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1 The Standard of Living Debate in International Perspective: Measures and Indicators

Stanley L. Engerman

1.1 Determining the Standard of Living

Probably the most famous debate on economic change has been that known as "the standard of living debate," about the impact of the British industrial revolution.[1] This debate began among individuals living in those times, continues today, and will go on, no doubt, tomorrow. The debate's vehemence has several distinct sources—the politics of the British class struggle, comparisons of British growth with the pattern of communist economic growth in the twentieth century, and more general questions of the attitudes toward society and culture that emerged in modern times.

Given the broad and emotion-laden sweep of the issues in the British case, it is perhaps surprising that no such prolonged debate has arisen for most of the other nations that developed subsequently. It is not that such debates could not have been generated elsewhere, for periods in which dramatic structural changes in the economy took place, with the expansion of urbanization and industrialization. Surely one might anticipate such concerns for late-nineteenth-century Germany or Japan. Perhaps it has been the earlier dating of the "First Industrial Revolution" in Britain, or maybe it was the focus of Marx and Engels on this case in their general discussions of the rise of capitalism, that made the British case so important a historical issue. For whatever reason, the concern with the changing standard of living has produced an extensive literature, with frequent appeals to various quantitative measures to represent economic growth and welfare. While what could be numerically measured was

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1. For recent examinations of this debate, see Lindert (1994) and Engerman (1994).

not the exclusive focus of the debate, numbers came to play a critical part in the analysis and rhetoric of the issues.

Other issues related to economic matters have arisen in some cases—for example, debates on the causes of out-migration in Scandinavia and Eastern Europe and on the economic and demographic effects of this immigration on those already resident in areas such as the United States, Canada, and Australia. These, however, seem to focus on narrower issues than does the British debate. There have recently been some signs of a debate emerging concerning the standard of living among the free population in the United States in colonial times and in the years before the Civil War, but at present it has not generated as much heat as has the British debate.[2] This may be because such a controversy would have seemed rather more surprising to residents of early-nineteenth-century New York than to residents of London at that same time.

The British debate poses two major questions, questions that have also been asked in regard to other issues. First, what can be said about changes pertaining to the entire national population, normally approached by considering per capita income, aggregate national income divided by the entire population? In answering such a question, collections of data by earlier scholars have presented much contemporary information, although later scholars have often been able to expand on these sources and to construct or reconstruct basic estimates of economic and demographic variables. Second, what has happened to the distribution of rewards (relatively or absolutely) among specific groups or individuals within the population? While some depiction of such patterns had been possible earlier, mainly by using measures that apply to specific parts of the population, such as real wages, answers to these questions have recently been facilitated by the application of the computer to the masses of individual-level data available in various public and private archives.

Many different types of measures have featured in the economic aspect of the standard of living debate—national income and wealth, per capita consumption, population, per capita income and wealth, consumption of various items, real wages, hours of work, mortality rates, heights, and so forth. Arguments relate to which measure, if any, deserves prominence, or else how best to aggregate the diverse constructs to come up with one simple summary number. In addition to these material issues, a range of concepts, each difficult to quantify, are debated, including relative changes in the rights of men, women, and children; expansion or contraction of political freedoms; changes in high-brow, middle-brow, and low-brow culture; and advantages and disadvantages of living in urban as contrasted with rural areas. All of these present major difficulties in evaluation, either separately or in combination with other material and nonmaterial components of the quality of life.[3]

2. See the discussions in Gallman and Wallis (1992).

3. The many debates on "progress," long a staple for historians and philosophers, will not be entered into, but they do illustrate that difficulty in agreeing on concepts and interpretations is not solely a characteristic of more quantitative and economically based debates. A recent examination

In this paper I shall not present a description of all the measures used to describe economic growth, nor an evaluation of the accuracy and interpretation of the broad set of measures that have been used in debates on economic change. Rather I shall attempt to place the discussion of some measures and indicators of economic change in perspective. In particular, I shall focus on two of the basic measures that have recently been used in examining economic progress, or its absence, national income estimates and physical measures of well-being, particularly heights of individuals.

1.2 Ideas of Progress

There have long been debates about the nature and existence of human progress over time, as well as about the comparative rankings of different nations and of different groups at particular times. These debates have referred to material progress, as well as political progress, cultural progress, and intellectual progress, and have been concerned both with the total population in a given area and with the behavior of specific groups within that population. Such comparisons, over time and place, have always been rather difficult to make, since it is often difficult to agree on the appropriate question, on the appropriate (conceptual) indicator, and on the best way to go from whatever information is available to the accurate measurement or description of that indicator. Moreover, given our customary desire to answer "yes" or "no," or "good" or "bad," to any question, difficulties may arise when more than one indicator can be used, or when they refer to quite different questions. This is particularly so when indicators present somewhat different patterns; this generates considerable dissatisfaction with the procedures and leads to a continuing search for the one single, unambiguous measure or concept for evaluation. That there may often be different concepts of progress and that any measurement or description must be severely limited by what information is available or can be applied to the past may, however, mean that for a number of distinct reasons any attempt to define one specific, all-purpose indicator is beyond our capacity.

Within the sphere of material changes the choice of measures to be used will depend on what information has been collected and made available by past agencies and individuals and how well it can be taken to represent what is desired. This need not mean that the measures we utilize are necessarily only those prepared in the past, as is shown by the importance of recent historical reconstructions of aggregate incomes and wealth and of their distributions. If we restricted ourselves to measures prepared in the past by official authorities, we would generally be confined to measures of population, foreign trade, government revenues and expenditures, and national debt. Population censuses on

of this set of issues can be found in Lasch (1991). For a broad discussion of "the idea of progress" by a leading economic historian, see Pollard (1968).

a continuing basis began in the nineteenth century, in 1790 for the United States. Despite the late-seventeenth-century emergence of a concept of national income, official governmental preparation of this measure did not begin until the 1930s. It is not usually true that contemporaries or earlier scholars prepared better estimates of economic variables than have subsequent scholars, as seen, for example, in the eighteenth-century debate on whether the population of England had increased or decreased, and also in the related debate between Hume and Wallace on the trend in population between the ancient and the modern worlds.[4] There are, of course, many fragments of incomplete data that have been used in examining changes in the past. These were often in the nature of partial indicators that are believed to be related to broader aggregates of interest, and which might serve as a proxy for the desired measure. Thus, for example, the earlier used measures of specie stocks and flows, of imports and exports, of urbanization, of nonagricultural workers, and so forth, were intended to serve as indexes of broader income measures, based either on theoretical arguments about economic relationships or else on some currently advocated empirical relationship with economic growth.

