FOR THE COMMON GOOD

Redirecting the Economy
toward Community,
the Environment, and a
Sustainable Future

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Updated and Expanded

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Misplaced Concreteness: Measuring Economic Success

The GNP: Its Political Importance

Economists want the market to perform well. They are deeply convinced that when the market performs well, people in general benefit. Most of their research is geared accordingly in one way or another to understanding what makes the market function well.

Although many of their theories about healthy market functioning are deductive, economists are also interested in measurements of market success, both in particular sectors of the market and for the market as a whole. The single most important measure in this country is the gross national product. Almost all economists view growth in GNP, or GNP per capita, as a sign of a healthy market, which means for them a healthy economy.

With respect to some aspects of economic teaching, such as opposition to government intervention in the labor market, the economists are regularly overruled by the public, acting through its elected representatives. But with respect to growth as measured by GNP, there has been no major public dissent. Both political parties are committed to economic progress, and for both that means an increased GNP. When alarm is expressed about the difficulty of stimulating adequate growth today, the meaning is that the policies adopted have not sufficiently increased the GNP. The general public also accepts this view of economic health and is more likely to keep a party in power when it believes the economy—and that means chiefly the GNP—is growing.

Other countries also measure their national products. Although complete standardization has not been attained and difficulties in intercountry comparisons are recognized, the GNP measurements are also used by international financial agencies to measure the comparative success

of development programs. Both the World Bank and the International Monetary Fund shape their policies by this indicator. Successful economic development *means* that the rate of increase of per capita GNP is satisfactory.

Humanitarians also often cite GNP figures. Their object is to arouse our sympathy for people whose income is very low. They usually imply that the countries with high per capita GNP should find means of transferring some of their wealth to countries with low per capita GNP. In short, GNP as the standard measure of economic success is accepted by economists, politicians, financiers, humanitarians, and the general public. It is enormously important. This makes its closer examination worthwhile.

All groups assume that GNP measures something of importance to the economy and most assume that this is closely bound up with human welfare. It is recognized, of course, that human welfare has dimensions other than the economic one. But it is rightly held that the economic element in welfare is *very* important, and that the stronger the economy the greater the contribution to human welfare. It is also often thought that the economy is the major area of welfare subject to political influence. In any case, there is little consensus on any other measurement, so that none of the others that have been proposed exert a remotely comparable influence on public policy.

The tendency to forget that the GNP measures only some aspects of welfare and to treat it as a general index of national well-being is, of course, a typical instance of the fallacy of misplaced concreteness. It is obvious and need not detain us. It can be countered by giving increasing visibility to social indicators, such as the Physical Quality of Life Index, which measures literacy, infant mortality, and life expectancy at age one. Indicators of ecological health should also be developed and publicized. Although not stated in the form of statistical indexes, Lester Brown's annual *State of the World* volumes help in this regard.

The assumption that economic welfare as measured by GNP can simply be added to other elements of welfare reflects the view of reality that underlies the academic world generally. The whole is found, supposedly, by putting together the parts into which it is divided for study. That assumes that the parts are in fact unchanged by their abstraction from the whole. That is clearly not true. Hence the first question to ask is whether growth in the economy as measured by GNP actually contributes to the total well-being of people.

Until recently this question was hardly raised, and even today it is not

taken seriously in most economic and political circles. Nevertheless, the question is now before the world. There is a mounting chorus of critics who point out how high the cost of growth of GNP has been in psychological, sociological, and ecological terms (Wachtel 1983). The relation of GNP to total human welfare requires further discussion.

