence of the failure of the strong version of the Purchasing Power Parity Doctrine is that the practice of using exchange rates as quick, easily obtained estimates of PPPs is invalidated. For some time it has been clear that exchange rates by themselves cannot be regarded as satisfactory proxies for PPPs in comparing different countries' GDPs.[9] Many but not all international organizations (e.g., the European Communities, the Organization for Economic Cooperation and Development, and the United Nations Development Program) and some governmental organizations (like the United States Agency for International Development) now extensively use PPP-based comparisons.

9. In early versions of the Penn World Table, the observed empirical relationship between the PPP-exchange rate ratio and per capita GDP was the basis for interspatial extrapolations. In the PWT4 treatment, observed GDP per capita benchmark values were regressed against GDP per capita derived from exchange rates, and other variables. This seemingly perverse reverse-regression approach was then used to "predict" the PPP-based GDP per capita of a country about which only the values of the exchange rate-based GDP per capita and other right-hand-side variables were known. (See subsection III.C for the PWT5 extrapolation procedure.)

Figure I depicts the price-level-versus-income relationship for the 60 countries of the 1980 benchmark study. The fitted curve shows the log-linear regression of the price level (that is, PPP/ Exchange Rate) on real GDP per capita, the latter expressed relative to that of the United States. Note two points here: in this regression, the curve was not constrained to go through the United States point, (1, 1); and the distinct heteroskedasticity apparent in the graph is not properly taken into account by the log-linear functional form that was used. The same unmistakable rising tendency of the curve appears in the benchmark data of other years.

The ICP's comparisons of country prices and quantities illuminate a number of aspects of national economic structures. A country's share of its national output that is devoted to a category of goods can be calculated either on the basis of its own national prices or prices representative of a set of countries. Unfortunately, cross-country comparisons based on national-price shares can be misleading if relative prices are not the same everywhere. Since in

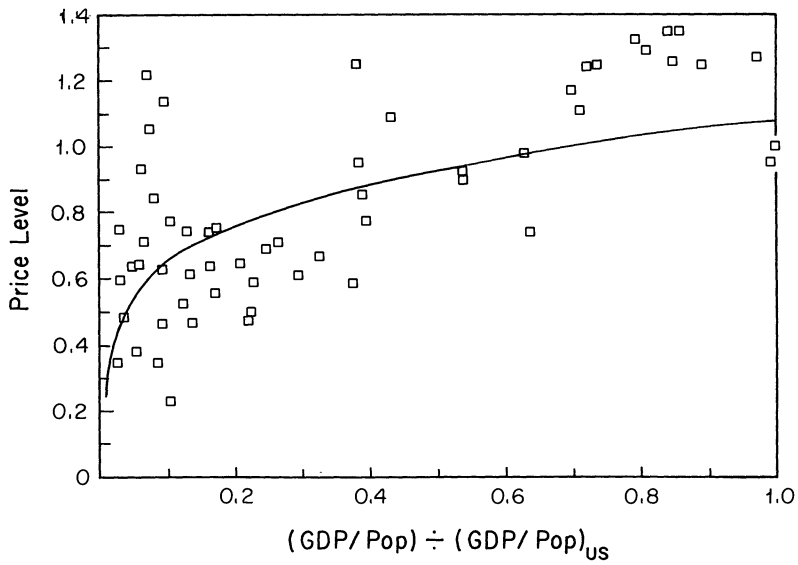


FIGURE I
Price Level versus GDP per capita (US = 1) 1980
$\ln PL$ 0.0945 + 0.2367 $\ln y$; $R^2 = 0.39$; $\sigma_u = 0.31$.

fact pervasive national-price patterns show up across the countries in the ICP benchmark studies, the use of a common set of prices is necessary. The sensible common set to use is some version of average prices of all the countries under analysis, and that is what international prices are. Expenditures in international dollars can then be used directly for quantity comparisons.

2. *Variation in Price Structure*

Table I distributes the benchmark countries for 1980 into six income groups. The averages of the country shares of expenditures, both in national currencies (NC) and in international dollars (I$), are given for each income group for a number of aggregations of the detailed components of GDP. For any aggregation and country group, the difference between the two share figures is due to differences between the national relative prices of the country group and the common set of world average relative prices. The third line of the aggregation, labeled "%," gives the ratio of the NC share to the I$ share, expressed as a percentage. (These ratios are given to show the difference between the income group's average national relative price and the international price for the aggregation.) A straightforward interpretation of this row is that its entries tell how the relative price of an aggregate changes with income. Domestic investment of group 1 countries can be used to illustrate the table. The average share in national currencies (NC) is 20.6 percent while the average share in international prices (I$) is only 13.3 percent. This is because investment goods are relatively expensive in low-income countries, by a factor of 1.55, compared with all countries, rich and poor. The decline in the percentage entries across the columns shows this dramatically. The major explanation for this price pattern undoubtedly lies in the area of public policy; for present purposes, the pattern is presented simply as an empirical fact.

For an aggregation like bread and cereals, the two kinds of share are virtually the same in each of the income groups. This is because the relative prices here do not vary much from country to country, and therefore are all close to the relative international price. (As one would expect from many budget studies, the average share goes down as one moves to higher income groups.) For food as a whole, national relative prices tend to decline with country income so the international-price shares are less than national-price shares for the poor countries and larger for the high-income

TABLE I
EXPENDITURE SHARES IN NATIONAL AND INTERNATIONAL PRICES, 1980

| Expenditure aggregation | | Country income groups (low to high) 1 | 2 | 3 | 4 | 5 | 6 | All* |
|---|---|---|---|---|---|---|---|---|
| Food | NC | 36.2 | 29.3 | 23.7 | 18.7 | 11.7 | 9.8 | 23.7 |
| | I$ | 34.0 | 27.8 | 22.4 | 18.3 | 12.2 | 10.8 | 22.8 |
| | % | 106 | 105 | 106 | 102 | 96 | 91 | 104 |
| Bread and cereals | NC | 12.8 | 7.7 | 4.5 | 2.6 | 1.6 | 1.2 | 5.9 |
| | I$ | 12.6 | 7.7 | 4.4 | 2.5 | 1.5 | 1.2 | 5.8 |
| | % | 102 | 100 | 102 | 104 | 107 | 100 | 102 |
| Milk, eggs, & cheese | NC | 2.6 | 3.2 | 2.7 | 2.3 | 1.6 | 1.4 | 2.5 |
| | I$ | 1.6 | 2.6 | 2.4 | 2.4 | 2.0 | 1.8 | 2.2 |
| | % | 162 | 123 | 112 | 96 | 80 | 78 | 114 |
| Housing | NC | 13.2 | 14.5 | 11.9 | 12.9 | 15.2 | 15.9 | 13.8 |
| | I$ | 13.9 | 15.4 | 13.1 | 11.6 | 15.0 | 16.2 | 14.1 |
| | % | 95 | 94 | 91 | 111 | 101 | 98 | 98 |
| Health care | NC | 2.1 | 3.7 | 3.8 | 4.6 | 5.8 | 6.5 | 4.1 |
| | I$ | 2.8 | 4.6 | 4.4 | 4.5 | 6.0 | 5.3 | 4.4 |
| | % | 75 | 80 | 86 | 102 | 97 | 123 | 93 |
| Domestic investment | NC | 20.6 | 25.5 | 28.1 | 25.1 | 24.6 | 23.5 | 24.6 |
| | I$ | 13.3 | 17.5 | 25.0 | 26.4 | 26.4 | 25.1 | 21.3 |
| | % | 155 | 146 | 112 | 95 | 93 | 94 | 115 |
| Producers durables | NC | 8.5 | 10.0 | 6.4 | 8.6 | 9.0 | 8.6 | 9.4 |
| | I$ | 5.7 | 5.8 | 4.9 | 7.5 | 10.7 | 10.2 | 7.6 |
| | % | 149 | 172 | 131 | 115 | 84 | 84 | 124 |
| Construction | NC | 10.2 | 13.9 | 14.7 | 15.1 | 14.1 | 13.7 | 13.5 |
| | I$ | 6.0 | 10.3 | 15.0 | 17.4 | 14.2 | 13.7 | 12.3 |
| | % | 170 | 135 | 98 | 87 | 99 | 100 | 110 |
| Services | NC | 31.5 | 29.9 | 29.9 | 35.7 | 40.7 | 41.6 | 33.8 |
| | I% | 43.3 | 37.9 | 34.1 | 34.3 | 39.0 | 36.9 | 37.8 |
| | % | 73 | 79 | 88 | 104 | 104 | 113 | 89 |
| Nontradables | NC | 41.7 | 43.8 | 44.6 | 50.7 | 54.8 | 55.3 | 47.3 |
| | I$ | 49.3 | 48.2 | 49.1 | 51.7 | 53.2 | 50.6 | 50.1 |
| | % | 85 | 91 | 91 | 98 | 103 | 109 | 94 |
| Country group GDP/POP (% US) | | 1 <10% | 2 10–20 | 3 20–35 | 4 35–60 | 5 60–75 | 6 >75% | |
| No. of countries | | 12 | 14 | 10 | 10 | 8 | 6 | 60 |

NC: Share of GDP in national prices.
I$: Share of GDP in international prices.
*Group averages and "All" are unweighted.

ones. Of course, the dramatic decline with income in the share of food in GDP (Engel's Law) is evident using either share measure.

The two components of domestic investment, producers durables and construction, each have higher national-to-international price ratios in low-income countries than in high. The combining of the components produces the systematic relationship referred to above, that the share of real GDP going to domestic investment goes up with GDP per capita rather than being almost flat, as is indicated by the national-price shares.

The last aggregation rows of Table I cover services and nontradables (services plus construction). These show one of the major structural differences between poor and rich countries: the higher relative prices of services in the latter. The service row also reveals an almost flat relationship between real service shares and income, which is quite contrary to the conventional wisdom. (For more on this, see Kravis, Heston, and Summers [1983]; Summers [1985]; Heston and Summers [1990].)

## III. From Benchmark Comparisons to PWT5

### *A. Level of Aggregation*

PWT5's version of a System of *Real* National Accounts reports in *real* terms national income aggregates at the level of private consumption *C,* private and public gross domestic capital formation *I,* public consumption (government) *G,* and the net foreign balance *NFB.* Only for a small number of countries, like OECD members, is a more detailed level of aggregation feasible over time. The level of aggregation of the available country national accounts data dictates how finely detailed PWT can be. Time series are needed on current- and constant-price national accounts expenditures to extrapolate each subaggregate, and these are generally available from the United Nations or the World Bank only at the level of *C, I,* and *G.*

### *B. Reconciliation of Benchmark and National Accounts Data*

The national accounts series can be used to connect the results of different benchmark studies. An immediate concern then is how well the ICP benchmark data sets and the national accounts data fit together. One should expect a problem to arise from working with intertemporal (national accounts) and interspatial (ICP) data sets that appear to view country-time interrelations in the same

way but in fact do not. The problem at hand in part is one of merging different empirical data sets not based on identical prices and goods. As a minimum, the reconciliation process described below provides a reasonable smoothing-over of the "errors in measurement."

Even if all expenditures and prices entering into the ICP work were the same as all of the expenditures and prices entering into the national accounts time series, a country's standing in successive benchmark years would still not necessarily equal what would be expected from the growth rates and price indexes of the national accounts. The intrinsic problem is that the ICP's *real* standings within a benchmark year are based on a common set of so-called "international dollar prices" of *that* year. These remarks indicate that even if the data of the national accounts and ICP were perfectly in accord, the SNA based on them still must be regarded as a conceptual "tableau" for displaying relative standings over time and space.

In fact, the two data sets are far from being perfectly in accord. In *many* cases, a country's standings in consecutive benchmark studies—at the level of GDP or its components—imply a growth rate between the benchmark years that differs significantly from the growth rate embedded in the constant-price series of the country's national accounts. Such observed inconsistencies arise partly from the "tableau effect" and partly as a consequence of mismatches between the specifications and pricing of goods by the national income accountants and by the ICP. A seasoned guess would be that the mismatching and "errors in measurement" are much more responsible for the inconsistencies than the tableau effect.

The resolution of this problem adopted in PWT5 follows a time-honored procedure in national accounting developed by Stone, Champernowne, and Meade [1942]. A reconciliation of differences between ICP benchmark quantity estimates and national accounts growth rates is equivalent to a reconciliation of differences between ICP estimates of purchasing power parities in successive years and price indexes derived from the national accounts. A procedure is applied to eliminate in PWT5 any violations of the intertemporal identity: "Next period's level must be equal to this period's level times the growth rate between the two periods." The procedure is needed only for countries involved in more than one benchmark study. A simple errors-in-measurement model has been used that provides maximum likelihood estimates of adjustment factors for

ICP benchmark comparisons and national accounts growth rates to reconcile them. (This process makes use of a priori information about the relative reliabilities of the benchmark estimates and the national accounts growth rates.) Details of these adjustments are provided in Appendix B.

*C. Extensions to Nonbenchmark Countries*

PWT5 covers many more countries than were included in the various ICP benchmark studies. This section presents a brief, general description of the methods used to get real product and PPP estimates for these countries. These estimates are necessarily more problematical than the benchmark estimates. However, they have the great merit that on an expected-value basis they are properly centered, unlike exchange rate-based estimates. The quality ratings in Appendix A.2 reflect the large variance of the estimates, particularly for the low income nonbenchmark countries. The accuracy of the price survey method can be judged by examining the residuals in a regression covering the data for 1985 of 77 ever-benchmarked countries. The percentage accuracy, to be interpreted in 0.95 confidence interval terms, is guessed to range from 60 percent up or down for countries with GDPs per capita less than a tenth of the United States, to 19 percent up or down for countries between half and seven-tenths of the United States; and 15 percent for countries as close as seven-tenths of the United States. Appendix B gives the details of the procedures followed for nonbenchmark market economies, and also discusses aspects of the estimation problem for centrally planned economies (CPEs).