1.3 Early Measures of Economic Progress

It is perhaps not surprising, given the paucity of early data on aggregate economic variables, that most early measures of growth were based on physical concepts. In the eighteenth century population was seen as the primary measure of economic and social progress. This was stated rather concisely by David Hume: "But, if every thing be equal, it seems natural to expect, that, wherever there are most happiness and virtue, and wisest institutions, there will be the most people."[5] "The principle that Hume states here . . . was widely held in the seventeenth and eighteenth century" (Eugene F. Miller in Hume 1985, 382). Hume's debate with Wallace concerning the relative size of populations in the ancient and the modern worlds was premised on the contention that larger populations were a sign of human betterment. Thus the debate on numbers reflected an analysis of the moral and philosophical question of whether mankind had or had not progressed. Hume had proposed some other physical indicators for determining whether this was a "flourishing age of the world," including "stature and force of body, length of life," but argued that they were "in all ages, pretty much the same." They would be expected to change too slowly in the period for which there was a historical record (Hume 1985, 387–88).

4. For the eighteenth-century debate on the trend in English population, see Price (1780), Howlett (1968), and Young (1967). Price based his argument on the use of excise tax collections, home building, house counts, and bills of mortality. The arguments for an eighteenth-century population decline did not convince, among others, Smith (1976, 344). For more recent discussions, see Glass (1973, 11–89), Bonar (1966), and Pearson (1978, 370–421).

5. See Hume's "Of the Populousness of Ancient Nations," in Hume (1985). The quotation is from p. 382.

While Hume discussed the relationship between economic growth and population, other writers in the seventeenth and eighteenth centuries used other physical measures to depict changes over time. In England, in the debate on progress versus decay ("moderns versus ancients"), advocates drew on indicators of height and life expectation, as well as population size, in making their arguments.[6] While little in the way of acceptable empirical evidence could be presented, one of the major participants in these debates, George Hakewill (1630, 198–99, 203–8), argued for the use of evidence from the sizes of, among other things, armor, beds, doors, altars, and seats and suggested the use of "bones dug up" to indicate changes in stature over time.[7]

The use of population as a proxy for economic progress was frequent in the mercantilist literature, where population growth was also seen as a way to achieve national power (Schumpeter 1954, 251; see also United Nations 1973, 1:35–37). Similarly, the early classical economists, including Adam Smith, argued that "what encourages the progress of population and improvement, encourages that of real wealth and greatness" (Smith 1976, 566). Even though Malthus pointed to the negative aspects of population growth, he notes that "favourable circumstances" in the English North American colonies, economically and politically, led to a population that had "a rapidity of increase probably without parallel in history" (Malthus 1970, 105). As long as the resources were there, population could increase without adding to human misery. Under different circumstances, however, a larger population would lead to difficulties. This set of differences made the use of population size as an index of progress more limited, even at a time when more reliable numbers on the sizes of populations were, for the first time, becoming available.

Although the size or rate of growth of population by itself is now seldom used as an indicator of economic progress, it has frequently been used as part of the definition used to determine the presence of economic growth. Kuznets's primary definition of economic growth, based on the observed pattern of modern economic growth, is that of a sustained rise in per capita output accompanied by a sustained rise in population (see, e.g., Kuznets 1966, 19–20).[8] Such a concern with population increase referred mainly to questions about the interpretation of the economic performance of Ireland, whose quite rapid postfamine growth in per capita income had been preceded, or perhaps caused, by

6. For summaries of these debates, see Jones (1961), Harris (1949), and Spadafora (1990, 21–84). The last book also includes much of interest for England and Scotland for the entire eighteenth century.

7. Hakewill's third book (1630, 154–286) in this work deals with "the pretended decay of mankinde in regard to age and duration, of strength and stature, of arts and wits." Various of the Greek and Roman historians did mention heights, life expectation, and relative population sizes, but these were not generally used as the basis for arguments about changes over time. The preparation of life tables by Halley (1942, 6) led him to argue that these tables "give a more just *Idea* of the *State* and *Condition* of *Mankind* than anything yet extant that I know of."

8. Kuznets (1965, 6, 10) also argued that since "a combination of secular stagnation or decline of population with a sustained rise in per capita product has been observed only rarely in the last two centuries," these nations lack the common experience of modern economic growth that would help in drawing meaningful generalizations. See also United Nations (1973, 1:505–19).

population decline due to high mortality, reduced fertility, and extensive outmigration (Kuznets 1959, 20–21).[9] There are, however, several historiographic antecedents that remain of relevance, where population changes may have meant that total income and per capita income moved in different directions. The debate on the economic circumstances of the Renaissance relates to its actual economic conditions in a time of apparent population decline, with the otherwise relatively limited economic data suggesting little increase in aggregate income.[10] R. A. Bridbury's depiction of the Black Death as the Marshall Plan of the Middle Ages may seem rather severe, but it does raise an important historical question—Were the deaths in the fourteenth century due to exogenously caused diseases or were they the endogenous economic outcome of prior rapid expansion of population beyond the capacity of England's resources?[11] Further, the interpretation of the settlement of the New World could look quite different if we begin with Native American GNP in 1491 and make explicit allowance for the overall population declines after the arrival of Columbus. The interpretation of this decline might vary depending on whether these demographic patterns were attributed primarily to disease, to warfare, or to other factors.[12]

In addition to population, other physical measures were used as indicators of past economic progress, both by contemporaries and by subsequent scholars. Macaulay, in his depiction of British economic growth written at the end of the industrial revolution, discusses population growth and notes several other favorable indicators, including decreased mortality and greater life expectation, and increased real wages (Macaulay 1849, chap. 3). Contemporaries often pointed to the comparative heights in different countries as indicators of differential welfare and living standards.[13] Some comparisons of military height standards over time, to indicate deterioration in living standards among the

9. See also Mokyr (1983) for a description and analysis of the causes and consequences of the Irish Famine.

10. See, e.g., the selections from Robert S. Lopez and Hans Baron in Dannenfeldt (1959); Lopez (in Dannenfeldt 1959, 50) commented in regard to interpretations linking artistic and economic flourishings that "the notion that wherever there was an economic peak we must also find an intellectual peak, and vice versa, has long enjoyed the unquestioned authority of mathematical postulate."

11. "For the survivors, the fourteenth-century famines were, no doubt, on personal grounds, inexpressibly grievous. But they unlocked a cornucopia. England was given a sort of Marshall Aid on a stupendous scale" (Bridbury 1962, 91). Postan (1966, 565–70) argued that increased real wages in England in the fourteenth century reflect the decline in labor supply and population due to increased mortality. The issue posed by endogeneity or exogeneity of population change remains central to many discussions of the welfare significance of changes in per capita incomes.

12. It probably took more than three centuries before the population of the Americas reachieved the pre-Columbian level. This also raises another issue concerning estimates where there may be explicit or implicit disagreement as to the specific groups whose welfare is considered to be appropriately evaluated. This arises also in the appropriate definition of national income in a society with slavery, and of how to balance free and slave height changes in such societies.