But there is also a question about the relation of GNP to economic welfare itself. This question is familiar to economists. Indeed, no knowledgeable economist supposes that the GNP is a perfect measure of welfare. Most recognize both that the market activity that GNP measures has social costs that it ignores, and that it counts positively market activity devoted to countering these same social costs. Obviously GNP overstates welfare! There are other weaknesses that make it vulnerable to ridicule. But there is a widespread assumption that these are minor weaknesses and that what the GNP measures comes close enough to economic welfare that it can be used without further ado in a whole range of practical contexts. When economists or political leaders forget that what is measured by GNP is quite distinct from economic welfare, and when they then draw conclusions from the GNP about economic welfare, the fallacy of misplaced concreteness appears again. Although economists quickly acknowledge this, they as quickly deny its importance. Our task will be to examine more closely the discussion of GNP and economic welfare to determine whether this wide consensus among economists is justified or whether the fallacy, in this instance, is more important than they suppose. We will discuss two moves away from GNP. First we consider a move toward a conceptually more correct concept of income (Hicksian income). The issue here is not to measure welfare at all, but simply to do a better job of measuring income. Of course there is a relation between income and welfare, and a better measure of income is likely to be a better index of welfare also, but Hicksian income does not directly address the relation to economic welfare in general. The second move away from GNP is toward a measure of economic welfare. Examining this move does involve us in the relation of income to welfare, component by component, both in this chapter in our review of the attempts of others, and in the Appendix, where we offer our own attempt at designing an index of welfare.

GNP: Concepts and Measurement

For a standard textbook account of GNP, we are using Howard J. Sherman's *Elementary Aggregate Economics* (1966). So far as we can tell it differs little from other standard treatments:

> The gross national product (GNP) may be calculated in two different ways, corresponding to the money flow from households to business or the equal money flow from business to households. In the first way, we examine the aggregate money demand for all products. This is the flow of money spending on consumer goods, investment goods, government expenditure, and net export spending. . . .
>
> The second way is to add up the money paid out by businesses for all of its costs of production. Most of these costs of production constitute flows of money income to households. These incomes include wages paid for services of labor, rent for the use of land, interest for the use of borrowed capital, and profit for capital invested. [pp. 30–31]

The text notes that depreciation and excise taxes must be added to the second way. When this is done, the first and second ways must attain identical results. Equality between the spending and income streams is guaranteed by the residual nature of profit. Any difference between the two streams appears as either profit or loss, which when added to the income stream guarantees the equality of the two flows.

Sherman goes on to show that by subtracting depreciation from GNP one arrives at *net national product;* by subtracting indirect business taxes also, one arrives at *national income;* by subtracting retained corporate profits, corporate income taxes, and contributions for social insurance and adding government transfer payments and net interest paid by government, one arrives at *personal income;* and by subtracting personal income taxes from this, one arrives at *disposable personal income.*

If Sherman were asked directly whether GNP is a measure of economic welfare, we are not sure what he would answer. But that he regards it as such for practical purposes and communicates this regard to his readers there can be no doubt. After having cautioned that each industry's contribution to the national product is only the value added rather than the total value of its output, he writes:

> A second qualification is necessary if we wish to measure accurately the year-to-year improvement *in national welfare.* . . . We must always deflate the changes in the money value of the national product by the price changes to find the real amount of change in the national product.
>
> Lastly, we may not be interested in the total national product but in the national product per person of the population. . . . Therefore, if we wish to measure the improvement in *individual welfare,* we must always deflate the increase in our total national product by the increase in our population. [emphasis added; pp. 52–53]

One would expect from this textbook account that the actual measure of the GNP in the National Income Accounts was a straight measure of

market activity only. There are those who would find this limitation beneficial in their work (Eckstein 1983). However, this has never been the case.

The reason that GNP has never been based on market activity alone is that this would distort the actual economic situation drastically. From the beginning of the accounts, two major additions to market activity have been the food and fuel produced and consumed by farm families and the rental value of owner-occupied dwellings. The reason for including these is obvious. Consider a scenario. Suppose one lives in a home one rents from someone else while owning a house elsewhere that one rents out to another party. Both rentals constitute market activity. If, then, one moves into one's own home, market activity is reduced, and if only market activity is counted then the GNP is reduced. Yet intuitively, no one feels that the economy has been damaged. (Also imputed have been the value of food and clothing provided to the military, and banking services rendered to depositors without payment [Ruggles 1983, p. 40].