The PPPs of nonbenchmark market economies were estimated on the basis of capital city price surveys conducted around the world by the United Nations International Civil Service Commission, a British firm serving an association of international businesses, and the U. S. State Department. The surveys were conducted as part of a postallowance program designed to supplement salaries in such a way as to equalize real incomes of high-ranking civil servants and business executives assigned to different foreign countries. The price indexes appropriate for this very special population—high-income nonnationals, living usually in capital cities—does not properly reflect all the prices in the country, of course, nor do the individual price weights built into the indexes reflect the relative importance of the individual goods in the countries for the nationals. However, a structural relationship was found in the benchmark countries between a country's PPP

and its postallowance PPP. This relationship was exploited to estimate for the nonbenchmark countries missing PPPs from their postallowance PPPs.[10] Of course, real quantity estimates followed easily once PPPs were available.

A similar approach, but one involving quantities rather than PPPs, was used to estimate the real shares of *C, I,* and *G* for nonbenchmark countries. A relationship was found within the benchmark countries between each of the real shares and the level of total output and the three nominal shares (the shares based on national prices). The three relationships for *C, I,* and *G* were then used to estimate the real shares for the nonbenchmark countries. These extrapolations to nonbenchmark countries were carried out in such a way that a complete set of entries, for both benchmark and nonbenchmark market economies, was in hand for 1985.

Only four centrally planned economies have full representation in PWT5. China (P. R.), Hungary, Poland, and Yugoslavia all supply SNA data over time. The latter three have participated in benchmark studies, and China has been involved in a quasi-benchmark comparison with the United States. As a consequence, for these four countries, the PWT5 time series of expenditures and PPPs can be estimated in the same way as the benchmark market economies included in PWT5. Although Romania participated in one benchmark study [1975], SNA time series are not available for it; as a result, Romania estimates only for 1975 are provided in Appendix B.

Times series for the per capita GDPs of four other CPEs—Bulgaria, Czechoslovakia, East Germany, and the Soviet Union—were given in PWT4, but do not appear in PWT5. Recent events, and particularly the growing consensus among CPE specialists that both the levels and growth rates in these economies have been overstated, have led us to hold off attempting to provide expenditure and PPP estimates for them at this time. The 1990 United Nations benchmark study will include these countries, so good estimates for them will be avilable in the future. (For now, see the

10. A variety of methods have been used in the past to estimate the PPPs of nonbenchmark countries. See, for example, the Beckerman physical-indicator approach as first described in Beckerman [1966], and the exchange-rate approach of Kravis, Heston, and Summers [1978b]. In PWT1–PWT3, nonbenchmark PPPs were estimated using the exchange-rate approach. (A visual impression of the efficacy of the exchange-rate approach can be obtained from Figure I.) Kravis and Lipsey [1989] in a recent review of different methods found that the price-survey approach performed marginally better than the others.

review of estimates for these and a few additional countries provided in Appendix B.)

*D. Extrapolating from Benchmark Years to the Rest of 1950–1988*

Section IV below deals with all the variables in PWT5 as listed in Appendix A.1. Here the intertemporal aspects of PWT5 will be discussed by focusing attention on four measures of GDP per capita given in the table: variable 2, RGDPCH; variable 6, RGDP; variable 7, RGDPTT; and variable 9, CGDP.

The simplest extrapolation is for RGDP (variable 6), real per capita GDP expressed in 1985 international prices. Its components, *C, I, G, X* (exports), and *M* (imports), are also per capita and expressed in 1985 international prices. Suppose that all of the components are known for 1985 from the ICP. The corresponding component values for any other year are obtained by applying the relevant growth rates from the constant-price national accounts series—the values for the year of interest divided by the corresponding 1985 ones—to the 1985 numbers. Then the RGDP for the new year, still in 1985 international prices, is simply the national accounting sum of the extrapolated components. Thus, RGDP for 1985 can be extrapolated to any year covered by the national accounts. The full set of RGDPs are directly comparable across time and countries.

Now consider CGDP, variable 9. The mnemonic first letter is meant to indicate that this version of GDP per capita is measured in *current* year international prices. In any year, CGDP is directly comparable across countries, but inflation effects keep it from being comparable over time. How is CGDP obtained for a nonbenchmark year? Its value for a benchmark year is known from the ICP's benchmark study or from a postallowance extrapolation. The PPPs of its components, *C, I,* and *G,* are also known. Moving to another year requires national accounts data. Component price indexes, easily obtained from the current- and constant-price time series of the national accounts, are used to extrapolate the PPPs to another year. These new PPPs, along with the current-price national accounts components for the new year, constitute the inputs for a standard Geary benchmark procedure. (Sixty benchmark countries and 150 goods were involved in the 1980 benchmark study; here all benchmark and nonbenchmark countries enter the calculations but just three goods, *C, I,* and *G.*) The Geary output would be all of

the countries' GDPs for the new year, expressed in the new year's international prices. These are the CGDPs.

If countries' CGDPs can be compared within a year but not across years, what advantage can they have over RGDP? If one were interested only in comparisons for a particular year other than 1985, CGDPs might reasonably be regarded as more directly comparable than RGDPs. The payoff from giving up intertemporal comparability is that the prices entering the comparisons are the current ones rather than those of (possibly remote) 1985. RGDP suffers from the Laspeyres fixed-base problem: After a while, relative prices change, and the base year weights become less and less appropriate. The differences between relative CGDPs and relative RGDPs are likely to be small for years close to 1985, but could be significant for the 1950s, 1960s, and 1970s.

A way of mitigating the declining appropriateness of the base year weights for comparison years distant from 1985—of retaining more of the flavor of CGDP in intertemporal comparisons—is to bring changing relative prices into the analysis explicitly through a chain index, RGDPCH, variable 2. The merit of RGDPCH (what makes it the recommended intertemporal GDP time series) is the fact that its growth rate for any period is based upon international prices most closely allied with the period.

RGDPTT, variable 7 in PWT5, was devised to take account of changes in the value of the country's output arising from changes in its terms of trade as well as changes in its production. (Thus, the mnemonic TT in RGDPTT.) The domestic absorption (DA) part of RGDPTT (*C, I,* and *G*), is the same as the DA part of RGDP. However, the net foreign balance is valued in *current* prices instead of 1985 prices. This is to allow for the part of the country's increased well-being that results from lower prices paid for imports or higher prices received for exports. (Considering all of the countries of the world, gains and losses from changes in the terms of trade should sum to zero. Unfortunately, in the standard international trade statistics underlying the national accounts, the total of all countries' NFBs is positive and not zero. Thus, the sum of all of PWT 5's RGDPTTs will not equal the sum of all of PWT5's RGDPs. This nontrivial disability should be kept in mind when relying on this variable.)

## IV. Description of PWT5

PWT5 presents in a variety of forms time series on expenditures of various sorts and on relative prices (that is, PPPs). These cover nearly all of the countries of the world for the period

1950–1988 or part thereof. (Note that expenditures and PPPs are not given explicitly. Nearly all PWT5 entries are expressed in some functional way. Expenditures appear in per capita, per equivalent adult, or per worker terms, or in percentage form. PPPs are expressed relative to exchange rates.[11]

*A. From PWT4 to PWT5*

Appendix A.3 shows how PWT has evolved from its original form. PWT5's expanded temporal and spatial coverage over PWT4, three more years (1986–1988) and a net addition of nine new countries (some with only partial data, however), surely make the table more useful now for analysis of the current economic scene. A more noteworthy improvement in the table over its predecessor, however, is that it is based on better data sets. Use of better national accounts data (the World Bank data archive has been adopted) certainly makes a difference, but of greater importance is the exploitation of a more extensive ICP data base. Where PWT4 barely drew on the 1985 benchmark data, PWT5 explicitly uses it to get the first clear look at comparative prices in a number of new countries. Eighty-one countries have now participated in benchmark studies, forty-seven in more than one. This reduces the need to rely on nonbenchmark estimating methods described in subsection III.C, above; but more than that, now the postallowance estimating method can be implemented with more observations.

PTW4 was enormous, and reasonably self-contained. Adding new entries at the extensive margin, more countries and years, was obviously worthwhile. However, the value of adding new entries at the intensive margin, that is, new variables, is not so clear. More variables would help researchers make new kinds of international comparisons, but they would also make the table (even) more unwieldy. The primary consideration in judging new candidates for PWT5 was, does the construction of the new variable draw particularly on ICP expertise, namely knowledge of PPPs? Pragmatism dominated the second consideration: is there a compelling international comparison need for variables that are the marriage of ICP-type numbers and international statistics available elsewhere? The new variables of PWT5, representing an uneasy compromise, cover, (i) new demographic information, (ii) sharper estimates of some national income variables, and (iii) capital stock estimates.

11. Even extra information about exports and imports is provided in the form of a new "openness" variable.

*B. The Anatomy of PWT5*

Appendix A.1 lists the 27 variables presented in PWT5, and Appendix A.2 lists the countries and years covered. The 27 variables in PWT5 divide naturally into five groups.

1. *Estimates of Gross Output, Measured in Eight Ways.* As indicated in the intertemporal extrapolation subsection III.D above, a country's real gross product can be valued in two basic ways: in the current year's international prices or in the international prices of a base year. These are given in PWT5 by CGDP (9) and RGDP (6). In addition, blends of the two are given: RGDPTT (7) is one kind of blend, valuing as it does domestic absorption at base year international prices and net foreign investment at current international prices; RGDPCH (2), a chain index series that is another kind of blend, is linked enough to the base-year approach to make intertemporal comparisons possible, but the base year is changed from year to year.

All four of these gross output series are expressed in per capita terms, and refer to gross *domestic* product. For some purposes, gross *national* product per capita is regarded as a better measure of the material well-being of the citizens of a country than a GDP measure, so CGNP/CGDP (26) is provided. Alternatives to per capita measures are provided in the per equivalent adult variable RGDPEA (18)[12] and the per worker variable RGDPW (19). (Each of these is based on RGDPCH.) The last of the eight measures, $y$ (8), is simply the ratio of the country's CGDP to that of the United States in the same year.

2. *Subaggregates of Gross Domestic Product.* The shares of gross product devoted to $C$, $I$, and $G$ (in percentage form), are given for each year in two ways. They are expressed relative to 1985-priced output (RGDP: $c$ (3), $i$ (4), and $g$ (5)); and current-priced output (CGDP: $cc$ (11), $ci$ (12), and $cg$ (13)).

The percentage share of the net foreign balance is given implicitly for both measures of gross output, since NFB/RGDPCH = $nfb$ = 100-$c$-$i$-$g$ and NFB/CGDP = $cnfb$ = 100-$cc$-$ci$ = $cg$. The net

12. The equivalent-adult value for an adult fifteen years of age or older is one, and for a person under fifteen years of age it is assumed here to be one half. Researchers preferring to assume an alternative value $\alpha$ for the equivalent value of a person under fifteen may calculate the appropriate GDP per equivalent adult from

$$\text{RGDPEA} = \text{RGDPCH}/[1 - 2(1 - R)(1 - \alpha)],$$

where $R$ is the ratio of RGDPCH and the tabled value of RGDPEA.

foreign balance gives the difference between exports and imports, but gives no information about their individual values. Putting in PWT5 the variable OPEN (25), the sum of current-priced exports and current-priced imports divided by CGDP, enables the user to recover the individual values.[13]

A decomposition of gross domestic investment into its private and public components can be useful for a variety of purposes. IPri (27) gives gross domestic private investment as a percentage of total gross domestic investment.

3. *Purchasing Power Parities.* Four measures of the purchasing power parity of each country's currency relative to the United States dollar are available in PWT5. The PPPs are presented in "price-level" form, as a percentage of the country's U. S. dollar exchange rate. *P* (13) relates to all of gross output; *PC* (14) to consumption; *PI* (15) to investment; and *PG* (16) to government.

4. *Capital Stock and Components.* Short time series of capital stock measures have been developed for a limited number of PWT5 countries using a perpetual inventory method. Kap*W*[14] (20), an estimate of a country's capital stock per worker, is the cumulated, depreciated sum of past gross domestic investment in producers durables, nonresidential construction, and other construction. The capital stock components, expressed as percentage shares of Kap*W*, are also provided: KPDUR (21): producers durables; KNRES (22): nonresidential construction: and KOTHER (23): other construction. A by-product of this capital stock work was a measure of capital in the form of residential construction. Although it is not included in Kap*W*, it is presented as a percentage of Kap*W*: KRES (24).

5. *National Income Accounts.* The country expenditures in PWT5 are all expressed in international prices. However, a country's national accounts expenditures—both the current- and constant-price series—can be recovered if the PPPs built into the price levels are applied appropriately to the PWT5 expenditures. (This is precisely the case for nonmultiple benchmark countries. For

13. The appropriate formulas for the recovery are

(i) $\text{Exports/CGDP} = [\text{OPEN} + cnfb]/200$

(ii) $\text{Imports/CGDP} = [\text{OPEN} - cnfb]/200.$

14. The residential construction capital stock is *not* included in Kap*W*. It is presented here primarily as a by-product of other capital stock calculations.

multiple benchmark countries what can be recovered is the World Bank's current-price time series and its constant-price time series as modified in the reconciliation process described in subsection III.B above.) The procedure requires information not in PWT5 itself about each year's average international prices of *C, I,* and *G.* Appendix B provides full information required to effect the national accounts recovery.

6. *General Variables Outside the National Accounts.* Four variables outside the national accounts are available from PWT5. Population POP (1) and the exchange rate ExR (17) appear explicitly. Implicit in the table is the proportion of the population under fifteen. It can be derived from the information on equivalent adults contained in RGDPEA combined with RGDPCH.[15] Similarly, the labor force participation rate, is given implicitly by the values of gross domestic product per capita, RGDPCH, and per worker, RGDPW.

Appendix B on the diskettes contains a full set of references for the variables of PWT5, and spells out all the details of how each was calculated.

*Country and Year Coverage.* Appendix A.2 lists the 139 countries that appear in PWT5. It gives each country's years of coverage for the 27 variables, and details its benchmark experience. In addition, it gives a rough estimate of the quality of the country's data, based somewhat subjectively on the error patterns displayed in checking consistency in multiple benchmark years and in the residual patterns described in footnote 10. (Appendix B provides the formal procedures followed.)