13. See, e.g., some of the descriptions regarding the Americas in Gerbi (1973, 5–6, 53–56, 82–86, 240–45, 508–11). This debate included evaluations not only of relative human heights but also the sizes of animals and plants.

lower classes in Europe in the nineteenth century, were presented by Karl Marx, quoting the work of J. von Liebig (Marx 1906, 264; see also pp. 221, 434).[14] Estimates of mortality and life expectation had been, as noted earlier, proposed quite early as central measures of human welfare. More recent discussions by Sen and others have suggested that mortality data can be used to analyze economic performance, and life expectation has become a key component in the composite indices of welfare and the quality of life prepared by Morris D. Morris and by the World Bank.[15]

1.4 Estimating National Income

The list of social and economic indicators that have been utilized as measures of, or proxies for, economic growth seems almost unlimited, constrained only by what numbers are available and the imagination of the investigator. It is often unclear exactly what these measures are intended to demonstrate and how to interpret them. In some cases, they seem to be meant as direct indicators of the concept (whether related only to a specific economic sector or as a useful indicator to be applied more generally). In other cases, they seem meant primarily as proxies related to the concept used because of the absence of an appropriate direct measure, while at still other times they are apparently part of some theory of either the causes or the consequences of economic change. Early discussions included, in addition to population estimates, exports (and their components), imports (and their components), shipping, public debt, specie supply, and urban population, while later the more frequently added variables included steel production, railroad miles, freight car loadings, percentage literate, and occupational structure.[16] Extrapolations were sometimes made on the basis of regional tax collections, particularly those on real estate, or from housing counts. Wealth in real and personal property was often made the basis

14. Von Liebig had noted that "in general and within certain limits, exceeding the medium size of their kind, is evidence of the prosperity of organic beings. As to man, his bodily height lessens if his due growth is interfered with, either by physical or social conditions."

15. See Sen (1993), Morris (1979), and United Nations Development Programme (1994). For discussions of the relation of mortality to per capita income, see, among others, Preston (1975) and Kunitz and Engerman (1992). For an interesting examination of "Expectation of Life as an Index of Social Progress," see Hart and Hertz (1944). Of course, not all additional years of life may yield positive utility, as suggested by the Greek myth of Aurora and Tithonus, in which Aurora requests "eternal life" but, unfortunately, not "eternal youth" for Tithonus. Or, as the Indian philosopher quoted in Plutarch's chapter on Alexander responded to the question "How long is it good for a man to live?"—"So long as he does not regard death as better than life."

16. Smithies (1946, 68) described an interesting sidelight to the Dawes negotiations regarding German reparations after World War I. It was argued that the burden should be proportional to national income, but since national income was regarded as an ambiguous number, they utilized a "prosperity index," based on "combining indexes of total exports and imports, revenues and expenditures of the federal and chief state governments, tonnage carried by the railroads, consumption of sugar, tobacco, beer, and liquor, population, and per capita consumption of coal." Writing in 1949, Smithies stated his belief that given the greater availability of "statistical material" (69), national income will now more frequently be used for such international arrangements.

of interregional comparisons, when such data were collected, as in the United States between 1850 and 1870. Various measures of outputs and inputs based on U.S. census collections of production data after 1840 were made central to contemporary discussions, particularly those comparing the North and South in the antebellum United States. This discussion led to several antebellum preparations of national income estimates, two of which have been deemed reasonably respectable (see Gallman 1961). A most imaginative measure was proposed by John Clapham, based on the quality of rags, but it is not clear that he ever systematically pursued this analysis.[17]

Most of us have been raised with the measure of national income per capita as the central concept for determining and measuring economic progress, and with the use of distributions of individual or family incomes as the basis for evaluating relative changes in economic well-being over time. These measures are derived, ultimately, from production and demographic data. The broader the extent of governmental and private data collection, the less the need for interpolation or extrapolation, and the more reliable will seem the resulting estimates. Nevertheless, many issues of inclusion and exclusion of items persist. Even with the attempts at standardization of definition and with its preparation by various governmental and international agencies, differences remain in what, precisely, is being measured as national income. Even if there could be agreement on the precise nature of the measure, the translation from specific amounts of goods and services to a belief in what this measure might represent for human welfare remains uncertain.

Standardized preparation by governments of national income accounts was in most cases a product of the depression of the 1930s, when the interest was in determining for policy purposes the magnitude of the economic problem, and of World War II, when the need for large-scale planning made knowledge of the scope and nature of the broad economy vital. Otherwise, it was a product of the post–World War II concern with aiding the growth of the then underdeveloped nations. The timing of national income preparation reflects also the dominance at the time of Keynesian approaches to macroeconomic policy and measurement. These various considerations, and their changing nature, have had a significant impact on the construction of national income accounts, influencing choices as to what to include and what to exclude, and the choice of what particular breakdowns of the national income total should be used. Prior to these governmental attempts, however, there had been numerous estimates of national income prepared by individual observers in several countries, and for various reasons, frequently to determine relative national power. Paul Studenski's (1958) study of the history of the income of nations presents a rela-

17. He claimed that "this is a sure test; for prosperous nations and classes throw away their clothes early" (Clapham 1961, 406–7). He did make some rough comparisons, claiming that "English specialists noted, in the ten years before the war [World War I], that German rags were not quite so good as they used to be," and "the best rags on the market are American and Canadian; the worst Italian and Greek."

tively full description of those pre-twentieth-century income estimates prepared by authors in England, France, Russia, the United States, Austria, Germany, Australia, Switzerland, Greece, India, Italy, and Norway, generally based on census and tax records, although several, particularly those before the nineteenth century, were based on imaginative constructions from quite limited partial data.[18]

The first estimate of national income, as opposed to national wealth, is generally attributed to William Petty, in 1665, although these estimates were not published until a quarter-century later (Petty 1899, 98–120).[19] More familiar to most, given their frequent appearance as a demographic and economic starting point for the study of modern British economic and social history, are the estimates of Gregory King for the year 1688. First published in 1696 and influenced, according to Studenski, by the writings of Petty, King's (1936) estimates rested primarily on information from various taxes, although other data sources were also employed.[20] Two innovations were made by King: (1) a comparison of years between 1688 and 1695 to see what the effects of England's wars had been and (2) a comparison of the per capita incomes of England, France, and Holland. There were several other calculations of a national income total for eighteenth- and nineteenth-century England (Studenski 1958, 101–19; Deane 1956, 1957). In addition to those by King, Studenski (1958, 140–41) also described two pre-1900 estimates of comparative per capita national incomes. Leone Levi's (1860) brief and unexplained comparison of Eng-

18. Studenski also provided a review of the various debates and disagreements on the concept of national income and how it is to be measured. Another rather complete discussion of issues and problems is to be found in the pioneering work of Simon Kuznets, most explicitly, in Kuznets (1941). Many of the volumes in the Conference on Research in Income and Wealth series contain important conceptual and practical discussions of the measurement of national income. Of particular interest are volume 20, *Problems in the International Comparison of Economic Accounts* (1957), particularly Kendrick's introduction and Kravis's essay, with comments by Jacob Viner, and volume 22, *A Critique of the United States Income and Product Accounts* (1958), particularly Jaszi's opening essay and Easterlin's comments. Also of interest are Clark (1957) and Rostow (1990, 209–22). Other surveys of the background of national income accounting are Kendrick (1972), Carson (1975), and Steckel (1992); the last also examined the use of heights as a measure of changing living standards.