Our point is that from the beginning there has been a tension in the consideration of what it is that GNP measures. The tension is visible in the textbook accounts. On the one hand, the emphasis is on market activity. On the other hand, there is a concern to make judgments about improvement in welfare. The GNP has emphasized the market but has made modest adjustments in the direction of welfare by imputing a value to farm-family production of household consumed goods and to owner-occupied housing. But the same logic that justifies the inclusion of these items would justify the inclusion of many others. Accordingly, many proposals have been advanced to impute additional values in computing the GNP. Thus far, none have been adopted. As Otto Eckstein comments, "NIPA [national income and product accounts] has many purposes: to gauge economic performance, compare economic welfare over time and across countries, measure the mix of resource use between private and public sectors and between consumption and investment, and to identify the functional distribution of income and of the tax burden. Inevitably, these purposes clash and the accounts must be a compromise" (Eckstein 1983, p. 316).

A compromise cannot be completely satisfactory to anyone. Our concern, however, is not whether as a result of the compromise comparisons of "economic welfare over time and across countries" are slightly warped, but whether the GNP, which remains primarily a measure of market activity, is in general a useful measure of economic welfare at all. Might it not be better to have a measure of market activity that would work well for the more technical purposes to which the GNP is put, and which made no adjustments whatever in the direction of measuring welfare? Then the question of how much correlation there is between increasing market activity and the economic welfare of the people could be asked more clearly and neutrally.

There is a second respect in which the GNP fails to be a pure measure of market activity. At some points it also concerns itself with wealth; specifically, capital. This is apparent where depreciation is included as a part of the cost of doing business. This operates in a rather odd way. The greater the depreciation of capital assets of business in a given year, the greater the GNP (all other things being equal). The decline in the value of a factory and its equipment increases the GNP. That this decline is not a contribution to economic welfare is recognized by the deletion of this figure in calculating the net national product and the national income. But we must remember that it is GNP rather than these other figures that functions in most comparative studies of economic welfare.

These comments indicate that although depreciation of capital assets does enter into GNP figures, it does so in a way that is opposite to its relation to national wealth. Some of the figures in the GNP do indicate a positive relation to the increase of national wealth; others are neutral in this respect and some, as we have seen, are negative. It is possible to ask whether measures of national wealth might not correlate more highly with national economic welfare than does either market activity or GNP. In fact, one great economist, Irving Fisher, argued strongly that this is the case (Fisher 1906). In Fisher's view nearly all consumer goods are classed as capital or as wealth, and their consumption represents depreciation. For Fisher, welfare is the service (the psychic sense of want satisfaction) rendered by this wealth, and for the most part would have to be imputed—for example, the value of the annual service of your overcoat is what it would cost you to rent it, which is the same imputation as with owner-occupied houses, only more difficult since we have no rental markets for overcoats. But the logic is the same. It is at least essential that no one suppose that GNP measures national wealth or has any necessary correlation with its increase or decrease.

None of these comments are intended to imply that the National Income and Product Accounts of the United States government or similar accounts in other countries are of no use. Our concern here is with one particular use—namely, use as a measure of economic welfare. Until we

understand exactly what GNP does and does not measure, we cannot make reasonable judgments on this question.

Like most of what happens in the world, the explanation of why the GNP measures what it does is historical rather than systematic. The Commerce Department began reporting statistics on the net product of the national economy in 1934. But it has been noted that "it was the mobilization for World War II and the consequent demand for data relating to the economy as a whole that was primarily responsible for shaping the accounts. The central questions posed by the war were how much defense output could be produced and what impact defense production would have upon the economy as a whole" (Ruggles 1983, p. 17).

Similar developments were occurring in other countries, and the United States compared its approach with those of the British and Canadians during 1944. The next year the League of Nations convened a meeting on national income accounting. So, by 1947, the United States was ready to publish its newly developed national accounting system. Although this was supplemented in various ways in later years and revised in 1958 and 1965, with respect to our concerns it has remained basically unchanged.