## V. The Use of PWT5

This part of the paper deals with three areas: subsection A contains a 1988 excerpt from PWT5 to give the reader a feeling for what is on the diskettes, and a table that gives a number of kinds of growth rates. Subsection B illustrates a particular kind of use the table can be put to. Most users of previous versions of PWT have introduced its entries into multiple regressions (either as independent variables or, less commonly, as dependent variables, in level or growth form). Here we draw on the table as a whole—all countries and all years—to give a brief, empirical description of how the

15. (Population proportion under 15) = $2 \times (1 - (\text{RGDPCH}/\text{RGDPEA}))$

(Labor Force Participation Rate) = RGDPCH/RGDPW.

income distribution of the world has been changing. Finally subsection C concludes with a number of caveats about the use of PWT5. At the end of the section are brief comments on the use of growth rates of GDP per capita based on national versus international prices. More attention is paid to this important subject in Appendix B where empirical comparisons are presented.

*A. The 1988 Segment of PWT5 and Growth Rates*

Table II presents most of the 1988 segment of PWT5. All 139 countries are represented, listed alphabetically by continents. To save space, 11 of PWT5's 27 variables are omitted here. The table contains chain index estimates of GDP, valued in 1985 international prices, expressed in per capita, per equivalent adult, and per worker terms. Except for the capital stock estimates, which incidentally refer to the end of 1987, the table focuses on entries that are based on 1988 international prices. From what is provided, one can infer other country values like labor-force participation rates, children-adult demographic ratios, comparative levels of consumption, prices of investment goods relative to prices of all other goods, and so on. The following summarizes what is extracted from PWT5 in Table II.

VALUES FOR 1988 OF VARIABLES REPRESENTED IN TABLE II

| Column # in Table II | | Variable # in PWT5 |
|---|---|---|
| 1 | Population (in thousands) | 1 |
| 2 | GDP/Pop (RGDPCH; 1985 int. prices) | 2 |
| 3 | GDP/EA (RGDPEA: 1985 int. prices) | 18 |
| 4 | GDP/W (RGDPW: 1985 int. prices) | 19 |
| 5 | GDP/Pop (CGDP: 1988 int. prices) | 9 |
| 6 | C/GDP (%) (*cc*: 1988 int. prices) | 10 |
| 7 | I/GDP (%) (*ci*: 1988 int. prices) | 11 |
| 8 | G/GDP (%) (*cg*: 1988 int. prices) | 12 |
| 9 | PPP/ExR | 13 |
| 10 | $PPP_c$/ExR | 14 |
| 11 | $PPP_i$/ExR | 15 |
| 12 | $PPP_g$/ExR | 16 |
| 13 | Exchange Rate | 17 |
| 14 | Kap*W* (1985 int. prices) (as of 12/31/87) | 20 |
| 15 | KPDUR KapProdDur/Kap*W* (%) (1985 int. prices) (as of 12/31/87) | 21 |
| 16 | KRES KapRes/Kap*W* (%) (Kap4: 1985 int. prices) (as of 12/31/87) | 24 |
| 17 | OPEN | 25 |
| 18 | CGNP/CGDP (%) | 26 |

TABLE II

ESTIMATES OF REAL PRODUCT AND PRICE LEVEL (DIFFERENT CONCEPTS AND AGGREGATION LEVELS); POPULATION; EXCHANGE RATE; CAPITAL STOCK: 138 COUNTRIES, 1988 (BASE YEAR: 1985)

| OBS COUNTRY | YR | POP | RGDPCH | RGDPEA | RGDPW | CGDP | CC | CI | CG | P | PC | PI | PG | XR | KAPW | KPDUR | KRES | OPEN | RGNP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AFRICA | | | | | | | | | | | | | | | | | | | |
| 1 ALGERIA | | 23805 | 2726 | 3515 | 12011 | 2662 | 52.1 | 28.8 | 18.3 | 85.3 | 81.6 | 103.7 | 77.0 | 5.915 | · | · | · | 29.7 | 96.6 |
| 2 ANGOLA | * | 8605 | 840 | 1081 | 1944 | 840 | 58.1 | 11.0 | 24.9 | 60.3 | 65.0 | 64.2 | 43.8 | 79.5 | · | · | · | · | · |
| 3 BENIN | | 4454 | 952 | 1246 | 2020 | 1054 | 75.7 | 4.3 | 24.8 | 38.2 | 44.8 | 120.4 | 16.3 | 297.85 | · | · | · | 48.6 | 102.4 |
| 4 BOTSWANA | # | 1103 | 2282 | 3025 | 6402 | 2507 | 33.5 | 19.3 | 40.5 | 43.3 | 50.0 | 55.9 | 22.6 | 1.868 | · | · | · | 116.3 | 87.3 |
| 5 BURKINA FASO | | 8546 | 566 | 726 | 1209 | 616 | 64.8 | 14.2 | 31.1 | 35.3 | 42.5 | 70.0 | 26.4 | 297.85 | · | · | · | 59.0 | 99.8 |
| 6 BURUNDI | | 5149 | 552 | 713 | 1054 | 597 | 58.2 | 13.0 | 33.5 | 35.6 | 47.6 | 57.8 | 16.2 | 140.39 | · | · | · | 38.0 | 98.0 |
| 7 CAMEROON | | 11213 | 1615 | 2067 | 4314 | 1669 | 70.1 | 8.0 | 23.8 | 68.9 | 75.2 | 164.3 | 24.9 | 291.71 | · | · | · | 35.0 | 96.7 |
| 8 CAPE VERDE IS | * | 327 | 1419 | 1786 | 3835 | 1419 | 65.5 | 32.0 | 18.6 | 24.5 | 35.4 | 46.8 | 21.0 | 93 | · | · | · | 101.8 | 97.0 |
| 9 CENTRAL AFR. R. | | 2794 | 686 | 874 | 1428 | 747 | 77.4 | 4.7 | 24.6 | 53.6 | 62.9 | 153.4 | 19.4 | 297.85 | · | · | · | 45.9 | 98.0 |
| 10 CHAD | * | 5018 | 519 | 658 | 1455 | 519 | 70.6 | 5.0 | 23.7 | 25.6 | 30.5 | 38.5 | 15.5 | 449.26 | · | · | · | 53.6 | 99.5 |
| 11 COMOROS | * | 395 | 711 | 923 | 1377 | 711 | 65.8 | 23.0 | 25.3 | 40.8 | 51.8 | 62.2 | 34.4 | 449.26 | · | · | · | 73.3 | 99.3 |
| 12 CONGO | # | 1953 | 2219 | 2839 | 5989 | 2116 | 37.3 | 8.8 | 60.1 | 44.8 | 71.8 | 165.7 | 16.6 | 346.3 | · | · | · | 93.5 | 92.6 |
| 13 EGYPT | | 51447 | 1716 | 2136 | 6373 | 1935 | 56.4 | 5.3 | 42.5 | 36.2 | 50.0 | 157.1 | 10.6 | 1.588 | · | · | · | 56.8 | 94.7 |
| 14 ETHIOPIA | # | 43496 | 332 | 428 | 738 | 351 | 67.7 | 3.8 | 31.9 | 34.3 | 40.1 | 126.2 | 18.2 | 2.07 | · | · | · | 35.4 | 99.4 |
| 15 GABON | * | 997 | 4210 | 5093 | 8103 | 4210 | 38.9 | 38.7 | 14.5 | 84.0 | 71.9 | 99.6 | 80.8 | 449.26 | · | · | · | 95.4 | 84.3 |
| 16 GAMBIA | * | 748 | 725 | 920 | 1766 | 725 | 68.6 | 12.1 | 20.8 | 31.8 | 37.2 | 49.2 | 18.0 | 4.988 | · | · | · | 100.2 | 78.1 |
| 17 GHANA | | 14040 | 877 | 1146 | 2287 | 991 | 71.1 | 5.4 | 25.7 | 37.6 | 44.7 | 96.9 | 12.1 | 202.35 | · | · | · | 43.0 | 97.5 |
| 18 GUINEA | * | 6081 | 501 | 638 | 1070 | 501 | 65.9 | 13.1 | 20.4 | 74.5 | 82.4 | 108.8 | 40.4 | 24.332 | · | · | · | · | · |
| 19 GUINEA-BISS | | 940 | 709 | · | · | 786 | 66.4 | 15.2 | 26.7 | 19.9 | 30.6 | 42.3 | 7.8 | 1111.1 | · | · | · | 77.8 | 96.6 |
| 20 IVORY COAST | | 11587 | 1300 | 1687 | 3445 | 1434 | 59.9 | 6.1 | 29.4 | 58.6 | 58.0 | 158.8 | 32.7 | 297.85 | · | · | · | 57.9 | 89.6 |
| 21 KENYA | | 23021 | 902 | 1224 | 2226 | 1014 | 63.2 | 12.0 | 26.1 | 36.8 | 34.5 | 89.3 | 23.6 | 17.747 | 1211 | 36.0 | 45.9 | 42.2 | 96.7 |
| 22 LESOTHO | * | 1545 | 1236 | 1568 | 2616 | 1236 | 79.4 | 14.0 | 22.1 | 13.1 | 27.9 | 37.0 | 13.1 | 2.191 | · | · | · | 153.9 | 199.7 |
| 23 LIBERIA | # | 2250 | 867 | 1133 | 2357 | 896 | 61.9 | 9.2 | 24.2 | 53.8 | 56.6 | 62.4 | 33.9 | 1 | · | · | · | 76.8 | 93.3 |
| 24 MADAGASCAR | | 11259 | 608 | 782 | 1426 | 670 | 71.3 | 7.9 | 22.9 | 25.0 | 28.2 | 59.0 | 11.4 | 1407.1 | · | · | · | 50.9 | 91.4 |
| 25 MALAWI | | 8155 | 543 | 705 | 1334 | 617 | 70.9 | 4.2 | 26.8 | 23.7 | 26.3 | 103.8 | 10.6 | 2.561 | · | · | · | 53.3 | 116.2 |
| 26 MALI | | 7989 | 474 | 617 | 1348 | 505 | 80.4 | 5.2 | 23.2 | 48.2 | 56.2 | 155.4 | 18.5 | 297.85 | · | · | · | 47.5 | 98.5 |
| 27 MAURITANIA | | 1907 | 958 | 1250 | 2846 | 1061 | 64.4 | 12.2 | 27.1 | 49.5 | 58.9 | 81.8 | 21.9 | 75.261 | · | · | · | 109.4 | 92.7 |
| 28 MAURITIUS | | 1048 | 4629 | 5486 | 11570 | 5316 | 64.9 | 16.2 | 18.9 | 35.0 | 34.4 | 62.8 | 17.6 | 13.438 | · | · | · | 144.0 | 98.1 |
| 29 MOROCCO | | 23920 | 2060 | 2565 | 6711 | 2376 | 61.4 | 9.5 | 29.1 | 38.7 | 39.3 | 109.2 | 17.1 | 8.209 | · | · | · | 49.9 | 95.1 |

* = 1985; # = 1986; † = 1987.

TABLE II
(CONTINUED)