19. The title of this essay is "Verbum Sapienti." See also "Political Arithmetick" (Petty 1899, 232–313), probably completed in 1676 but not published until 1690. Petty also computed "the value of the People," the capitalized value of the stock of human capital; made comparisons of the economic conditions of Holland, England, France, Scotland, and Ireland; and in "The Political Anatomy of Ireland," written in 1672 and published in 1691, noted that "for their Shape, Stature, Colour, and Complexion, I see nothing in them inferior to other People" (201). In describing policies for the Irish he argued that "their Lazing seems to me to proceed rather from want of Employment and Encouragement to Work" than from any natural factors. See Kiker (1968, 1–4) for a discussion of Petty's concept of human capital.

20. See Studenski (1958, 30–37) and Deane (1955). For another discussion of Petty and King (as well as of contemporaneous estimates of mortality and life expectation), see Pearson (1978). Pearson included a rather interesting 1796 calculation by the mathematician Lagrange, based on some material collected by the chemist Lavoisier, to attempt to determine whether France was self-sufficient in food during the wars (628–35). See also Studenski (1958, 68–75). For a broad view of the early development of "statistics as a social science," see Porter (1986, 17–39).

land, France, Russia, and Austria indicated that England had by far the highest income.[21] Michael Mulhall, in his 1899 *Dictionary of Statistics*, one of his very imaginative collections of data and calculations, presented, for 1885, per capita income estimates for 14 European countries, plus the United States, Canada, Australia, and Argentina.[22] In the United States, Ezra Seaman, in 1852, presented comparative data on per capita incomes in France, the Netherlands, and England and Wales, as well as the United States, with the English having the highest income.[23]

The concept of national income and its usefulness have thus long been recognized and discussed, but it was only with the basic work of Simon Kuznets that a more theoretical as well as empirical basis of estimation was applied to the measurement of national income. There were, of course, others working on these issues in the United States and elsewhere. Occasional early estimates had been conceptually more sophisticated than most customary estimates of the times, such as those by Seaman in the United States and by Timothy Coughlan in Australia.[24] No earlier estimates anywhere, however, were as detailed, systematic, and analytical as they were in the works of Kuznets, once he turned to the estimation of national income in the United States during the interwar period.[25]

The basic question of what should or should not be included in national income poses many problems, and it is often extremely difficult to be consistent, particularly if one wishes to relate national income to welfare.[26] Some activities that occur in the market are generally excluded, if they are illegal and if legality is considered among the criteria for inclusion in national income.

21. Such calculations do not seem to appear in some of his subsequent work, such as Levi (1880). Levi (1885, 25–27), drawing on the British Academy of Social Sciences studies of height, suggested the use of such measures for determining changes in well-being but commented that "there is no reliable evidence of the physique of the people at any distinct period." He pointed to the 1882 report of the British Association for the Advancement of Science, "which will afford a useful standard whereby to compare their future progress," but since "no such observations were made before" there are no "reliable data" for current comparisons.

22. Mulhall (1899, 320). The United Kingdom had the highest European income but lagged behind the United States and Australia. Mulhall briefly described the underlying basis of his calculations, based on census data for the various countries.

23. Seaman (1852, 418–68). In addition to contemporary data drawn from "official valuations made by government officers in detail . . . for purposes of taxation" (439), Seaman gives estimates for the three European countries going back to 1200, "taking into consideration the present condition and productive industry of Mexico and South America" (438–39).

24. On Seaman, see Gallman (1961). On Coughlan, see Studenski (1958, 135–37) and Snooks (1993, 143–50; 1994, 152–54). While both provided some brief explanations of the specifics of measurement and understood the distinction between gross output and value-added, neither went into much detail on either concepts or measurement.

25. For some background to the political aspects of the U.S. government's adoption of national income accounts, see Perlman (1987).

26. For some, among many, useful discussions of the relation between measured income and welfare, in addition to those by Kuznets, see Abramovitz (1959, 1989), Denison (1971), Usher (1968, 1980), and Pigou (1929). For some broad economic discussions of the meaning of welfare, see also Scitovsky (1976), Hirsch (1978), and Zolotas (1981). An important extension of conventional national income accounts is Eisner (1989). See also Kendrick (1976) for the measurement of a broader definition of capital, and the discussion by Engerman and Rosen (1980).

The debate on the Smithian conception, adopted by marxists, of restricting consideration to material production is quite familiar but can probably now be considered resolved (see Studenski 1958, 181–88). Restriction to market transactions, however it might be considered desirable, is difficult, particularly since changes in economic structure will affect the extent to which various activities are performed in the market.[27] Those variations in the locus of family and individual activity that have taken place, whether related to the process of economic change or due to other factors, have long been the source of controversy in using national income accounts. Some of these problems could be solved by imputations of value, based on actual or hypothetical market transactions, but a large area of disagreement will no doubt remain.

Among the major disputes about national income accounting is that concerning the value of the spouse's time in the household, and the contribution of cooking, cleaning, child care, and so forth, to measured output.[28] At present this work time is not included in national income, reflecting in part the development of systematic national income accounting in the depression of the 1930s, although the argument for its inclusion has long been known and earlier calculations made (Kuznets 1941, 432–33; Studenski 1958, 177–78).[29] A. C. Pigou's 1920 remark that "if a man marries his housekeeper or his cook, the national dividend is diminished," presents a frequently discussed "paradox" (Pigou 1929, 32–33).[30] Ten years earlier, Philip Wicksteed posed a related problem, combined with what he regarded as the difficulties posed by "inherently vicious activities":

> The "services" for which the wages of shame are paid constitute a part of the national revenue as much as any other; but if Portia is Brutus's wife and not his harlot her companionship ceases to count in the national revenue. And, moreover, any changes in the tastes, habits, or morals of the community which enabled them to derive increased enjoyment from their own personal activities or their mutual intercourse would tell for nothing in the estimates of national wealth. (1910, 651)

27. See the discussion in Kuznets (1953, 192–252).

28. See, e.g., Folbre and Abel (1989) and Folbre and Wagman (1993), and the works cited therein, as well as Snooks (1994). This debate goes back to quite early in the preparation of national income accounts, as seen in the writings of Seaman (1846) and W. I. King (1969). King (1969, 133–35) noted the role of value-added by housewives, which when shifted to the factory raised income as measured, in addition to the problems due to the "disappearance" of free goods. Solomon Fabricant's introduction to this volume is quite useful.

29. Kuznets's estimate for 1929 was that housewives' services were about one-fourth of total national income, in reasonable approximation to the estimates made by Snooks for Australia and Folbre and Wagman for the United States. Ezra Seaman (1846, 305) spoke of adding various services, including "ordinary domestic labour" to estimated income, and this treatment of all services raised income by about one-third. In 1852, however, he excluded from the "rank of productive industry, housekeeping, the labor of domestic servants," and other services, on the basis that they are not material products.