There have, however, been critical discussions of the National Income Accounts that raised questions relevant to our concerns. This was especially true of the 1971 Conference on Income and Wealth, which did concern itself with welfare questions. It became clear that: "Many users considered that the present emphasis of the national income and product accounts on market transactions led to a perspective that was too narrow for the measurement of economic and social performance. It was cogently argued that additional information was required on nonmarket activity, on the services of consumer and government durables and intangible investment, and on environmental costs and benefits" (Ruggles 1983, p. 332).

There was some discussion of the evaluation of leisure. But such considerations involved large imputations that would render the accounts less useful to "those who used the national accounts for the analysis of economic activity in the short run, with a focus on inflation, the business cycle, and fiscal policy" (Ruggles 1983, p. 332). For this reason the concerns of those interested in measuring long-term economic and social performance have not been dealt with in the accounts. On the other hand:

> BEA has established a new program to develop measures of nonmarket activity within the framework of GNP accounts. In part this work is a response to the emphasis put on this topic at the 1971 Conference on Income and Wealth, but it also reflects the strong interest in environmental studies within the Department of Commerce. The federal government's concern with the measurement of the costs of pollution control and environmental damage has stimulated work in this area. BEA's current program, however, includes not only environmental questions but also (1) time spent in nonmarket work and leisure, (2) the services of consumer durables, and (3) the services of government capital. The close relationship to the national income accounting system in this work is stressed, but as yet it has not been formally integrated. [Ruggles 1983, p. 35]

The tension we have noted between a measure of market activity and a measure of economic welfare is clearly being felt by those responsible for National Income Accounts. The problem seems to be insoluble as long as the effort is to have a single summary figure, such as GNP.

Richard Ruggles, whose historical account we have been following, concludes:

> There is no well-defined universe of nonmarket activities and imputations to be covered. The set of all possible imputations is unbounded. The only criterion that can be employed is whether the imputations are considered to be useful and necessary for the particular purpose at hand. . . .
>
> For all these reasons, an explicit separation of market transactions from imputations in the national accounts would seem highly desirable. . . . It would be recognized, however, that imputations alone cannot meet the information needs for measuring economic and social performance. . . . No amount of imputation can convert a one-dimensional summary measure such as the GNP into an adequate or appropriate measure of social welfare. [pp. 41–43]

From GNP to Hicksian Income and Sustainable Development

Not only is GNP a poor measure of welfare, it is also a poor measure of income. In this chapter, as well as in Chapter 7 and in the Appendix, the effort is to move from GNP toward a measure of welfare. This is a very difficult task involving many controversial issues. In this section, the focus is on the less controversial issue of converting GNP into a better measure of income. Unlike welfare the concept of income has a fairly clear theoretical definition, although there are big problems in making that definition operational. In measuring welfare one cannot avoid to a large extent implicitly defining the concept by one's very measure of it. With income we have an explicit independent definition to which our measurements may to a greater or lesser degree correspond. With welfare we have no such independent theoretical definition. It is therefore useful to keep these two departures from GNP quite separate.

The central criterion for defining the concept of income has been well stated by Sir John Hicks in *Value and Capital:*

> The purpose of income calculations in practical affairs is to give people an indication of the amount which they can consume without impoverishing themselves. Following out this idea, it would seem that we ought to define a man's income as the maximum value which he can consume during a week, and still expect to be as well off at the end of the week as he was at the beginning. Thus when a person saves he plans to be better off in the future; when he lives beyond his income he plans to be worse off. Remembering that the practical purpose of income is to serve as a guide for prudent conduct, I think it is fairly clear that this is what the central meaning must be. [1948, p. 172]

The same basic idea of income holds at the national level and for annual time periods. Income is not a precise theoretical concept but rather a practical rule-of-thumb guide to the maximum amount that can be consumed by a nation without eventual impoverishment. We all know that we cannot consume the entire GNP without eventually impoverishing ourselves, so we subtract depreciation to get net national product (NNP), which is usually taken as income in Hicks's sense. Note that the central defining characteristic of income is *sustainability.* The term "sustainable income" ought therefore to be considered a redundancy. The fact that it is not is a measure of how far we have strayed from the central meaning of income, and consequently of the need for correction.