| OBS COUNTRY | YR | POP | RGDPCH | RGDPEA | RGDPW | CGDP | CC | CI | CG | P | PC | PI | PG | XR | KAPW | KPDUR | KRES | OPEN | RGNP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 MOZAMBIQUE | | 14967 | 919 | 1173 | 1694 | 1034 | 65.6 | 9.1 | 29.1 | 8.1 | 11.5 | 32.8 | 5.4 | 525 | · | · | · | 77.6 | 80.5 |
| 31 NIGER | | 6998 | 602 | 787 | 1222 | 659 | 72.0 | 5.9 | 25.0 | 52.0 | 61.3 | 99.0 | 20.5 | 297.85 | · | · | · | 40.1 | 97.4 |
| 32 NIGERIA | | 110131 | 1003 | 1324 | 2786 | 1033 | 72.5 | 5.5 | 21.4 | 26.4 | 26.7 | 70.3 | 13.0 | 4.537 | · | · | · | 48.4 | 93.9 |
| 33 RWANDA | | 6657 | 661 | 871 | 1322 | 733 | 68.8 | 6.5 | 29.3 | 47.3 | 56.6 | 128.7 | 17.1 | 76.445 | · | · | · | 25.8 | 99.4 |
| 34 SENEGAL | | 7154 | 1126 | 1448 | 2623 | 1248 | 68.0 | 5.9 | 29.1 | 55.8 | 61.3 | 156.9 | 27.5 | 297.85 | · | · | · | 56.5 | 95.3 |
| 35 SEYCHELLES | # | 66 | 3069 | · | · | 3246 | 46.2 | 41.7 | 28.9 | 98.3 | 121.1 | 59.2 | 115.6 | 6.177 | · | · | · | 93.2 | 96.0 |
| 36 SIERRA LEONE | † | 3841 | 924 | 1166 | 2561 | 1031 | 64.2 | 1.6 | 34.0 | 15.4 | 19.8 | 116.2 | 2.5 | 31.847 | · | · | · | 25.1 | 109.6 |
| 37 SOMALIA | | 5882 | 791 | 1021 | 2232 | 881 | 70.4 | 15.9 | 23.6 | 32.4 | 40.0 | 78.8 | 12.2 | 170.45 | · | · | · | 46.1 | 93.9 |
| 38 SOUTH AFRICA | | 33938 | 4431 | 5574 | 12781 | 4936 | 58.8 | 17.3 | 21.2 | 52.5 | 50.3 | 70.4 | 40.2 | 2.261 | · | · | · | 52.2 | 96.1 |
| 39 SUDAN | | 23776 | 883 | 1140 | 2754 | 1003 | 77.1 | 1.2 | 23.4 | 49.1 | 54.1 | 483.6 | 16.2 | 3.75 | · | · | · | 12.0 | 96.3 |
| 40 SWAZILAND | * | 665 | 2113 | 2741 | 5147 | 2113 | 61.0 | 18.3 | 26.7 | 24.1 | 33.2 | 49.9 | 15.5 | 2.191 | · | · | · | 163.1 | 110.3 |
| 41 TANZANIA | | 24739 | 488 | 646 | 1015 | 567 | 47.4 | 13.3 | 45.1 | 22.4 | 43.9 | 40.5 | 5.3 | 99.292 | · | · | · | 57.5 | 93.3 |
| 42 TOGO | | 3362 | 668 | 863 | 1685 | 710 | 63.4 | 12.8 | 27.6 | 56.9 | 61.8 | 108.0 | 30.7 | 297.85 | · | · | · | 74.8 | 96.2 |
| 43 TUNISIA | | 7796 | 2921 | 3608 | 9336 | 3170 | 70.3 | 6.3 | 23.2 | 40.6 | 37.4 | 137.4 | 24.9 | 0.858 | · | · | · | 84.6 | 95.0 |
| 44 UGANDA | * | 14680 | 430 | 566 | 895 | 430 | 81.1 | 3.0 | 17.5 | 60.2 | 69.9 | 206.8 | 13.2 | 672.02 | · | · | · | 27.7 | 98.2 |
| 45 ZAIRE | | 33615 | 356 | 460 | 958 | 391 | 59.2 | 10.9 | 31.2 | 49.2 | 56.6 | 56.2 | 33.1 | 187.07 | · | · | · | 75.5 | 91.9 |
| 46 ZAMBIA | | 7486 | 715 | 938 | 2162 | 868 | 63.3 | 9.6 | 25.5 | 61.5 | 67.3 | 82.8 | 36.3 | 8.266 | · | · | · | 53.4 | 89.9 |
| 47 ZIMBABWE | | 9257 | 1265 | 1663 | 3158 | 1371 | 51.1 | 11.2 | 36.2 | 49.8 | 56.0 | 106.9 | 22.5 | 1.802 | 1860 | 37.9 | 18.1 | 51.7 | 96.7 |
| CENTRAL & NORTH AMERICA | | | | | | | | | | | | | | | | | | | |
| 48 BAHAMAS | † | 241 | 10516 | · | · | 11004 | 63.4 | 19.0 | 11.9 | 102.3 | 103.1 | 114.1 | 92.2 | 1 | · | · | · | 117.1 | 94.0 |
| 49 BARBADOS | * | 253 | 6152 | 7123 | 12256 | 6152 | 62.8 | 16.9 | 17.0 | 77.2 | 80.1 | 82.8 | 61.7 | 2.011 | · | · | · | 124.8 | 98.8 |
| 50 CANADA | | 26104 | 16272 | 18220 | 32421 | 17681 | 57.0 | 25.8 | 16.4 | 105.9 | 109.2 | 103.8 | 105.1 | 1.231 | 41422 | 33.8 | 33.7 | 51.7 | 96.9 |
| 51 COSTA RICA | | 2670 | 3800 | 4647 | 10421 | 4317 | 60.0 | 15.0 | 24.8 | 40.3 | 39.7 | 79.5 | 21.1 | 76.7 | · | · | · | 71.9 | 92.9 |
| 52 DOMINICA | * | 78 | 2570 | · | · | 2570 | 79.9 | 7.2 | 23.3 | 49.2 | 61.1 | 66.4 | 33.3 | 2.7 | · | · | · | 101.8 | 98.9 |
| 53 DOMINICAN REP | | 6859 | 2209 | 2742 | 7388 | 2423 | 66.2 | 21.4 | 14.4 | 27.9 | 32.8 | 34.9 | 10.4 | 6.1 | 5514 | 16.5 | 94.9 | 74.3 | 93.1 |
| 54 EL SALVADOR | | 5056 | 1705 | 2185 | 4269 | 1948 | 62.0 | 6.0 | 35.5 | 55.5 | 72.9 | 132.5 | 17.6 | 5 | · | · | · | 38.1 | 97.9 |
| 55 GRENADA | * | 96 | 2619 | · | · | 2619 | 65.5 | 27.6 | 20.1 | 46.0 | 53.8 | 65.8 | 37.9 | 2.7 | · | · | · | 120.6 | 98.4 |
| 56 GUATEMALA | | 8688 | 2228 | 2886 | 7822 | 2431 | 83.4 | 6.3 | 12.5 | 38.3 | 38.6 | 96.8 | 21.9 | 2.55 | 2961 | 44.7 | 35.1 | 37.2 | 98.0 |
| 57 HAITI | | 6254 | 877 | 1121 | 1826 | 973 | 78.2 | 5.8 | 18.4 | 41.0 | 45.0 | 78.0 | 21.1 | 5 | · | · | · | 31.2 | 98.9 |
| 58 HONDURAS | | 4837 | 1346 | 1747 | 4458 | 1491 | 66.6 | 8.0 | 28.4 | 60.9 | 65.9 | 136.5 | 32.6 | 2 | · | · | · | 51.5 | 94.7 |
| 59 JAMAICA | † | 2401 | 2362 | 2876 | 4918 | 2628 | 59.8 | 11.3 | 28.8 | 45.4 | 47.6 | 102.8 | 20.5 | 5.487 | · | · | · | 109.4 | 88.2 |

* = 1985 # = 1986 † = 1987

TABLE II
(CONTINUED)

| OBS COUNTRY | YR | POP | RGDPCH | RGDPEA | RGDPW | CGDP | CC | CI | CG | P | PC | PI | PG | XR | KAPW | KPDUR | KRES | OPEN | RGNP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 MEXICO | | 83593 | 4996 | 6258 | 14581 | 5323 | 71.3 | 15.3 | 12.4 | 39.7 | 37.7 | 59.9 | 28.2 | 2250 | · | · | · | 30.6 | 95.7 |
| 61 NICARAGUA | # | 3387 | 1759 | 2293 | 5773 | 1888 | 49.6 | 22.1 | 37.0 | 42.8 | 54.3 | 39.0 | 41.3 | 159 | · | · | · | 40.9 | 90.2 |
| 62 PANAMA | # | 2226 | 3569 | 4380 | 10168 | 3794 | 46.5 | 17.0 | 34.5 | 60.6 | 75.3 | 68.5 | 34.6 | 1 | · | · | · | 64.5 | 94.0 |
| 63 ST. LUCIA | † | 142 | 2730 | · | · | 3164 | 55.5 | 27.8 | 25.3 | 44.3 | 42.1 | 78.9 | 35.9 | 2.7 | · | · | · | 152.3 | 103.9 |
| 64 ST. VINCENT & GR | # | 118 | 2396 | · | · | 2469 | 60.8 | 24.6 | 19.4 | 40.2 | 43.2 | 54.8 | 31.2 | 2.7 | · | · | · | 153.9 | 97.0 |
| 65 TRINIDAD & TOBAGO | | 1241 | 5674 | 6770 | 14671 | 4839 | 59.1 | 11.1 | 27.7 | 70.4 | 68.3 | 133.2 | 48.3 | 3.844 | · | · | · | 74.8 | 94.0 |
| 66 U.S.A. | | 245871 | 18339 | 20605 | 37608 | 19851 | 66.5 | 17.3 | 17.7 | 100.0 | 100.0 | 100.0 | 100.0 | 1 | 32046 | 40.1 | 52.4 | 24.1 | 100.7 |
| SOUTH AMERICA | | | | | | | | | | | | | | | | | | | |
| 67 ARGENTINA | | 31506 | 4030 | 4771 | 11258 | 4363 | 78.2 | 7.1 | 11.9 | 65.2 | 59.4 | 146.1 | 52.6 | 8753E4 | 9632 | 13.5 | 39.7 | 16.1 | 94.3 |
| 68 BOLIVIA | | 6917 | 1362 | 1744 | 4362 | 1481 | 62.7 | 8.3 | 30.7 | 42.1 | 49.3 | 60.5 | 24.7 | 2350E3 | · | · | · | 35.2 | 93.9 |
| 69 BRAZIL | † | 141433 | 4441 | 5414 | 12142 | 4621 | 74.3 | 14.9 | 9.3 | 46.4 | 38.7 | 77.9 | 56.8 | 39229 | · | · | · | 14.9 | 96.3 |
| 70 CHILE | | 12760 | 4099 | 4804 | 11480 | 4719 | 61.8 | 11.5 | 24.1 | 36.7 | 38.9 | 61.9 | 14.1 | 245.05 | 8399 | 18.0 | 31.7 | 67.5 | 92.1 |
| 71 COLOMBIA | | 30007 | 3568 | 4366 | 10818 | 3807 | 72.1 | 13.5 | 13.8 | 34.2 | 31.9 | 59.3 | 23.3 | 299.2 | 9198 | 12.7 | 35.3 | 30.2 | 93.5 |
| 72 ECUADOR | | 10154 | 2727 | 3432 | 8933 | 2810 | 61.5 | 19.4 | 19.8 | 36.2 | 40.1 | 49.5 | 17.1 | 301.61 | · | · | · | 55.1 | 96.5 |
| 73 GUYANA | | 799 | 1302 | 1583 | 2859 | 1542 | 61.5 | 15.9 | 24.2 | 33.6 | 30.3 | 51.0 | 34.5 | 10 | · | · | · | 131.9 | 78.1 |
| 74 PARAGUAY | | 4042 | 2376 | 2992 | 7210 | 2590 | 71.4 | 12.2 | 17.5 | 57.6 | 58.2 | 131.6 | 16.2 | 550 | · | · | · | 54.6 | 96.5 |
| 75 PERU | | 20681 | 2847 | 3552 | 8725 | 3084 | 67.1 | 14.4 | 20.2 | 40.3 | 40.7 | 90.5 | 14.5 | 200200 | · | · | · | 24.1 | 94.8 |
| 76 SURINAME | * | 398 | 4074 | 5001 | 13859 | 4074 | 65.3 | 10.8 | 24.2 | 61.5 | 67.9 | 51.6 | 51.3 | 1.785 | · | · | · | 82.3 | 99.3 |
| 77 URUGUAY | | 3004 | 5163 | 5950 | 12948 | 5787 | 66.4 | 13.5 | 18.3 | 45.7 | 50.6 | 38.0 | 28.5 | 359.44 | · | · | · | 40.3 | 96.2 |
| 78 VENEZUELA | † | 18272 | 5717 | 7102 | 16719 | 5648 | 64.3 | 15.0 | 20.4 | 48.0 | 48.6 | 87.8 | 21.2 | 14.5 | · | · | · | 43.8 | 97.4 |
| ASIA | | | | | | | | | | | | | | | | | | | |
| 79 AFGHANISTAN | * | 18140 | 714 | 903 | 2606 | 714 | 72.0 | 7.7 | 15.6 | 33.4 | 33.9 | 59.9 | 7.7 | 50.64 | · | · | · | · | · |
| 80 BAHRAIN | # | 431 | 10000 | 12012 | 22901 | 9782 | 40.6 | 31.9 | 13.7 | 86.3 | 88.1 | 67.4 | 114.6 | 0.38 | · | · | · | 170.9 | 91.2 |
| 81 BANGLADESH | * | 100590 | 700 | 908 | 2441 | 700 | 78.3 | 6.4 | 17.4 | 22.8 | 27.8 | 52.8 | 6.7 | 26 | · | · | · | 22.5 | 99.4 |
| 82 BURMA (Myanmar) | * | 36943 | 659 | 811 | 1458 | 659 | 68.7 | 11.0 | 19.6 | 27.9 | 31.3 | 43.4 | 13.7 | 8.486 | · | · | · | · | · |
| 83 CHINA | | 1083887 | 2308 | 2669 | 3823 | 2472 | 54.4 | 29.6 | 16.1 | 13.9 | 14.4 | 20.1 | 5.4 | 3.722 | · | · | · | 28.8 | 100.0 |
| 84 HONG KONG | | 5674 | 13281 | 15029 | 25006 | 14014 | 66.2 | 17.1 | 13.1 | 68.6 | 62.3 | 126.7 | 32.7 | 7.806 | · | · | · | 266.8 | · |
| 85 INDIA | | 813990 | 786 | 955 | 2059 | 870 | 61.8 | 14.2 | 25.1 | 37.9 | 41.0 | 72.4 | 16.6 | 14.477 | 1545 | 25.4 | 48.4 | 16.4 | 98.9 |
| 86 INDONESIA | | 174832 | 1714 | 2102 | 4404 | 1822 | 58.9 | 23.0 | 17.3 | 24.7 | 26.9 | 27.9 | 12.7 | 1696 | · | · | · | 48.5 | 94.2 |

* = 1985; # = 1986; † = 1987.

TABLE II
(CONTINUED)