30. Similarly, Pigou notes that if a woman leaves "factory work or paid home-work to unpaid home-work," the national dividend also, paradoxically, falls.

Various estimates of the value of a housewife's time using wages in domestic service and other measures had been made by those preparing earlier national income accounts, including Kuznets, but these were made primarily for illustrative purposes and were not included in the basic estimates of national income, which were generally restricted to transactions in the market.[31] Since the national accounts do not impose any breakdown of consumption within the home and the family unit itself, no division relating to the importance of changes between spouses is estimated. The present treatment of household production is not intended to answer questions concerning changes in the relative benefits and costs to the different spouses. Not all of the gross output in the household is omitted from national income, however, only the amount of value-added by the labor within the household. As Robert Gallman (1966) pointed out, the basic raw materials going to household production of food, clothing, and so forth, are already included as part of national income.[32]

In considering the family unit there are other issues of imputations that might be raised. If children are regarded as the outcome of a choice that could have led to more leisure or more parental consumption, is it appropriate to ignore the utility provided to parents in excess of the costs of a child's consumption of market goods? If children are desired, should the more appropriate denominator of the national income calculation be per family rather than per capita? Can we attribute an effect on imputed income of the fertility decline in the demographic transition, due either to changed demand for numbers of children or for "quality-adjusted" children, whether or not these are regarded as reflecting a change in tastes? And how will such an adjustment influence the measure of economic growth in recent times?

Some types of imputations for nonmarket consumption are considerably less controversial and are conceptually and empirically easier to make, as they can be based on market prices for closely related items that are subject to frequent transactions. These include imputations for food grown and consumed on a farm, without entering the market, and for owner-occupied housing, which does not involve a market transaction for its periodic rental.

Other forms of imputations, since they are not strictly based on market exchange, present more complex problems. Among the concomitants of modern

31. Indeed, the first set of national income accounts that also provided an estimate for the value of housewife services, by Mitchell et al. (1921, 57–60, 67), placed it at equal to about 25–31 percent of measured national income. A detailed worldwide survey of the estimated value of housewife services, by Goldschmidt-Clermont (1982), has almost all values falling within the range of 20–40 percent of national income or GNP.

For an analysis of the 1890 census adjusting female labor force participation for boarding housekeepers, unpaid agricultural family farm workers, and some manufacturing workers, see Goldin (1990, 42–55, 219–27). She estimated that "the inclusion of these activities increases the participation rate of married women across the entire economy by about 10 percentage points."

For a different approach to the evaluation of housewife's services, based on nineteenth-century legal cases, see Segal (1994).

32. There may, of course, be some disagreement about how to value this labor time, depending on whether alternative uses of labor were available.

economic growth has been a reduction in the time worked per surviving capita, with fewer hours per day, days per year, and years per lifetime worked. There have been several attempts to value this leisure, on the presumption that its increase has been voluntary and not involuntary. At the margin, the value of voluntary leisure would be evaluated at the wage rate, while the value to be placed on involuntary leisure is less obvious. A similar outcome for the measure of growth could be obtained by shifting from output per capita to output per man-hour. Familiar estimates of the value of increased leisure, by Kuznets (1952) for 1869–1948 and by Nordhaus and Tobin (1972) for 1929–65, demonstrate the great impact this adjustment has on measured consumption.[33] Similarly influential, but with somewhat more complexity, is the consumption value of increased life expectation, first proposed by Dan Usher and estimated by Usher for Canada and several other countries and by Jeffrey Williamson for Britain (Usher 1980, 223–57; Williamson 1984). These provide, in effect, composite measures of goods and services output and life expectation, with their own particular set of weights, at least to the extent that increased life expectation was not attributed to increases in measured consumption. (Presumably, if utility or market gain could be applied to height, the same procedure could be tried.)

Another set of suggested imputations requires the use of hedonic price regressions to obtain appropriate "prices," since no adequate direct analogue can be provided in the market. Noteworthy here is the analysis of the costs of the "dark satanic mills" of England conducted by Williamson (1981) on the basis of a regression of the argued for disutility-causing aspects of urban life—mortality and density.[34] Possible offsetting gains from urban residence (privacy, entertainment, and culture) are, however, not fully examined and evaluated. Since the historical debates have frequently regarded movement to an urban residence as a negative factor, Williamson's test of the factors in the urban-rural wage differential does point to procedures useful to those who wish to adjust national income estimates rather than keep various components of welfare separate for discussions.[35]

In addition to the complexities of estimating measured income, the interpretation of changes in measured income as demonstrating changes in welfare has a number of other important problems. While prices can be a measure of relative marginal scarcity, they need not reflect the full benefits of a priced good or the value of an unpriced one to consumers. The Smithian evaluation prob-

33. See, e.g., the calculation by Kuznets (1952, 63–69) and Nordhaus and Tobin (1973), who discuss some of the complexities involved in these imputations. See also Usher (1980, 135–47).

34. The subsequent exchange between Pollard and Williamson points to some of the problems in trying to evaluate these issues, such as the various problems in determining causes of death and in getting better measures of what influences worker decisions.

35. Other measures of the cost of "disamenities of urbanization" are based on regressions including population density in trying to explain differentials in income. See Nordhaus and Tobin (1973) and, for a later discussion of this set of issues, Roback (1982). Kuznets (1952, 60–62) used estimated price differentials by city size to adjust for costs of increased urbanization.

lem posed by the diamond-water paradox and also Lord Lauderdale's distinction of public wealth and individual riches, based on property ownership, reflect complications in the use of market prices.[36] The use of market prices based on transactions with some specific distribution of income was questioned by Wicksteed (1910, 649–59), who argued that redistribution of income could change market evaluations, a point that was central to the discussion of welfare economics criteria in the 1940s and 1950s. The discussion of prices and their meaning thus raises issues as to whether these prices contain all desired welfare information and also, more simply, as to what might be regarded as the appropriate set of weights to be applied when aggregating individual outputs into national income totals.

A related problem, one early noted as a paradox by Pigou, was that "the frequent desecration of natural beauty through the hunt for coal or gold, or through the more blatant forms of commercial advertisement, must, on our definition, leave the national dividend intact" (1929, 33). Important issues about the most appropriate treatment of the depletion of natural resources and of pollution have recently been raised. Unpriced pollution and other disamenities serve to raise questions about the precise meaning of current income measures, as based on estimates of their costs by Roback (1982) and Nordhaus and Tobin (1973). Such resource depletion and pollution can both influence our beliefs regarding current levels of income (welfare) and affect prospects for future economic growth. Further, whether differences in current levels of income provide the best forecast of differences in future levels of income, even when allowing for differential levels of investment, public and private, is not easy to evaluate, particularly given the uncertainty of exogenous changes in the economic environment and of the economy's ability to respond to them.[37]

Working in a direction opposite to these costs of growth are some benefits of growth that are either unpriced or priced at an inappropriate level. Benefits such as clean water, a healthier atmosphere, and safer transportation are often not priced, while the nature of quality changes in existing goods or the introduction of new goods (which are at times functionally equivalent to existing products) means that there are benefits that are usually undervalued when entered into the national income accounts. Given the magnitude of such new and improved goods in the process of economic growth, it is expected that this factor will cause some understatement of long-term economic growth and its contribution to welfare.[38]

36. Smith (1976, 44–45) made a distinction between "value in use" and "value in exchange" and claimed that "the things which have the greatest value in use have little or no value in exchange," and vice versa. Lauderdale (1819, 39–110) commented, "the wealth of the nation, and the mass of individual riches, cannot be regarded in every respect the same" (45).