But could we really consume even NNP year after year without impoverishing ourselves? No, we could not, for two reasons: first, because the production of NNP at the present scale requires supporting biophysical transformations (environmental extractions and insertions) that are not ecologically sustainable; second, because NNP overestimates net product available for consumption by counting many defensive expenditures (expenditures necessary to defend ourselves from the unwanted side-effects of production) as final products rather than as intermediate costs of production. Consequently, NNP increasingly fails as a guide to prudent conduct by nations.

For example, a developing country may obtain 6% of its GNP from timber exports. Perhaps 2% of that is based on sustained yield exploitation and the remaining 4% is based on deforestation. The maximum sustainable consumption has been overestimated by 4%, not even counting the loss of unpriced natural services of the forest. That may sound small, but in an economy whose conventional GNP was growing at 3%, a 4% reduction is the difference between growth and decline, which makes a very big qualitative difference in a nation's perception of itself and its policies, and, indeed, of its leaders. The last difference is one reason for resistance to this change in income accounting. No politician wants to be known as the minister under whom the country went from growth to decline in one year! Yet there is an opportunity for someone to be known as the leader who finally introduced the income accounting system that saved the nation from eventual impoverishment (Repetto 1987, pp. 94–99).

Two adjustments to NNP are necessary to arrive at a good approximation to Hicksian income and a better guide to prudent behavior. One adjustment is a straightforward extension of the principle of depreciation to cover consumption of natural capital stocks depleted as a consequence of production. The other is to subtract defensive (regrettably necessary) expenditures made to defend ourselves from the unwanted side effects of growing aggregate production and consumption. Defensive expenditures are of the nature of intermediate goods; that is, they are costs of production rather than final products available for consumption. To correct for having counted defensive expenditures in NNP, their magnitude must be estimated and subtracted in order to arrive at an estimate of sustainable consumption or true income.

To summarize, let us define our corrected income concept, Hicksian income (HI), as net national product (NNP) minus both defensive expenditures (DE) and depreciation of natural capital (DNC). Thus,

$$HI = NNP - DE - DNC$$

No interference whatsoever with the current national accounts (or loss of historical continuity or comparability) is entailed in this suggestion. Two additional adjustment accounts are introduced, not for frivolous or trendy reasons, but simply to gain a better approximation to the central and well-established meaning of income. Since these two adjustment accounts are also relevant to our attempt to measure welfare, they will be discussed in that context and are not further considered here.

What does deserve some mention in this context is the recent surge of interest in "sustainable growth" or "sustainable development" within development agencies and Third World countries, following the publication of the Brundtland Report (1987). Although the two terms are used synonymously we suggest a distinction. "Growth" should refer to quantitative expansion in the scale of the physical dimensions of the economic system, while "development" should refer to the qualitative change of a physically nongrowing economic system in dynamic equilibrium with the environment. By this definition the earth is not growing,

but it is developing. Any physical subsystem of a finite and nongrowing earth must itself also eventually become nongrowing. Therefore growth will become unsustainable eventually and the term "sustainable growth" would then be self-contradictory. But sustainable development does not become self-contradictory. Now that these terms have become buzzwords among the development agencies it is important to make this distinction, and even more important to define sustainable development in operational terms. If we had defined development operationally as an increase in Hicksian income rather than as an increase in GNP, then sustainability would have been guaranteed, as we have seen.