| OBS COUNTRY | YR | POP | RGDPCH | RGDPEA | RGDPW | CGDP | CC | CI | CG | P | PC | PI | PG | XR | KAPW | KPDUR | KRES | OPEN | RGNP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87 IRAN | * | 46005 | 3558 | 4524 | 12569 | 3558 | 59.5 | 19.3 | 19.2 | 84.2 | 85.1 | 111.3 | 62.8 | 91.061 | · | · | · | · | · |
| 88 IRAQ | * | 15784 | 3508 | 4584 | 13001 | 3508 | 48.6 | 42.4 | 16.6 | 84.6 | 77.4 | 104.5 | 78.8 | 0.311 | · | · | · | · | · |
| 89 ISRAEL | | 4444 | 9412 | 11113 | 24249 | 10864 | 52.4 | 15.3 | 38.2 | 93.1 | 105.1 | 115.7 | 66.1 | 1599.2 | 19297 | 52.8 | 97.4 | 70.8 | 96.9 |
| 90 JAPAN | | 122433 | 12209 | 13579 | 24417 | 13645 | 56.5 | 27.9 | 10.6 | 171.2 | 173.8 | 216.1 | 128.9 | 128.15 | 49256 | 34.8 | 32.2 | 23.2 | 100.6 |
| 91 JORDAN | | 3937 | 2356 | 3103 | 10196 | 2684 | 68.6 | 14.8 | 29.4 | 43.4 | 48.2 | 87.3 | 35.6 | 0.372 | · | · | · | 136.6 | 91.8 |
| 92 KOREA, SOUTH (R) | | 42593 | 5156 | 6083 | 12275 | 5682 | 54.5 | 25.9 | 13.6 | 70.8 | 67.1 | 92.9 | 46.8 | 731.47 | 16659 | 28.0 | 18.5 | 73.0 | 98.6 |
| 93 KUWAIT | # | 1791 | 13044 | 16306 | 33090 | 9644 | 60.9 | 23.8 | 20.2 | 99.1 | 87.8 | 102.8 | 127.6 | 0.292 | · | · | · | 101.1 | 143.6 |
| 94 MALAYSIA | | 16921 | 4727 | 5781 | 11945 | 5070 | 44.8 | 30.2 | 20.9 | 40.4 | 44.7 | 39.8 | 24.4 | 2.619 | · | · | · | 124.6 | 94.5 |
| 95 NEPAL | * | 16687 | 729 | 930 | 1771 | 729 | 68.7 | 16.3 | 16.9 | 20.5 | 24.0 | 34.2 | 8.6 | 17.777 | · | · | · | 33.1 | 101.5 |
| 96 OMAN | * | 1242 | 9833 | 12629 | 33830 | 9833 | 41.9 | 32.9 | 15.2 | 81.9 | 69.9 | 81.3 | 100.5 | 0.345 | · | · | · | 87.0 | 88.5 |
| 97 PAKISTAN | | 105677 | 1567 | 1999 | 5162 | 1790 | 57.6 | 6.0 | 37.5 | 20.2 | 25.8 | 70.1 | 6.6 | 17.555 | · | · | · | 33.4 | 97.8 |
| 98 PHILIPPINES | | 59686 | 1947 | 2424 | 5431 | 2168 | 64.1 | 13.4 | 22.3 | 30.3 | 34.6 | 44.5 | 11.1 | 21.1 | 2660 | 24.2 | 47.3 | 48.5 | 99.6 |
| 99 SAUDI ARABIA | * | 11508 | 9541 | 12277 | 32246 | 9541 | 51.7 | 35.6 | 19.0 | 84.4 | 75.9 | 79.8 | 111.5 | 3.57 | · | · | · | 80.0 | 112.3 |
| 100 SINGAPORE | * | 2558 | 10417 | 11869 | 21735 | 10417 | 47.3 | 37.8 | 6.6 | 79.2 | 67.6 | 88.3 | 102.7 | 2.2 | · | · | · | · | 103.6 |
| 101 SRI LANKA | † | 16361 | 1959 | 2362 | 5259 | 2120 | 49.7 | 21.7 | 30.6 | 19.6 | 30.8 | 23.4 | 5.6 | 29.445 | · | · | · | 59.8 | 97.8 |
| 102 SYRIA | | 11667 | 4144 | 5472 | 16740 | 4460 | 66.4 | 15.1 | 19.6 | 28.7 | 31.1 | 36.0 | 20.5 | 11.225 | · | · | · | 26.4 | 98.7 |
| 103 TAIWAN | | 19904 | 5708 | 6629 | 13524 | 6528 | 52.1 | 19.1 | 18.3 | 93.1 | 92.9 | 118.2 | 69.8 | 28.17 | · | · | · | · | · |
| 104 THAILAND | | 54469 | 2879 | 3468 | 5532 | 3282 | 62.4 | 12.9 | 25.3 | 32.4 | 33.1 | 78.7 | 12.2 | 25.294 | 2859 | 27.7 | 23.4 | 70.7 | 98.3 |
| 105 UNITED ARAB E | * | 1350 | 20529 | 24410 | 40577 | 20529 | 36.2 | 31.8 | 6.9 | 97.5 | 77.8 | 91.3 | 199.9 | 3.671 | · | · | · | 89.7 | 100.4 |
| 106 YEMEN, N-ARAB | | 8742 | 1562 | 2039 | 7431 | 1683 | 68.8 | 8.2 | 28.0 | 40.2 | 47.0 | 71.4 | 24.7 | 9.76 | · | · | · | 44.7 | 96.5 |
| EUROPE | | | | | | | | | | | | | | | | | | | |
| 107 AUSTRIA | | 7563 | 11201 | 12326 | 23907 | 12353 | 54.8 | 28.1 | 16.6 | 136.1 | 138.9 | 146.9 | 125.1 | 12.348 | 28245 | 45.4 | 31.9 | 74.4 | 99.1 |
| 108 BELGIUM | | 9867 | 11495 | 12671 | 27481 | 13005 | 61.2 | 19.6 | 15.8 | 119.9 | 124.8 | 124.1 | 106.2 | 36.768 | 42670 | 23.1 | 46.1 | 133.9 | 98.7 |
| 109 CYPRUS | | 686 | 7858 | 9032 | 16828 | 8434 | 64.1 | 22.7 | 15.1 | 73.3 | 72.5 | 94.0 | 59.3 | 0.466 | · | · | · | 100.2 | 100.2 |
| 110 DENMARK | | 5133 | 12089 | 13263 | 21969 | 13607 | 49.9 | 17.5 | 28.0 | 153.9 | 166.2 | 179.3 | 123.2 | 6.732 | 30878 | 34.2 | 57.9 | 61.7 | 96.0 |
| 111 FINLAND | | 4944 | 12360 | 13673 | 24190 | 13980 | 50.5 | 28.0 | 21.8 | 152.2 | 163.2 | 167.2 | 118.1 | 4.183 | 46451 | 28.6 | 43.0 | 49.9 | 98.0 |
| 112 FRANCE | | 55873 | 12190 | 13598 | 27140 | 13584 | 58.9 | 22.0 | 18.9 | 125.1 | 128.2 | 134.5 | 110.5 | 5.957 | 38093 | 36.8 | 49.3 | 42.9 | 99.8 |
| 113 GERMANY, WEST | | 61049 | 12604 | 13643 | 26219 | 14621 | 54.0 | 20.8 | 17.5 | 135.3 | 137.1 | 152.7 | 130.9 | 1.756 | 38261 | 33.1 | 48.5 | 59.5 | 100.5 |
| 114 GREECE | | 10030 | 5857 | 6554 | 15366 | 6436 | 70.3 | 15.8 | 19.6 | 82.2 | 80.0 | 107.4 | 76.1 | 141.86 | 15310 | 26.4 | 76.2 | 52.5 | 98.6 |
| 115 HUNGARY | | 10604 | 5530 | 6169 | 11166 | 5924 | 58.7 | 25.2 | 14.9 | 44.6 | 46.5 | 50.6 | 29.6 | 50.413 | · | · | · | 72.9 | 96.2 |
| 116 ICELAND | | 249 | 13204 | 15160 | 24846 | 14875 | 65.8 | 20.0 | 15.4 | 161.2 | 151.5 | 181.3 | 178.4 | 43.014 | · | · | · | 69.5 | 96.8 |

* = 1985; # = 1986; † = 1987.

TABLE II
(CONTINUED)

| OBS COUNTRY | YR | POP | RGDPCH | RGDPEA | RGDPW | CGDP | CC | CI | CG | P | PC | PI | PG | XR | KAPW | KPDUR | KRES | OPEN | RGNP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 117 IRELAND | | 3574 | 6239 | 7302 | 15546 | 7022 | 51.6 | 17.7 | 18.1 | 114.1 | 112.2 | 149.4 | 100.4 | 0.656 | 22741 | 39.4 | 66.1 | 119.0 | 88.1 |
| 118 ITALY | | 57470 | 11741 | 12919 | 29201 | 13001 | 61.5 | 22.0 | 17.0 | 110.9 | 111.7 | 134.4 | 88.5 | 1301.6 | 32968 | 32.7 | 67.5 | 36.6 | 99.3 |
| 119 LUXEMBOURG | | 370 | 13933 | 15257 | 33259 | 14293 | 61.4 | 23.1 | 13.7 | 124.3 | 116.1 | 151.3 | 133.6 | 36.768 | · | · | · | 205.1 | 135.4 |
| 120 MALTA | | 345 | 6802 | 7718 | 16392 | 7436 | 64.8 | 24.5 | 19.3 | 71.4 | 73.1 | 95.5 | 56.5 | 0.331 | · | · | · | 166.1 | 104.7 |
| 121 NETHERLANDS | | 14760 | 11468 | 12641 | 28050 | 12684 | 60.0 | 17.5 | 17.6 | 121.9 | 121.2 | 150.2 | 107.8 | 1.977 | · | · | · | 105.0 | 99.6 |
| 122 NORWAY | | 4205 | 14976 | 16553 | 30103 | 13819 | 49.0 | 30.7 | 21.0 | 156.7 | 166.6 | 164.1 | 133.5 | 6.517 | 50932 | 23.4 | 33.9 | 71.9 | 97.8 |
| 123 POLAND | † | 37664 | 4086 | 4672 | 7928 | 4189 | 53.8 | 33.0 | 12.6 | 40.6 | 48.7 | 39.8 | 15.9 | 265.08 | · | · | · | 41.1 | 95.4 |
| 124 PORTUGAL | | 10162 | 5321 | 6050 | 11583 | 5984 | 58.6 | 22.2 | 25.8 | 68.6 | 77.1 | 105.9 | 32.5 | 143.95 | · | · | · | 78.8 | 98.0 |
| 125 SPAIN | | 38997 | 7406 | 8380 | 20398 | 8253 | 61.8 | 22.8 | 16.7 | 105.8 | 108.0 | 123.5 | 83.5 | 116.49 | 26221 | 25.4 | 84.4 | 40.0 | 98.9 |
| 126 SWEDEN | | 8357 | 12991 | 14219 | 25330 | 14941 | 51.5 | 18.6 | 27.8 | 145.3 | 149.9 | 172.7 | 120.9 | 6.127 | 25256 | 33.0 | 51.7 | 63.3 | 98.1 |
| 127 SWITZERLAND | | 6545 | 16155 | 17654 | 33080 | 17763 | 62.5 | 32.3 | 5.1 | 159.0 | 147.7 | 171.3 | 318.0 | 1.463 | · | · | · | 71.6 | 105.2 |
| 128 TURKEY | | 53772 | 3598 | 4369 | 8507 | 3904 | 65.3 | 19.3 | 14.8 | 33.7 | 33.8 | 47.8 | 17.4 | 1422.4 | · | · | · | 46.1 | 97.0 |
| 129 U.K. | | 57019 | 11982 | 13251 | 24725 | 13060 | 64.7 | 18.7 | 20.8 | 110.8 | 109.6 | 143.3 | 88.5 | 0.562 | 22600 | 44.0 | 33.2 | 50.5 | 100.2 |
| 130 YUGOSLAVIA | † | 23411 | 4628 | 5241 | 10191 | 4857 | 48.3 | 32.5 | 17.6 | 58.6 | 52.4 | 42.7 | 98.8 | 737 | · | · | · | 46.2 | 97.5 |
| OCEANIA | | | | | | | | | | | | | | | | | | | |
| 131 AUSTRALIA | | 16506 | 13321 | 15043 | 28490 | 14529 | 59.6 | 24.5 | 16.9 | 102.6 | 100.3 | 115.8 | 99.9 | 1.28 | 29829 | 41.9 | 39.1 | 34.4 | 96.0 |
| 132 FIJI | † | 722 | 3353 | 4114 | 10090 | 3593 | 59.6 | 13.7 | 24.6 | 44.6 | 48.4 | 45.9 | 29.6 | 1.224 | · | · | · | 82.2 | 96.8 |
| 133 NEW ZEALAND | | 3339 | 9864 | 11151 | 21609 | 11308 | 60.5 | 19.2 | 16.8 | 105.4 | 104.2 | 140.0 | 81.5 | 1.553 | · | · | · | 53.4 | 96.1 |
| 134 PAPUA N. GUINEA | | 3804 | 1696 | 2129 | 3603 | 1885 | 55.6 | 21.3 | 25.6 | 49.1 | 51.7 | 67.3 | 35.7 | 0.875 | · | · | · | 94.4 | 94.1 |
| 135 SOLOMON IS. | | 304 | 2282 | · | · | 2444 | 66.4 | 22.1 | 22.9 | 27.3 | 28.6 | 54.3 | 35.6 | 2.083 | · | · | · | 165.6 | 99.7 |
| 136 TONGA | * | 97 | 2135 | · | · | 2135 | 74.2 | 23.5 | 18.2 | 29.6 | 41.3 | 54.0 | 20.7 | 1.304 | · | · | · | 102.2 | 103.2 |
| 137 VANUATU | * | 137 | 1973 | · | · | 1973 | 54.0 | 27.0 | 26.2 | 43.7 | 48.8 | 54.2 | 43.0 | 106.03 | · | · | · | 123.4 | 103.2 |
| 138 WESTERN SAMOA | | 168 | 1744 | · | · | 1887 | 66.6 | 17.5 | 29.6 | 35.8 | 48.9 | 68.6 | 19.4 | 2.08 | · | · | · | 95.3 | 99.7 |

* = 1985; # = 1986; † = 1987.

To give the reader a glimpse of the country *dynamics* lying behind the Table II entries, Table III provides growth rates for selected variables and time periods. Note that symbols in the YR column indicate the terminal year of the period 1980–1988 if data for 1988 are not available.

*B. Changes in the World Income Distribution*

A simple illustration of what can be done with PWT5 is presented in Table IV. The table tracks over time the shares of world output accruing to countries in various geographic regions and in different income tiers.[16] The "world" of this table consists of 119 countries for which PWT5 entries are available back to 1960. The relative stability of the shares of the poor and rich over the 27 years shows through clearly. Both went down a little, while the share of the middle income countries went up sharply.

The shares are shown for two different measures of income: (i) CGDP, where each country's national-price GDP is converted into dollars using its PPP; and (ii) an alternative dollar GDP where each country's national-price GDP is converted into dollars using its exchange rate. This is to show the sensitivity of judgments about the world's income distribution to the choice of income measure. The table makes clear that it really makes a difference if exchange rates are used rather than PPPs. The share of world income received by the developing nations of Africa, Asia, and Latin America is significantly understated when exchange rates are used to add together the incomes of different countries. Note that over time changing patterns of exchange rates not matched by changing PPPs make it appear that the income share of the poorest nations has halved between 1960 and 1988 when, as noted above, in fact it has remained almost the same.

*C. Caveats about the Use of PWT5*

As was said in the Introduction, PWT5 is envisioned as one more step in the creation of a System of *Real* Accounts, a companion to the SNA but not at all a replacement for it. (The reader should be reminded that the SNA can be recovered from PWT5. Therefore, there is no need to use PWT5 entries simply because they are more conveniently available than SNA numbers. Note again, however, that the recovered constant-price series for multiple benchmark countries are the World Bank numbers as modified by the PWT5 reconciliation process described in subsec-

16. A more detailed but somewhat less up-to-date analysis of the world income distribution is given in Summers, Kravis, and Heston [1984].