37. Such difficulties in linking present and future measures exist, of course, for any particular measure chosen. This can be seen, e.g., by the comparisons of Irish and English heights before the Irish Famine, and by the discussion of the effects of wars on various economies.

38. For a recent discussion of this issue, applied mainly to producer and consumer durables, see Gordon (1990).

The distinction between final goods and intermediate goods has also long presented difficulties of both theory and measurement. The conceptual distinction between final output in a slave and that in a free society, noted by Seaman, has been further discussed recently. More generally, however, as Kuznets pointed out, the costs to a free individual of earning his or her living, including the necessary food input and clothing costs, could be considered intermediate inputs into the economic system in redefining final outputs, although Kuznets concluded by rejecting this because he regarded human wants as the basic end of the system (Kuznets 1941, 36–45; Studenski 1958, 188–94).[39] More recently, John Wallis and Douglass North (1986) estimated the magnitude of the increased transactions costs of doing business in a modern economy, arguing that much of the output of the service sector should more reasonably be regarded as intermediate not final outputs.[40] Variations on this problem were investigated in detail by Kuznets in a comparison of national incomes in China and in the United States, as well as in his examination of the role of the government sector in the economy (Kuznets 1941, 31–36; 1953, 145–91; Studenski 1958, 194–204).

The philosophical complexities of treating what have been called "regrettable necessities" in national income comparisons have also long been discussed. Some of these reflect, in part, the impact of climatic and other forces on needs and relative evaluations.[41] There are also items of expenditure, such as for war or defense, that do not directly provide welfare as usually argued but do play a crucial role (as do what we call intermediate goods) in offsetting what might otherwise have been more difficult individual or societal circumstances.

1.5 Alternative Concepts of Welfare

Because of these many different problems, as well as others not mentioned, such as the general index number (and quality difference) problems in making international comparisons and comparisons over time, some dissatisfaction with measures of national income has emerged. This has led to the search for alternative indicators to be used to evaluate economic change. Such measures are generally based on some available social and economic indicators that, it is argued, are related somewhat more directly to economic welfare, as either cause or consequence, than a single national income estimate. The League of Nations and its International Labor Office focused on studies of the importance

39. Various other measured consumption components, such as education, health care, and migration, may also be regarded as forms of investment, with additions for their opportunity costs, including time.

40. See also the discussion of this paper by Lance Davis.

41. Usher (1968) provided a detailed recompution of national income differentials between Thailand and the United Kingdom based primarily on price differences in the two economies. As is well known, for international comparisons of income it can make a considerable difference depending upon which price indexes are used for the examination.

of nutrition in the 1930s.[42] In the 1940s and 1950s the search for nonmonetary measures was pursued by various economists in the United States and elsewhere, as well as by several United Nations commissions.[43] Bennett (1951), for example, used 16 nonmonetary measures of relative consumption to compare nations, achieving a single index by an arbitrary weighting scheme applied to relative data. The UN study listed considerably more items, rejecting the usefulness of national income for welfare measures since "no type of monetary index as a general international measure of levels of living could be recommended" (United Nations 1954, vi). They did not, however, provide any theoretical resolution of what measures to include, or of how to weight items in order to obtain a single index to be used for comparative purposes. Such listings of items have long been used, often to supplement income comparisons, and to indicate what economic growth has meant, without necessarily being seen as a replacement for income estimates. As presented by Stanley Lebergott (1976, 1993), for example, their principal purpose has been to bring out the dramatic changes meant by economic growth, which are highlighted by giving attention to the creation and diffusion of some specific items (see also U.S. Department of Labor, n.d.).

One of the major characteristics of economic growth has been constant change in the structure of the economy, due to shifting patterns of consumption and production. Changes in consumption patterns are best described by Engel's law, which gives the expected variation in expenditure patterns with changes in income, whether over time or in a cross section (see, e.g., Kuznets 1966, 262–84). Perhaps the most firmly supported part of Engel's law is that as income rises, the share of consumption expenditures on food declines, even as the absolute amount expended continues to rise. Applied to nations this would mean that estimates of growth based only on food consumption will understate the rate of economic growth, at least as compared with the rate estimated from conventional national income accounts. Since it is expected that height will increase with increased food consumption, not increased total consumption, it is anticipated that as income and consumption increase height should increase less than proportionately. If income elasticities for food consumption are known, however, growth in income can be estimated from growth in food consumption. It would seem, then, that income is the preferred index, with food

42. See, e.g., League of Nations (1937) and International Labor Office (1936). The League of Nations report used conscription data for northern and Western Europe to argue that "there was undoubtedly an increase in stature" (25–26). These increases were Sweden (1840–1926) 8 cm, Denmark (1840–1913) 8 cm, Norway (1800–1900) 10 cm, and the Netherlands (1850–1907) about 5 inches. It mentioned that similar results were observed for "male and female students at American universities." They attributed some of this to increased outputs, particularly of food. They then tried to disentangle the effects of "the economic and medical" factors in this change in health and concluded, based on comparisons of timing, that it was the economic forces that played a "perhaps dominant role."

43. See, e.g., Bennett (1937, 1951), Davis (1945), and United Nations (1954). Some earlier discussions of the issue of standards and their measurement can be found in Zimmerman (1936), Eliot (1931), and works cited in Lamale (1958).

consumption used primarily as a proxy for the desired measure, not itself being the welfare concept.

1.6 New Indexes of Welfare

More recently, several attempts at simpler composite measures with fewer, but hopefully more essential, categories have been made. One such index, presented by Morris D. Morris in 1979, the Physical Quality of Life Index, is based on three measures: infant mortality, life expectancy at age one, and literacy rates. These variables all have reasonable, but not perfect, correlations with levels of national income. Morris detailed his procedures of calculation and weighting, but the weighting is, as it must be, somewhat arbitrary. Starting with its 1990 *Human Development Report,* the United Nations has prepared a Human Development Index (HDI) as a "contribution" to the search "for a better, more comprehensive socio-economic measure" (United Nations Development Programme 1994). It is described as "an alternative to GNP for measuring the relative socio-economic progress of nations. It enables people and their governments to evaluate progress over time—and to determine priorities for policy intervention. It also permits instructive comparisons of the experiences in different countries." As the authors indicate, both the contents and the methods of calculating the HDI have been adjusted, and estimates for various subgroups as well as for the nation have been introduced. The basic variables that went into HDI estimates in 1994 were life expectancy, adult literacy, mean years of schooling, and real GDP per capita. The principle underlying the combination of these different concepts is to provide a common measuring rod for "the socio-economic distance travelled," based on "a minimum and a maximum for each dimension." The concept of the HDI was extended in a study by Partha Dasgupta (1993, 108–16) to include measures of both political rights and civil rights, in order to provide an "inter-country comparison of the quality of life." Unlike the United Nations, however, Dasgupta presented his summary rankings in ordinal, not cardinal, form. For all listed countries, the correlation of rankings between this index and per capita income are reasonable but not perfect, but the breakdown into developed nations in contrast with developing nations is basically the same. What additional guides this measure provides for the planning of policy that are not also given by GNP (and its related indexes) is not clear, except perhaps that it encourages a focus on making improvements primarily in regard to the specific variables that go into the index.