The main operational implication of Hicksian income is to keep capital intact. Our problem is that the capital we have endeavored to maintain intact is humanly created capital only. The category "natural capital" is left out. Indeed it is left out by definition as long as one defines capital as "(humanly) produced means of production." We suggest a functional definition of capital as a stock that yields a flow of goods or services. There are then two categories of capital, natural and humanly created. Natural capital is the nonproduced means of producing a flow of natural resources and services. Only humanly created capital has been maintained intact, along with some natural capital stocks that are privately owned (herds of cattle, plantation forests).

Why has natural capital been ignored? Aside from the past nonscarcity of natural capital due to the relatively small scale of the human economy, neoclassical economic theory has taught that humanly created capital is a near-perfect substitute for natural resources, and consequently for the stock of natural capital that yields the flow of these natural resources. Even if this assumed near-perfect substitutability were true, it would still be necessary to maintain intact total capital (humanly created plus natural) in arriving at Hicksian income. That is, the running down of natural capital would have to be offset by the accumulation of an equivalent amount of humanly created capital. Maintaining the total capital intact in this way might be referred to as "weak sustainability" in that it is based on generous assumptions about the substitutability of humanly created and natural capital (which imply high substitutability between capital and natural resources in production functions). By contrast, "strong sustainability" would require maintaining both humanly created and natural capital intact separately, on the assumption that they are complements rather than substitutes in most production functions (our reasons for believing that this is the case are given in Chapter 10). We advocate the strong sustainability approach to

operationalizing sustainable development. But even weak sustainability would be an improvement over present practice.

Another approach that is relevant both to making GNP a better measure of income and to operationalizing the definition of sustainable development has been advanced by Salah El Serafy (1988). El Serafy tackles the difficult issue of how to treat receipts from nonrenewable resources in defining income (or, what comes to the same thing, how can a community avoid the absurdity of leaving its nonrenewable resources forever in the ground doing no one any good, yet not allow their exploitation to deflect the community from the path of sustainable development?). He argues that receipts from a nonrenewable resource can be divided into an income and a capital component. The income component is that portion of the receipts that could be consumed annually in perpetuity on the assumption that the remainder of the receipts were invested in renewable assets. The return on the renewable assets and the amount invested each year are such that when the nonrenewable resource is exhausted the new renewable assets will be yielding an amount equal to the income component of the receipts.

The basic logic underlying El Serafy's method is that "the finite series of earnings from the resource, say a 10-year series of annual extraction leading to the extinction of the resource, has to be converted to an infinite series of true income such that the capitalized value of the two series be equal. From the annual earnings from sale, an income portion has to be identified, capable of being spent on consumption, the remainder, the capital element, being set aside year after year to be invested in order to create a perpetual stream of income that would sustain the same level of *'true'* income, both during the life of the resource as well as after the resource had been exhausted."

To make the separation into income and capital components, it turns out that one need know only the rate of discount (which must ultimately be related to the rate of growth of renewable resources and the rate of growth of factor productivity, although this relation is not discussed by El Serafy), and the life expectancy of the nonrenewable resource (total reserve stock divided by the annual extraction rate). Social choices or assumptions about these magnitudes will allow the calculation of the percentage of the nonrenewable resource receipts that should be counted as income. For example, if the life expectancy of a nonrenewable resource is 10 years and the discount rate is 5%, then it can be shown that 42% of current receipts is income and the remaining 52% is the capital content that must be reinvested. Alternatively, if the

discount rate were 10% and the life expectancy remained at 10 years, the income component would be 65%. A discount rate of 10% and a life expectancy of 50 years would result in a 99% income component.