TABLE III

GROWTH RATES FOR 1960–1973, 1973–1980, 1980–1988: GDP, GDP PER CAPITA, AND GDP PER WORKER: 133 COUNTRIES

| | 1960–1973 | | | 1973–1980 | | | 1980–1988 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AFRICA | GDP | GDP/Pop | GDP/W | GDP | GDP/Pop | GDP/W | GDP | GDP/Pop | GDP/W | YR |
| 1 ALGERIA | 4.3 | 1.7 | 3.3 | 8.7 | 5.5 | 5.3 | 1.8 | −1.3 | −1.8 | |
| 2 ANGOLA | 4.0 | 1.8 | 2.5 | −5.6 | −7.9 | −8.2 | 0.5 | −2.0 | −1.2 | * |
| 3 BENIN | 2.9 | 0.3 | 1.3 | 2.0 | −0.6 | 0.0 | 1.7 | −1.4 | −0.4 | |
| 4 BOTSWANA | 10.4 | 7.3 | 8.6 | 10.8 | 6.9 | 7.6 | 6.8 | 3.3 | 3.3 | # |
| 5 BURKINA FASO | · | · | · | 4.4 | 2.1 | 2.6 | 5.2 | 2.5 | 3.2 | |
| 6 BURUNDI | 0.8 | −0.7 | −0.5 | 3.7 | 1.6 | 2.3 | 4.6 | 1.7 | 2.4 | |
| 7 CAMEROON | 5.0 | 2.8 | 3.3 | 8.5 | 5.2 | 6.9 | 4.0 | 0.8 | 2.1 | |
| 8 CAPE VERDE IS. | 1.0 | −1.5 | −1.6 | 7.6 | 6.2 | 6.5 | 6.9 | 4.8 | 3.3 | * |
| 9 CENTRAL AFR. R. | 1.7 | 0.1 | 0.7 | 1.5 | −0.6 | 0.3 | 0.9 | −1.6 | −0.5 | |
| 10 CHAD | 0.7 | −1.1 | −0.8 | −2.2 | −4.2 | −3.9 | 3.0 | 0.7 | 1.2 | * |
| 11 COMOROS | · | · | · | · | · | · | · | · | · | |
| 12 CONGO | 5.8 | 3.3 | 3.8 | 5.4 | 2.3 | 3.2 | 5.6 | 2.2 | 3.7 | # |
| 13 EGYPT | 5.9 | 3.5 | 3.8 | 11.1 | 8.4 | 8.8 | 4.3 | 1.5 | 1.6 | |
| 14 ETHIOPIA | 4.3 | 1.7 | 2.0 | 3.5 | 0.8 | 1.5 | 1.8 | −0.5 | 0.1 | # |
| 15 GABON | 9.1 | 7.2 | 8.5 | 6.7 | 1.9 | 5.8 | 6.3 | 1.6 | 5.6 | * |
| 16 GAMBIA | 6.3 | 3.8 | 4.2 | 3.7 | 0.3 | 1.7 | 4.6 | 1.2 | 3.4 | * |
| 17 GHANA | 2.6 | 0.2 | 0.9 | 0.9 | −1.0 | −1.5 | 1.8 | −1.6 | −0.9 | |
| 18 GUINEA | 1.3 | −0.3 | −0.2 | 4.1 | 2.0 | 2.3 | 2.5 | 0.3 | 0.9 | * |
| 19 GUINEA-BISS | 4.3 | 3.9 | · | −1.5 | −6.2 | · | 4.6 | 2.6 | · | |
| 20 IVORY COAST | 7.7 | 3.7 | 4.7 | 5.7 | 1.4 | 3.0 | 0.0 | −4.0 | −2.6 | |
| 21 KENYA | 6.7 | 3.0 | 3.3 | 4.2 | 0.4 | 0.6 | 3.4 | −0.8 | −0.1 | |
| 22 LESOTHO | 7.8 | 5.6 | 6.2 | 11.5 | 8.8 | 9.4 | 2.1 | −0.6 | 0.1 | * |
| 23 LIBERIA | 4.5 | 1.7 | 2.0 | 2.8 | −0.3 | 0.2 | −1.9 | −5.0 | −4.0 | # |
| 24 MADAGASCAR | 2.0 | −0.4 | 0.0 | 1.0 | −1.6 | −1.1 | −1.2 | −4.3 | −3.1 | |
| 25 MALAWI | 5.2 | 2.5 | 3.0 | 3.7 | 0.7 | 1.4 | 2.1 | −1.5 | −0.5 | |
| 26 MALI | 0.3 | −2.1 | −1.3 | 5.3 | 3.1 | 3.5 | 1.5 | −0.9 | −1.0 | |
| 27 MAURITANIA | 3.9 | 1.6 | 2.0 | 2.4 | −0.0 | 0.7 | 0.5 | −2.1 | −2.2 | |
| 28 MAURITIUS | 2.9 | 0.9 | 0.2 | 7.4 | 5.6 | 4.8 | 4.7 | 3.7 | 1.7 | |
| 29 MOROCCO | 6.9 | 4.2 | 4.5 | 6.8 | 4.4 | 3.2 | 3.3 | 0.6 | 0.0 | |
| 30 MOZAMBIQUE | 5.2 | 2.9 | 2.9 | −3.7 | −6.2 | −7.2 | −1.4 | −4.0 | −3.4 | |
| 31 NIGER | 3.4 | 0.8 | 1.2 | 5.6 | 2.6 | 3.6 | −0.5 | −3.5 | −2.8 | |
| 32 NIGERIA | 4.4 | 1.8 | 1.6 | 3.6 | 1.1 | 0.5 | −2.2 | −5.3 | −4.7 | |
| 33 RWANDA | 3.4 | 0.4 | 0.8 | 6.6 | 3.1 | 3.4 | 2.6 | −0.7 | −0.2 | |
| 34 SENEGAL | 2.2 | −0.2 | −0.6 | 3.9 | 1.1 | 0.6 | 2.0 | −0.8 | 0.1 | |
| 35 SEYCHELLES | · | · | · | · | · | · | −2.1 | −2.8 | · | # |
| 36 SIERRA LEONE | 5.3 | 3.7 | 4.4 | −0.6 | −2.7 | −1.6 | −0.9 | −3.2 | −2.0 | † |
| 37 SOMALIA | 2.4 | −0.9 | 0.2 | 3.7 | 1.0 | −0.1 | 2.0 | −0.9 | 0.2 | |
| 38 SOUTH AFRICA | 5.3 | 2.9 | 2.8 | 3.2 | 0.9 | 1.9 | 1.8 | −0.5 | −1.0 | |
| 39 SUDAN | 1.6 | −0.7 | −0.3 | 5.9 | 2.7 | 3.2 | 0.5 | −2.5 | −2.3 | |
| 40 SWAZILAND | 8.4 | 5.1 | 6.4 | 4.6 | 1.5 | 2.5 | −0.2 | −3.4 | −2.3 | * |
| 41 TANZANIA | 6.5 | 3.2 | 3.7 | 6.4 | 3.0 | 3.5 | 3.0 | −0.5 | 0.2 | |
| 42 TOGO | 7.1 | 4.2 | 4.6 | 5.7 | 3.1 | 3.5 | 0.0 | −3.3 | −2.2 | |
| 43 TUNISIA | 5.5 | 3.5 | 3.7 | 7.0 | 4.5 | 3.2 | 2.3 | −0.2 | −0.7 | |
| 44 UGANDA | 4.6 | 0.9 | 1.0 | −5.7 | −8.1 | −8.1 | 16.8 | 13.3 | 13.7 | * |
| 45 ZAIRE | 5.4 | 3.2 | 3.9 | −3.7 | −6.8 | −5.5 | 3.3 | 0.2 | 1.0 | |
| 46 ZAMBIA | 4.0 | 1.0 | 1.3 | −2.6 | −5.5 | −5.1 | 0.6 | −2.8 | −2.5 | |
| 47 ZIMBABWE | 5.5 | 1.8 | 2.1 | 5.4 | 2.4 | 2.5 | 2.2 | −1.3 | −0.6 | |

* = 1985; # = 1986; † = 1987.

TABLE III
(CONTINUED)

| CENTRAL & NORTH AMERICA | 1960–1973 GDP | 1960–1973 GDP/Pop | 1960–1973 GDP/W | 1973–1980 GDP | 1973–1980 GDP/Pop | 1973–1980 GDP/W | 1980–1988 GDP | 1980–1988 GDP/Pop | 1980–1988 GDP/W | YR |
|---|---|---|---|---|---|---|---|---|---|---|
| 48 BAHAMAS | · | · | · | · | · | · | 3.6 | 1.6 | · | † |
| 49 BARBADOS | 4.6 | 4.2 | 4.0 | 3.2 | 2.8 | 0.5 | −2.6 | −2.9 | −4.0 | * |
| 50 CANADA | 4.8 | 3.1 | 1.9 | 3.8 | 2.6 | 0.7 | 3.2 | 2.1 | 1.9 | |
| 51 COSTA RICA | 6.6 | 3.4 | 3.0 | 5.1 | 2.6 | 1.2 | 1.7 | −0.6 | −1.1 | |
| 52 DOMINICA | · | · | · | · | · | · | · | · | · | |
| 53 DOMINICAN REP. | 6.8 | 3.9 | 4.3 | 4.3 | 1.7 | 1.1 | 2.0 | −0.3 | −1.3 | |
| 54 EL SALVADOR | 5.9 | 2.6 | 2.4 | 2.6 | 0.4 | −0.4 | 0.3 | −1.1 | −2.7 | |
| 55 GRENADA | · | · | · | · | · | · | · | · | · | |
| 56 GUATEMALA | 5.3 | 2.2 | 2.8 | 5.3 | 2.5 | 3.1 | 0.7 | −2.1 | −2.1 | |
| 57 HAITI | 1.0 | −0.6 | −0.2 | 5.0 | 3.1 | 4.0 | −0.5 | −2.2 | −2.4 | |
| 58 HONDURAS | 5.2 | 2.0 | 2.5 | 6.3 | 2.8 | 3.1 | 2.9 | −0.6 | −0.9 | |
| 59 JAMAICA | 6.0 | 4.4 | 4.8 | −2.4 | −3.7 | −5.2 | 0.8 | −0.6 | −2.0 | † |
| 60 MEXICO | 6.8 | 3.4 | 3.6 | 6.6 | 3.7 | 2.1 | 0.4 | −1.8 | −2.7 | |
| 61 NICARAGUA | 6.7 | 3.8 | 3.7 | −0.4 | −3.2 | −3.2 | −0.8 | −4.1 | −4.4 | # |
| 62 PANAMA | 8.1 | 5.0 | 5.0 | 4.9 | 2.5 | 2.4 | 2.8 | 0.6 | −0.1 | # |
| 63 ST. LUCIA | · | · | · | · | · | · | 2.4 | 0.5 | · | † |
| 64 ST. VINCENT & GRE | · | · | · | · | · | · | 6.3 | 4.8 | · | # |
| 65 TRINIDAD & TOBAGO | 4.5 | 2.6 | 3.0 | 9.4 | 7.8 | 7.0 | −6.7 | −8.2 | −8.9 | |
| 66 U.S.A. | 4.0 | 2.7 | 2.1 | 2.1 | 1.1 | −0.2 | 3.3 | 2.3 | 2.1 | |
| SOUTH AMERICA | | | | | | | | | | |
| 67 ARGENTINA | 3.9 | 2.3 | 2.6 | 1.8 | 0.1 | 0.8 | −0.3 | −1.7 | −1.4 | |
| 68 BOLIVIA | 5.7 | 3.2 | 3.7 | 3.5 | 0.9 | 1.4 | −1.0 | −3.7 | −3.7 | |
| 69 BRAZIL | 10.0 | 7.1 | 6.6 | 6.5 | 4.0 | 3.0 | 2.0 | −0.2 | −0.2 | † |
| 70 CHILE | 3.9 | 1.8 | 2.0 | 2.6 | 1.1 | 0.2 | 1.3 | −0.4 | −1.1 | |
| 71 COLOMBIA | 5.9 | 3.0 | 3.1 | 4.8 | 2.8 | 2.2 | 2.7 | 0.9 | 0.0 | |
| 72 ECUADOR | 5.8 | 2.8 | 3.1 | 9.2 | 6.0 | 6.3 | 1.0 | −1.8 | −2.0 | |
| 73 GUYANA | 3.3 | 1.1 | 0.8 | 1.4 | 0.4 | −2.3 | −4.3 | −4.9 | −6.9 | |
| 74 PARAGUAY | 4.6 | 2.0 | 1.9 | 10.7 | 7.3 | 6.9 | 2.3 | −0.9 | −0.7 | |
| 75 PERU | 5.9 | 2.9 | 3.5 | 3.2 | 0.4 | −0.2 | 0.8 | −1.4 | −2.0 | |
| 76 SURINAME | 6.0 | 3.7 | 4.3 | 3.3 | 4.4 | 2.8 | −1.3 | −3.5 | −3.6 | * |
| 77 URUGUAY | 1.0 | 0.2 | 0.3 | 4.4 | 4.1 | 4.2 | −1.3 | −1.8 | −1.9 | |
| 78 VENEZUELA | 6.5 | 2.7 | 3.1 | 7.1 | 3.4 | 2.1 | 0.0 | −2.7 | −3.3 | † |
| ASIA | | | | | | | | | | |
| 79 AFGHANISTAN | 1.9 | −0.4 | −0.1 | 1.7 | −0.8 | 0.2 | 3.0 | 0.4 | 2.3 | * |
| 80 BAHRAIN | · | · | · | 7.5 | 2.6 | −1.0 | 2.4 | −1.2 | −2.6 | # |
| 81 BANGLADESH | 1.5 | −1.0 | −0.1 | 5.9 | 3.1 | 3.7 | 3.7 | 0.8 | 0.9 | * |
| 82 BURMA (Myanmar) | 4.5 | 2.2 | 2.4 | 5.3 | 3.2 | 3.0 | 5.2 | 3.2 | 3.2 | * |
| 83 CHINA | 4.6 | 2.3 | 2.3 | 5.3 | 3.7 | 2.8 | 9.2 | 7.8 | 6.8 | |
| 84 HONG KONG | 9.6 | 7.0 | 5.8 | 8.8 | 5.9 | 4.2 | 7.6 | 6.0 | 5.3 | |
| 85 INDIA | 2.5 | 0.2 | 0.9 | 2.3 | −0.0 | 0.5 | 5.0 | 2.8 | 3.0 | |
| 86 INDONESIA | · | · | · | 9.1 | 6.7 | 6.8 | 4.4 | 2.3 | 2.0 | |
| 87 IRAN | 7.8 | 4.3 | 4.6 | 0.1 | −2.9 | −3.0 | 8.7 | 5.0 | 5.2 | * |
| 88 IRAQ | 5.5 | 2.2 | 2.4 | 12.7 | 8.8 | 8.3 | −7.5 | −10.7 | −10.8 | * |
| 89 ISRAEL | 9.2 | 5.6 | 5.5 | 3.2 | 0.8 | 0.4 | 3.0 | 1.3 | 0.8 | |
| 90 JAPAN | 9.8 | 8.7 | 8.2 | 3.9 | 2.7 | 3.1 | 3.6 | 3.0 | 2.7 | |
| 91 JORDAN | 4.5 | 1.4 | 2.0 | 9.4 | 6.9 | 8.3 | 2.8 | −1.0 | −1.5 | |
| 92 KOREA, SOUTH (R) | 9.3 | 6.7 | 6.1 | 6.9 | 5.2 | 4.2 | 8.3 | 6.9 | 5.7 | |
| 93 KUWAIT | 3.8 | −4.7 | −3.6 | −4.6 | −10.4 | −11.1 | −5.0 | −9.1 | −10.2 | # |

* = 1985; # = 1986; † = 1987.