The discussion thus far has focused on the measurement of aggregate national income averaged over the population and on various indexes of the quality of life. Such measures say nothing about the distribution of income among members of society, nor about how the distribution of income changed over time with the process of economic growth. Kuznets suggested a U-shaped relation between income equality and economic growth, with inequality increasing in the early stage of economic expansion and then declining as growth

proceeds.[44] While others have found this pattern to be widespread, the overall shape of the income distribution as well as the actual changes for each particular individual or family seem to follow no obvious pattern. As the debates on welfare criteria have shown, comparisons of two situations are difficult when it cannot be argued that each and every individual has been made better off absolutely (here putting aside those issues arising when there are interdependent utilities and when utilities are based on relative positions), and when no real-world compensation of losers by gainers can be undertaken. Presumably, however, this type of distributional problem exists for any attempt at a single index, unless we believe with certainty that the underlying distribution around that average number is known and can be related to changes in the mean.

1.7 Heights as a Welfare Measure

In the past two decades there has been considerable work, as this volume demonstrates, using another index of economic change to describe the historical past—heights of individuals at specified ages.[45] This approach to social and economic change has long been known and utilized, as James Tanner has amply demonstrated, and the use of height as a measure of well-being, with information about heights frequently coming from military data, has been undertaken in many Continental countries. Height is an attractive measure since it was used as a primary source for the identification and recognition of individuals. Moreover, in the case of the military, reported height was the result of direct measurement under quite specific conditions. A wide variety of sources going back for long periods—farther back than the data required to prepare systematic estimates of national income—have been found that contain data on heights, such as military records, shipping records for convicts, slaves, and indentured servants, criminal records, runaway slave advertisements, slave registrations, school records, and records of public and private agencies. While military records have been almost exclusively for males of adult or near adult age, other sources have permitted estimation of heights for women and children. In addition to achieved adult heights, it has been possible to measure rates of change in heights at preadult ages, and to make comparisons not only for one country over time but also for different nations. Further, this has led to

44. On trends in income distribution, see also Williamson (1991) and Adelman and Morris (1973). At issue is not only the distribution at any moment of time but also the changes in the relative and absolute positions of various individuals and generations over time, the question of social mobility. For an examination of some early measures in the United States of the distribution of wealth and income by size, see Merwin (1939), and the discussion by Kuznets.

45. Because of the focus of this volume, I will not provide a more complete set of citations but will restrict myself mainly to general observations. For discussions of the study of heights in history and by economic historians, see Tanner (1981), Harris (1994), Fogel (1986, 1993), Komlos (1994, 1995), Floud, Wachter, and Gregory (1990), and Steckel (1992); see also Kunitz (1987).

some expansion in the use of physical measures to describe well-being, including data on birthweights, reflecting maternal conditions, and the body mass index (BMI), a composite measure of the present height and weight of individuals.[46]

Given the widely discussed and often believed expected relationship between height and nutrition, and the relationship between nutritional input and per capita income, and given that usable height data exist for times and places where reliable national income estimates are not available, it was initially thought that heights could serve as a useful proxy for income in those cases where no estimates of the latter had been presented. The initial studies of heights suggested a quite reasonable correlation between heights and income, both when dealing with growth in one country and when comparing different countries during similar time periods. These early studies had to deal with two major problems, one statistical, one conceptual. Because of the importance of military data, and the facts that the military did not accept everyone who was examined, for health and other reasons, and that its standards of acceptable height and health varied over time (often in response to greater manpower needs in wartime), means of determining statistical truncation points and the number of applicants who were eliminated because of truncation were needed. Clearly, the measured heights of those entering the army could present a misleading picture of the heights of the overall population of adult men, and this led to some difficulties in interpretation in the past. Two procedures, both premised on there being a normal distribution of the relevant group (however this group is defined), were devised and discussed in a study by James Trussell and Kenneth Wachter (Wachter and Trussell 1982). These adjustments compensated for the effects of various minimum and maximum height requirements and of their change over time. These improved measures were, nevertheless, subject to discussions and controversies about their relevance and accuracy.

Second, since there are calls on nutritional input for work and other activities, and thus nutritional requirements vary with work effort and intensity of input, the relevant concept to describe the expected impact of nutrition on height is not gross nutrition, the input of foodstuffs, but rather net nutrition—net of work and other requirements. Height measures, unlike measures of national income, can thus allow for the disutility of increased work intensity. Further, in going from gross nutrition to net nutrition the role of disease is of obvious importance, both in causing an increase in the nutritional input needed to maintain health and also as an element determining the efficiency in converting energy from food input into physical growth.

46. For studies of birthweights, see Goldin and Margo (1989) and Ward (1993). Studies of BMI by economic historians are discussed in Fogel (1993). While these can supplement the information provided by heights, many of the issues discussed below also apply to them.

Since the earlier studies seemed to demonstrate a high correlation between height and income, and their change, as well as between height and mortality, measures of height and of income were seen to be complementary rather than competitive. It was, however, with subsequent studies that provided height estimates for periods in which national income estimates existed that some important and interesting differences arose. In many different places, there were seen to be cycles, with expansions and downturns, in the patterns of height change, not the basically upward linear trend found for incomes and expected to have occurred for heights as well. While expectations regarding heights seem to be better met for cross-sectional comparisons both within and across countries, with the expected class differences within nations generally to be found, it was in the measurement of economic growth over time that problems arose and the nature of interpretation became more difficult. Given the desire for a unique answer to a question, initial responses in dealing with these different measures were more often to argue a preference for one or the other of the measures as dealing with the most important welfare concept, rather than to aim at resolving the apparent paradox by reconciling what were possibly measures of different concepts. In some cases there seemed to be a possible reconciliation of measures going in different directions. Possibly, for example, there was some reduced food input in agricultural regions newly opened to trade as part of the economic growth process, or increased income may have meant that food consumption shifted to varieties of food that were more processed and had, per dollar of expenditure, less nutrient value. These possibilities have been mentioned as different means of reconciling increased incomes and decreased heights, even if it leaves open the welfare implications. Similarly, it has been claimed that new disease environments, whether exogenous or endogenous, imposed costs on society that were not reflected in national incomes, a situation that again could lead to increased incomes and decreased heights. On the other hand, as the example of public health measures suggests, it is possible that gains (or losses) in mortality experience occur without any major, direct changes in individual incomes. Thus reconciliations have been suggested between changes in heights and in incomes in different directions or of different orders of magnitude, although disagreement persists on how best to answer the question of whether people were better or worse off.

The difficulties in measuring national income are well known and have long been discussed and debated, as pointed out above. The concept of national income has survived much of this criticism and is still in general use, pitfalls and all. What I want to do now is to raise certain conceptual issues about the use of height measures, which deal with the interpretation of findings from empirical studies, leaving aside the various issues of appropriate measurement and of correction for known biases. While it is clear that studies of changing heights have made and will continue to make a major contribution to the study of economic history, to take full advantage of their promise certain pieces of information would be useful for detailed analysis.

1.8 Factors in Human Physical Growth

One problem whose importance for the study of heights has become clear only relatively recently concerns the precise nature of diseases, their causes and their consequences. It is obvious that certain diseases can influence physical growth patterns of individuals. Since these diseases may influence individuals at different ages, with generally the greatest impact at ages from birth to age two, it may be necessary to consider the full sequence of the growth path in order to determine the conditions that permit "catch-up" growth to occur or to see whether the losses suffered are permanent. Interacting with disease in influencing infant growth could be changes in breast-feeding practices, with some direct effects on nutrition as well as on disease susceptibility.

Diseases can result from human behavior (e.g., from migration or from health and cleanliness habits), as well as being generated by the natural environment (e.g., climatic changes, hurricanes, earthquakes, and insect and animal population changes). Disease may be the outcome of the process of economic change, or it can be independent of the economic situation. More plausibly, perhaps, there is some degree of interaction between the two. Since disease will influence the relation between food input and achieved height, changes in the disease environment that affect stature can mean that height changes are not to be regarded as the direct result of changes in nutrition. The worsening of the disease environment, for any reason, can reduce the achieved height consistent with any level of national income, although the interpretation of the welfare significance of such a height reduction will vary depending on whether the cause of the disease change is endogenous or exogenous to the economic growth process. Thus more information on the nature and causes of diseases, and on their influence on the relationship of foodstuffs to height, will help us to better understand the process and evaluation of economic change.

Comparisons between changes in national income and changes in height are often difficult because there remains uncertainty as to the precise period of time to which to attribute the causes of height variations, while the specific year for which national income is measured is clearly known. Explanations of the nature and timing of some specific events leading to height changes often suggest the existence of a long and varying lag, so that contemporaneous comparisons of heights and incomes will be misleading. The relative role of birthweight (and maternal influences) and of various ages prior to, during, and after growth spurts have been frequently discussed but, as noted, with little apparent certainty at present as to critical periods of impact. Physiological impacts may vary with individual age and with time of changes, so that the value of indicators will vary depending on whether our primary interest is in long-term trends or in shorter periods, including business cycles. Short-term movements, including famines, may not be as sensitively or as accurately measured by heights as by national incomes, nor may height data show up rapidly enough to serve as a useful guide to economic and social policy.

Related to this issue of physical growth patterns is the question of what is precisely known about the relationship between food input and height: Is it linear or nonlinear? Are there threshold levels at either the short or the tall end? The conversion of income into height may also depend on level of education, which can influence the efficiency of the individual's diet selection and food preparation. These pieces of information will be useful for several questions, including that of the expected relationship between income and height at different levels of food input, and the relationship between the distribution of heights and the distribution of incomes and food inputs. Further, it may be important to distinguish among the impacts of different foodstuffs in adding to physical growth potential, a distinction that suggests that the relation of income, food input, and height may be considerably more varied than earlier anticipated. Given the impact of Engel's law over time and across income levels at a moment of time, the translation between relative heights and relative incomes is frequently not obvious.

The persistence of the pattern of higher mortality for those of smaller heights can also present certain problems in the interpretation of changes over time. There will be some measured increase in average height over time since in general those who die tend to have been shorter than the average (see, e.g., Friedman 1982). And as overall mortality declines over time there could be a small tendency for average heights to fall since there will now be more survivors of below average height. Whether these points are of any quantitative significance awaits more data on patterns of mortality and mortality change attributable to factors related to height.

1.9 Concluding Reflections

It remains difficult to find any one measure or index that can provide us with all we wish to know about the magnitude of welfare and its distribution, as well as their changes over time. None of the indicators seem to always provide the expected answers, either over time or across countries. We have a number of imperfect indicators, and while there are often adjustments that can be made to better approximate our goal, these will often leave many issues open. Disagreements on interpretations exist for numerous reasons, including a failure to agree on the proper set of weights for calculating indexes based on more than one component, and in the desire to go beyond ordinal rankings to get cardinal differences, attempted so that we can discuss orders-of-magnitude differentials across classes and nations. And for each possible indicator it is necessary to determine the proportionality between the index and the welfare we are attempting to measure, and to determine if the components of the index rise equally with what we regard as welfare over time.

Some attempts to go beyond the basic economic indicators have led to interest in so-called social indicators, which include various measures of social ills

and social betterment.[47] As with other nonmonetary indicators, however, there are no schemes of weighting to provide an unambiguous single-number index. Some scholars have utilized questionnaires, asking people about their perceived happiness and well-being. In an analysis of such questionnaires by Richard Easterlin, it appears that the results do suggest that individuals, in any nation, with above average income feel better than those whose incomes fall below average, but there seem to be no major increases in happiness with growth of income over time (Easterlin 1974; see also Campbell, Converse, and Rodgers, 1976). However interesting these surveys, they present many basic difficulties—some peculiar to the method, including understanding what makes for individual evaluations, as well as some similar to those of other measures.

The difficulty in choosing among indicators or in somehow combining them reflects two different types of problems. One concerns the possibility and the costs of obtaining the data necessary to appropriately measure the desired concept. Do the data exist, presumably as a result of some other functions within society, and are they easily translatable into the concept of interest, either directly or with some suitable adjustments? Or if new data are required, can they be obtained at low enough cost? Second, how can we relate any of the measures to some basic underlying economic model? Which measures can be argued to be the direct outcome of maximizing behavior, and which are more the by-products of individual behavior that had sought other goals? Such issues are difficult to argue about since, while we might believe that individuals maximize utility, not measured income, life expectation, food consumption, or height, it is not clear how to determine what enters into different individual utility functions. Given the difficulties in finding an answer to any basic question of differential welfare, perhaps our best strategy is to accept the specific value of particular indicators for answering particular questions but also remain aware of the complexity of the multitude of factors that makes these examinations so difficult and generalization so uncertain.

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47. This was a concern of various governmental agencies in the United States in the 1960s and 1970s, but this effort did not seem prolonged. See, e.g., U.S. Department of Health, Education, and Welfare (1969) and U.S. Department of Commerce (1977)—the first such publication was in 1973; this was the second. More generally on this approach, see Bauer (1966).

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