TABLE III
(CONTINUED)

| ASIA | 1960–1973 GDP | 1960–1973 GDP/Pop | 1960–1973 GDP/W | 1973–1980 GDP | 1973–1980 GDP/Pop | 1973–1980 GDP/W | 1980–1988 GDP | 1980–1988 GDP/Pop | 1980–1988 GDP/W | YR |
|---|---|---|---|---|---|---|---|---|---|---|
| 94 MALAYSIA | 6.8 | 3.9 | 3.8 | 8.5 | 6.0 | 4.6 | 3.5 | 0.8 | 0.6 | |
| 95 NEPAL | 2.2 | 0.2 | 1.0 | 4.6 | 1.9 | 2.8 | 3.9 | 1.2 | 1.6 | * |
| 96 OMAN | · | · | · | · | · | · | 16.2 | 10.9 | 10.5 | * |
| 97 PAKISTAN | 4.9 | 1.9 | 2.6 | 4.4 | 1.3 | 1.6 | 7.3 | 4.0 | 4.2 | |
| 98 PHILIPPINES | 5.5 | 2.5 | 2.9 | 6.0 | 3.2 | 3.5 | 1.9 | −0.5 | −0.6 | |
| 99 SAUDI ARABIA | 9.7 | 5.8 | 5.7 | 6.9 | 1.6 | 1.2 | −7.8 | −11.5 | −11.6 | * |
| 100 SINGAPORE | 8.8 | 6.4 | 5.3 | 7.6 | 6.1 | 3.1 | 6.1 | 4.9 | 4.1 | * |
| 101 SRI LANKA | 2.0 | −0.1 | −0.1 | 3.9 | 2.1 | 1.5 | 4.6 | 3.1 | 3.0 | † |
| 102 SYRIA | 6.9 | 3.5 | 4.4 | 13.0 | 9.2 | 9.2 | 0.7 | −2.8 | −2.8 | |
| 103 TAIWAN | 10.5 | 7.5 | 7.5 | 8.4 | 6.3 | 4.6 | 6.7 | 5.3 | 3.6 | |
| 104 THAILAND | 7.0 | 3.8 | 4.0 | 6.8 | 4.2 | 3.9 | 5.9 | 3.8 | 3.5 | |
| 105 UNITED ARAB E. | · | · | · | 14.0 | −1.5 | −4.0 | −4.4 | −9.7 | −9.1 | * |
| 106 YEMEN, N-ARAB | · | · | · | 12.5 | 9.3 | 11.5 | 5.2 | 2.4 | 2.3 | |
| EUROPE | | | | | | | | | | |
| 107 AUSTRIA | 5.0 | 4.4 | 5.5 | 2.9 | 2.9 | 2.1 | 1.9 | 1.9 | 1.3 | |
| 108 BELGIUM | 4.8 | 4.3 | 4.4 | 2.4 | 2.2 | 1.5 | 1.2 | 1.1 | 0.6 | |
| 109 CYPRUS | 7.5 | 7.0 | 6.4 | 2.8 | 2.4 | 1.5 | 5.1 | 3.9 | 3.9 | |
| 110 DENMARK | 4.4 | 3.7 | 3.1 | 1.6 | 1.3 | 0.3 | 2.0 | 2.0 | 1.5 | |
| 111 FINLAND | 4.9 | 4.4 | 4.0 | 3.0 | 2.6 | 2.2 | 3.2 | 2.7 | 2.4 | |
| 112 FRANCE | 5.7 | 4.6 | 4.8 | 2.6 | 2.1 | 1.7 | 1.6 | 1.1 | 0.8 | |
| 113 GERMANY, WEST | 4.4 | 3.5 | 4.0 | 2.1 | 2.2 | 1.6 | 1.6 | 1.7 | 1.2 | |
| 114 GREECE | 7.9 | 7.3 | 7.7 | 3.2 | 2.1 | 2.4 | 1.3 | 0.8 | 0.8 | |
| 115 HUNGARY | · | · | · | 5.8 | 5.4 | 6.3 | 1.2 | 1.3 | 1.1 | |
| 116 ICELAND | 5.0 | 3.5 | 2.3 | 6.2 | 5.1 | 3.3 | 2.5 | 1.4 | 0.9 | |
| 117 IRELAND | 4.9 | 4.2 | 4.5 | 3.2 | 1.7 | 2.0 | 0.7 | 0.1 | −0.9 | |
| 118 ITALY | 5.1 | 4.4 | 4.9 | 4.2 | 3.8 | 3.8 | 2.3 | 2.0 | 1.6 | |
| 119 LUXEMBOURG | 4.0 | 3.1 | 3.7 | 1.7 | 1.2 | 0.2 | 2.9 | 2.7 | 2.6 | |
| 120 MALTA | 4.6 | 4.8 | 3.1 | 10.6 | 8.7 | 8.4 | 3.3 | 4.0 | 2.2 | |
| 121 NETHERLANDS | 5.2 | 3.9 | 3.6 | 2.9 | 2.1 | 1.4 | 1.5 | 1.0 | 0.2 | |
| 122 NORWAY | 4.5 | 3.7 | 2.9 | 5.2 | 4.7 | 3.1 | 3.2 | 2.9 | 2.4 | |
| 123 POLAND | · | · | · | · | · | · | 0.3 | −0.5 | −0.4 | † |
| 124 PORTUGAL | 6.9 | 6.9 | 6.3 | 3.8 | 2.3 | 1.2 | 2.4 | 2.1 | 1.5 | |
| 125 SPAIN | 7.7 | 6.6 | 7.2 | 1.8 | 0.7 | 1.0 | 2.2 | 1.6 | 1.0 | |
| 126 SWEDEN | 4.0 | 3.3 | 2.7 | 1.7 | 1.4 | 0.6 | 2.3 | 2.2 | 1.9 | |
| 127 SWITZERLAND | 4.5 | 3.0 | 3.0 | 0.3 | 0.4 | 0.0 | 2.0 | 1.7 | 1.4 | |
| 128 TURKEY | 6.1 | 3.5 | 4.6 | 4.4 | 2.0 | 2.6 | 4.6 | 2.3 | 2.4 | |
| 129 U. K. | 3.2 | 2.7 | 2.7 | 1.1 | 1.1 | 0.6 | 2.9 | 2.7 | 2.4 | |
| 130 YUGOSLAVIA | 6.1 | 5.1 | 5.2 | 6.2 | 5.2 | 5.3 | 0.8 | 0.1 | −0.2 | † |
| OCEANIA | | | | | | | | | | |
| 131 AUSTRALIA | 5.2 | 3.1 | 2.6 | 2.7 | 1.3 | 0.4 | 3.1 | 1.6 | 1.4 | |
| 132 FIJI | 5.8 | 3.1 | 2.4 | 4.0 | 2.0 | 1.0 | −0.7 | −2.6 | −2.9 | † |
| 133 NEW ZEALAND | 3.8 | 2.1 | 1.7 | 0.3 | −0.5 | −1.7 | 1.8 | 0.9 | 0.1 | |
| 134 PAPUA N. GUINEA | 6.6 | 4.3 | 4.7 | 1.6 | −0.9 | −0.3 | 1.6 | −1.0 | −0.5 | |
| 135 SOLOMON IS. | · | · | · | · | · | · | 6.4 | 2.7 | · | |
| 136 TONGA | · | · | · | · | · | · | · | · | · | |
| 137 VANUATU | · | · | · | · | · | · | · | · | · | |
| 138 WESTERN SAMOA | · | · | · | · | · | · | −0.1 | −1.1 | · | |

* = 1985; # = 1986; † = 1987.

TABLE IV
THE DISTRIBUTION OF WORLD INCOME
INCOME SHARES OF GROUPS OF COUNTRIES: 1960, 1970, 1980, 1988

| Year | Measure | Panel A: Percent of world output received by countries in five regions: Africa | Latin America | Asia | Europe | Canada & the U.S. |
|---|---|---|---|---|---|---|
| 1960 | | | | | | |
| | CGDP | 4.3 | 7.9 | 24.9 | 29.7 | 33.2 |
| | Exch. rate | 3.3 | 5.6 | 16.4 | 28.8 | 45.9 |
| 1970 | | | | | | |
| | CGDP | 4.2 | 8.8 | 27.1 | 29.3 | 30.6 |
| | Exch. rate | 3.0 | 6.0 | 18.6 | 30.7 | 41.7 |
| 1980 | | | | | | |
| | CGDP | 4.8 | 11.1 | 30.2 | 26.7 | 27.2 |
| | Exch. rate | 3.9 | 8.0 | 22.6 | 36.1 | 29.4 |
| 1988 | | | | | | |
| | CGDP | 4.0 | 8.9 | 35.6 | 24.4 | 27.1 |
| | Exch. rate | 2.1 | 4.6 | 28.1 | 33.3 | 31.9 |
| 1980 | Population (%) | 12.4 | 9.2 | 60.8 | 11.0 | 6.6 |

| Year | Measure | Panel B: Percent of world output received by four income tiers: Lowest | Lower middle | Upper middle | Industrialized |
|---|---|---|---|---|---|
| 1960 | | | | | |
| | CGDP | 17.2 | 9.3 | 5.5 | 68.0 |
| | Exch. rate | 10.1 | 6.7 | 4.9 | 78.3 |
| 1970 | | | | | |
| | CGDP | 15.4 | 11.0 | 5.6 | 68.0 |
| | Exch. rate | 8.0 | 6.8 | 4.4 | 80.8 |
| 1980 | | | | | |
| | CGDP | 15.7 | 14.2 | 7.2 | 62.9 |
| | Exch. rate | 6.9 | 8.5 | 6.9 | 77.7 |
| 1988 | | | | | |
| | CGDP | 20.6 | 12.9 | 6.1 | 60.4 |
| | Exch. rate | 4.9 | 6.4 | 4.9 | 83.8 |
| 1980 | Population (%) | 59.0 | 15.5 | 6.0 | 19.5 |
| No. of countries | | 39 | 37 | 17 | 26 |

tion III. B. above and in Appendix B.) It is envisioned that researchers in a variety of fields will find PWT5 helpful in answering many kinds of questions, but by no means all. Comparisons of real quantities across countries nearly always call for comparisons of countries' national-currency expenditures. Most

such comparisons require that the country expenditures be converted to a common currency, and this is nearly always best done if the conversion factors used are appropriate PPPs for the countries. They may be overall PPPs for GDP, or PPPs for a lower aggregation like, say investment. (Or a special-purpose PPP may be needed, like one specifically designed to help in the comparison of military expenditures in different countries.)

But in each of these cases, the fact that relative prices are not the same in different countries is not critically important. Where differences in relative prices make a difference in particular comparisons, they should not be ignored. In most international comparisons of effort, national prices are what count. After all, residents of a country face their own prices, not international prices. For example, consider country savings rates. They are normally directed at measuring a country's effort to set aside currently available output in order to augment future production. They should be calculated on the basis of domestic prices. That is, if the share of GDP devoted to capital formation is the form the country's saving takes, the share calculation should be based on domestic prices rather than international prices.

One more observation: it was argued strongly in subsection II. C that the exchange rate is a poor substitute for a PPP in comparing countries' national outputs. But the exchange rate *is* the right number to use in comparing different countries' capital flows. The terms on which residents of one country can buy goods from another country are defined by the country's exchange rate, not by its PPP. In general, a country's international transactions, quantified in its own currency units, are best compared with those of other countries' transactions via exchange rates rather than PPPs.

A detailed comparison is presented in Appendix B of growth rates of GDP per capita calculated on the basis of a number of different sets of prices. That analysis is motivated by a desire to understand the empirical differences between growth rates based on national and international prices. (That is, a need to see how growth rates embedded in an S*R*NA differ from those of the SNA.)[17] This is not the place for a discussion of the merits of using

17. The reader should be reminded that "international prices" here are average world prices of final goods and not the actual "one-price" values prevailing around the world. Most discussions of whether world prices or national prices should be used in measuring growth are concerned with this latter comparison. (See, for example, Bhagwati and Hansen [1972].)

one set of prices or another in appraising countries' growth performance. It is sufficient here to make a few observations to guide researchers calculating growth rates from PWT5. Growth rates based on international prices can differ significantly from those based on national prices; but when they do, it is nearly always the case that relative prices within the countries have changed substantially over the growth rate period.

Consider two measures of a country's national growth rate between 1960 and 1988, the first based on 1960 national prices and the second on 1988 national prices. The difference between them, the Laspeyres-Paasche spread, would be ignored by most researchers not primarily concerned with index numbers (except Gerschenkron). Unfortunately, if the Laspeyres-Paasche spread is large, substantive conclusions can be affected by the choice of which is used. Normally, the one that is at hand is the one that is used, without much concern for the size of the spread or concern about which is the right one to use. In the light of this, the strong finding in comparing national and international price growth rates is of some interest: the differences between the two are rarely significant unless the Laspeyres-Paasche spread is large. (Appendix B provides more detailed information about this.)

## VI. Conclusion

The conclusion of the article laying out PWT4 [Summers and Heston, 1988], quoted from the conclusion of the article laying out PWT3 Summers and Heston [1984]. We resist now the temptation to end this description of PWT5 by quoting from the PWT4 conclusion. Nothing said there was turned upside down subsequently, and in fact we think there are more grounds now for optimism about a quasi-official *SR*NA coming into existence in the future. The main encouragement comes from the fact that after 1990 the underpinning of the table, the ICP benchmark studies, will be extended to give us fresh readings on previously included countries and first-time benchmark readings on some important countries about which our information is still uncomfortably casual. The Penn World Table has certainly been growing bigger. With the continued cooperation of users, we shall soon learn the extent to which it is also getting better.

APPENDIX A.1: VARIABLE LIST

| | |
|---|---|
| 1. POP | Population |
| 2. RGDPCH[a] | Real GDP per capita (1985 international prices; Chain index) |
| 3. *c* | Real Consumption (% of RGDP; 1985 international prices) |
| 4. *i* | Real Gross Domestic Investment (private and public) (% of RGDP; 1985 international prices) |
| 5. *g* | Real Government (public consumption) (% of RGDP; 1985 international prices) |
| 6. RGDP[b] | Real GDP per capita (1985 international prices; Laspeyres Index) |
| 7. RGDPTT[c] | Real GDP per capita adjusted for changes in the terms of trade (1985 international prices for domestic absorption; current prices for net foreign balance) |
| 8. *y* | $CGDP_j/CGDP_{US}$ (current international prices) |
| 9. CGDP | Real GDP per capita (current international prices) |
| 10. *cc* | Real Consumption (% of CGDP; current international prices) |
| 11. *ci* | Real Gross Domestic Investment (private and public) (% of CGDP, current international prices) |
| 12. *cg* | Real Government (public consumption) (% of CGDP, current international prices) |
| 13. *P* | Price level of GDP (%) (PPP of GDP)/(Exchange Rate)[d] |
| 14. PC | Price level of Consumption (%) (PPP of Consumption)/(Exchange rate)[d] |
| 15. PI | Price level of Investment (%) (PPP of Investment)/(Exchange Rate)[d] |
| 16. PG | Price level of Government (%) (PPP of Government)/(Exchange Rate)[d] |
| 17. ExR | Exchange Rate[d] |
| 18. RGDPEA | Real GDP per equivalent adult (1985 international prices) |
| 19. RGDPW | Real GDP per worker (1985 international prices) |
| 20. Kap*W*[e] | Capital stock per worker (1985 international prices) (Kap1*W* + Kap2*W* + Kap3*W*) |
| 21. KPDUR | Producers Durables (% of Kap*W*) (1985 international prices) |
| 22. KNRES | Nonresidential Construction (% of Kap*W*) (1985 international prices) |
| 23. KOTHER | Other Construction (% of Kap*W*) (1985 international prices) |
| 24. KRES | Residential Construction (% of Kap*W*) (1985 international prices) |
| 25. OPEN | Openness (exports + imports)/(CGDP) (current international prices) |
| 26. RGNP | Real Gross National Product (% of CGDP) (current international prices) |
| 27. IPri | Gross Domestic Private Investment (% of gross domestic investment in current international prices) |

a. RGDP2 in PWT4.
b. RGDP1 in PWT4.
c. RGDP3 in PWT4.
d. PPP: Purchasing Power Parity relative to the U. S. dollar. Exchange Rate relative to the U. S. dollar.
e. Note that Residential Construction is not included in Kap*W*.

APPENDIX A.2: COUNTRY LIST

| Country | Variables: 1–19, 25,26 | Variables: 27[a] | Variables: 20–24 | Benchmark years | Quality rating |
|---|---|---|---|---|---|
| Africa | | | | | |
| 1 Algeria | 60–88 | | | | D |
| 2 Angola | 60–85 | | | | D |
| 3 Benin | 59–88 | | | 85 | D+ |
| 4 Botswana | 60–86 | | | 80,85 | C |
| 5 Burkina Faso | 65–88 | | | | D |
| 6 Burundi | 60–88 | | | | D |
| 7 Cameroon | 60–88 | | | 80,85 | C– |
| 8 Cape Verde Is. | 60–85 | | | | D |
| 9 Central Africa. Rep. | 60–88 | | | | D |
| 10 Chad | 60–85 | | | | D |
| 11 Comoros | 85 | | | | D |
| 12 Congo, Peop. Rep. | 60–86 | | | 85 | D+ |
| 13 Egypt | 50–88 | | | 85 | D+ |
| 14 Ethiopia | 50–86 | | | 80,85 | D+ |
| 15 Gabon | 60–85 | | | | D |
| 16 Gambia, The | 60–85 | | | | D |
| 17 Ghana | 55–88 | | | | D |
| 18 Guinea | 59–85 | | | | D |
| 19 Guinea Bissau | 60–88 | | | | D |
| 20 Ivory Coast | 60–88 | | | 80,85 | C– |
| 21 Kenya | 50–88 | * | | 70,75,80,85 | C |
| 22 Lesotho | 60–85 | | | | D |
| 23 Liberia | 60–86 | | | | D |
| 24 Madagascar | 60–88 | | | 80,85 | D+ |
| 25 Malawi | 54–88 | | | 75,80,85 | D+ |
| 26 Mali | 60–88 | | | 80,85 | D+ |
| 27 Mauritania | 60–88 | | | | D |
| 28 Mauritius | 50–88 | | | 85 | D+ |
| 29 Morocco | 50–88 | | | 80,85 | C– |
| 30 Mozambique | 60–88 | | | | D |
| 31 Niger | 60–88 | | | | D |
| 32 Nigeria | 50–88 | | | 80,85 | D+ |
| 33 Rwanda | 60–88 | | | 85 | D+ |
| 34 Senegal | 60–88 | | | 80,85 | C– |
| 35 Seychelles | 76–86 | | | | D |
| 36 Sierra Leone | 60–87 | | | 85 | D+ |
| 37 Somalia | 60–88 | | | | D |
| 38 So. Africa | 50–88 | * | | | C– |

APPENDIX A.2
(CONTINUED)

| Country | Variables: 1–19, 25,26 | Variables: 27[a] | Variables: 20–24 | Benchmark years | Quality rating |
|---|---|---|---|---|---|
| 39 Sudan | 55–88 | | | | D |
| 40 Swaziland | 60–85 | * | | 85 | D+ |
| 41 Tanzania | 60–88 | | | 80,85 | C– |
| 42 Togo | 60–88 | | | | D |
| 43 Tunisia | 60–88 | | | 80,85 | C– |
| 44 Uganda | 50–85 | | | | D |
| 45 Zaire | 50–88 | | | | D |
| 46 Zambia | 55–88 | | | 75,80,85 | D+ |
| 47 Zimbabwe | 54–88 | * | | 80,85 | C– |
| Asia | | | | | |
| 48 Afghanistan | 60–85 | | | | D |
| 49 Bahrain | 73–86 | | | | D |
| 50 Bangladesh | 59–85 | | | 85 | C– |
| 51 Burma (Myanmar) | 50–85 | | | | D |
| 52 China, P.R. | 60–88 | | | | D |
| 53 Hong Kong | 60–88 | | | 80,85 | B– |
| 54 India | 50–88 | * | | 70,75,80,85 | C |
| 55 Iran | 55–88 | * | | 70,75,85 | C– |
| 56 Iraq | 53–85 | | | | D |
| 57 Israel | 53–88 | | | 80 | B |
| 58 Japan | 50–88 | | 80–88 | 70,75,80,85 | A |
| 59 Jordan | 54–88 | | | | D |
| 60 Korea, Rep. of | 53–88 | | | 70,75,80,85 | B– |
| 61 Kuwait | 60–86 | | | | D |
| 62 Malaysia | 55–88 | | | 70,75 | C |
| 63 Nepal | 60–85 | | | 85 | D+ |
| 64 Oman | 80–85 | | | | D |
| 65 Pakistan | 50–88 | | | 75,80,85 | C– |
| 66 Philippines | 50–88 | | | 70,75,80,85 | C |
| 67 Saudi Arabia | 60–85 | | | | D |
| 68 Singapore | 60–85 | | | | C |
| 69 Sri Lanka | 50–87 | | | 75,80,85 | C– |
| 70 Syrian Arab Rep. | 60–88 | | | 75 | C– |
| 71 Taiwan | 50–88 | | | | D– |
| 72 Thailand | 50–88 | * | | 75,85 | C– |
| 73 U. Arab Emirates | 70–85 | | | | D |
| 74 Yemen | 69–88 | | | | D |

APPENDIX A.2
(CONTINUED)

| Country | Variables 1–19, 25,26 | 27[a] | 20–24 | Benchmark years | Quality rating |
|---|---|---|---|---|---|
| Europe | | | | | |
| 75 Austria | 50–88 | * | 80–88 | 75,80,85 | A– |
| 76 Belgium | 50–88 | * | 80–88 | 70,75,80,85 | A |
| 77 Cyprus | 50–88 | | | | C |
| 78 Denmark | 50–88 | * | 80–88 | 75,80,85 | A– |
| 79 Finland | 50–88 | * | 80–88 | 80,85 | A– |
| 80 France | 50–88 | * | 80–88 | 70,75,80,85 | A |
| 81 Germany, Fed. Rep. | 50–88 | * | 80–88 | 70,75,80,85 | A |
| 82 Greece | 50–88 | | 80–88 | 80,85 | A– |
| 83 Hungary | 70–88 | * | | 70,75,80,85 | B |
| 84 Iceland | 50–88 | | | | B+ |
| 85 Ireland | 50–88 | * | 80–88 | 75,80,85 | A– |
| 86 Italy | 50–88 | | 80–88 | 70,75,80,85 | A |
| 87 Luxembourg | 50–88 | * | 80–88 | 75,80,85 | A– |
| 88 Malta | 54–88 | | | | C |
| 89 Netherlands | 50–88 | * | 80–88 | 70,75,80,85 | A |
| 90 Norway | 50–88 | * | 80–88 | 80,85 | A– |
| 91 Poland | 80–87 | | | 75,80,85 | B |
| 92 Portugal | 50–88 | | | 80,85 | A– |
| 92a Romania | 75 | | | 75 | D |
| 93 Spain | 50–88 | * | 80–88 | 75,80,85 | A– |
| 94 Sweden | 50–88 | * | 80–88 | 85 | A– |
| 95 Switzerland | 50–88 | | | | B+ |
| 96 Turkey | 50–88 | | | 85 | C |
| 97 United Kingdom | 50–88 | * | 80–88 | 70,75,80,85 | A |
| 98 Yugoslavia | 60–87 | | | 75,80,85 | B |
| Central and North America | | | | | |
| 99 Bahamas | 77–87 | | | | D |
| 100 Barbados | 60–85 | | | 85 | C |
| 101 Canada | 50–88 | * | 80–88 | 80 | A– |
| 102 Costa Rica | 50–88 | * | | 80 | C |
| 103 Dominica | 85 | | | | D |
| 104 Dominican Rep. | 50–88 | | | 80 | C |
| 105 El Salvador | 50–88 | | | 80 | C |
| 106 Grenada | 85 | | | | D |
| 107 Guatemala | 50–88 | | | 80 | C |
| 108 Haiti | 60–88 | | | | D |

APPENDIX A.2
(CONTINUED)

| Country | Variables: 1–19, 25,26 | Variables: 27[a] | Variables: 20–24 | Benchmark years | Quality rating |
|---|---|---|---|---|---|
| 109 Honduras | 50–88 | | | 80 | C |
| 110 Jamaica | 53–87 | | | 75 | C |
| 111 Mexico | 50–88 | | | 75 | C |
| 112 Nicaragua | 50–86 | | | | D |
| 113 Panama | 50–86 | * | | 80 | C |
| 114 St. Lucia | 77–87 | | | | D |
| 115 Trinidad & Tobago | 50–88 | | | | C |
| 116 United States | 50–88 | * | 80–88 | 70,75,80,85 | A |
| 117 St. Vincent | 77–86 | | | | D |
| South America | | | | | |
| 118 Argentina | 59–88 | * | | 80 | C |
| 119 Bolivia | 50–88 | | | 80 | C |
| 120 Brazil | 50–87 | | | 75,80 | C– |
| 121 Chile | 50–88 | * | | 80 | C |
| 122 Colombia | 50–88 | | | 70,75,80 | C |
| 123 Ecuador | 50–88 | | | 80 | C |
| 124 Guyana | 50–88 | | | | D |
| 125 Paraguay | 50–88 | | | 80 | C |
| 126 Peru | 50–88 | | | 80 | C |
| 127 Suriname | 60–85 | | | | D |
| 128 Uruguay | 50–88 | | | 75,80 | C– |
| 129 Venezuela | 50–87 | | | 80 | C |
| Oceania | | | | | |
| 130 Australia | 50–88 | * | 80–88 | 85 | A– |
| 131 Fiji | 60–87 | | | | D |
| 132 Indonesia | 62–88 | * | | 80 | C |
| 133 New Zealand | 50–88 | | | 85 | A– |
| 134 Papua New Guinea | 60–88 | | | | D |
| 135 Solomon Is. | 80–88 | | | | D |
| 136 Tonga | 85 | | | | D |
| 137 Vanuatu | 85 | | | | D |
| 138 Western Samoa | 79–88 | | | | D |

a. An asterisk in this column indicates that IPri is available for some set of years. A blank indicates it is not available at all.

APPENDIX A.3:
COMPARISON OF COVERAGE OF VARIOUS VERSIONS OF THE PENN WORLD TABLE

| | Mark 1 | Mark 2[a] | Mark 3 | Mark 4 | Mark 5 |
|---|---|---|---|---|---|
| No. of market economies | 119 | — | 115 | 121 | 134 |
| No. of centrally planned economies | — | — | 9 | 9 | 5 |
| Years covered[b] | 1950–1977 | — | 1950–1980 | 1950–1985 | 1950–1988 |
| No. of variables[c] | 10 | — | 11 | 17[d] | 27[d] |

a. Mark 2 was never published.
b. Not all countries are covered for the full periods.
c. Before Mark 5, all variables were available for all countries except for CPEs. Data limitations make it impossible to extend the variable coverage of Mark 5 to all countries.
d. Mark 4 All CPEs: Only population and GNP per capita.
Mark 5 5 CPEs: All variables (1 CPE: One year only).
*Sources.* See note 1.

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