El Serafy's method is elegant and parsimonious in terms of its information requirements. The effect of rising costs of extraction can be taken into account as a reduction of reserves. The whole calculation can be redone on the assumption of rising relative price of resources, rather than the assumption of constant prices used for simplicity. As a correction of GNP, El Serafy's method is more radical than the subtraction of depletion of natural capital from NNP, because it would change the very calculation of GNP itself. Instead of keeping the present overestimate of Hicksian income and then subtracting an adjustment figure, El Serafy's method would avoid the overestimate from the beginning by calculating GNP differently. While this is logically neater, it is politically more difficult to convince national income accountants to do this because it sacrifices historical continuity in the way accounts are kept. But even if the estimation of a natural capital depreciation adjustment account were favored for this reason, El Serafy's method would still be useful in calculating natural resource depreciation, which would still be receipts in excess of the income component, assuming this amount was being consumed rather than invested. In the Appendix we seek to employ El Serafy's method in this way, and in that context we will point out some technical difficulties with it.

If a development bank or agency takes sustainable development as its guiding principle, then, ideally, each of the projects it finances should be sustainable. Whenever this is not possible, as with the exploitation of a nonrenewable resource, there should be a complementary project that would insure sustainability for the two taken together. The receipts from the nonrenewable extraction should be divided into an income and capital component as discussed above, with the capital component invested each year in the renewable complement (long-run replacement). Furthermore if projects or combinations of projects must be sustainable, then it is inappropriate to calculate the net benefits of a project or policy alternative by comparing it with an unsustainable option—that is, by using a discount rate that reflects rates of return on alternative uses of capital that are themselves unsustainable. For example, if a sustainably managed forest can yield 4% and is judged an uneconomic use of land on the basis of a 6% discount rate, which on closer inspection turns out to be based on unsustainable uses of resources, including perhaps the unsustainable clearing of that same forest, then clearly the

decision simply boils down to sustainable versus unsustainable use. If we have already adopted a policy of sustainable development, then of course we choose the sustainable alternative, and the fact that it has a negative present value when calculated at a nonsustainable discount rate is simply irrelevant. The present value criterion itself is not irrelevant because we are still interested in efficiency—in choosing the best sustainable alternative. But the discount rate must then reflect only *sustainable* alternative uses of capital. The allocation rule for attaining a goal efficiently (maximize present value) cannot be allowed to subvert the very goal of sustainable development that it is supposed to be serving! Use of an unsustainable discount rate would do just that. We suspect that discount rates in excess of 5% often reflect unsustainable alternatives. At least one should be required to give, say, five concrete examples of sustainable projects that yield 10% before one uses that figure as a discount rate.

Given acceptance of the goal of sustainable development, there still remains the question of the level of community at which to seek this goal. International trade allows one country to draw on the ecological carrying capacity of another country and thus be unsustainable in isolation, even though sustainable as part of a larger trading bloc. The trade issue raises again the question of complementarity versus substitutibility of natural and humanly created capital. If we follow the path of strong sustainability then this complementarity must be respected either at the national or international level. A single country may substitute humanly created for natural capital to a high degree if it can import the products of natural capital (the flow of natural resources and services) from other countries that have retained their natural capital to a greater degree. In other words, the demands of complementarity can be evaded at the national level, but only if they are respected at the international level. One country's ability to substitute humanly created for natural capital to a high degree depends on some other country's making the opposite (complementary) choice. For reasons elaborated in Chapter 11, we advocate seeking this complementary balance of humanly created and natural capital mainly within each nation rather than between nations.

One reason for the unanimity of support given to the phrase "sustainable development" is precisely that it has been left rather vague—development is not distinguished from growth in the Brundtland Report, nor is there any distinction between strong and weak sustainability. Politically this was wise on the part of the author. They managed to put high on the international agenda a concept whose unstated implications were

too radical for consensus at that time. But in so doing they have guaranteed eventual discussion of these radical implications. Consider, for example, two questions immediately raised by any attempt to operationalize their definition of sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs." First there is the question of distinguishing "needs" from extravagant luxuries or impossible desires. If "needs" includes an automobile for each of a billion Chinese, then sustainable development is impossible. The whole issue of *sufficiency* can no longer be avoided. Second, the question of not compromising "the ability of future generations to meet their own needs" requires an estimate of that ability. It may be estimated on the basis of either strong or weak sustainability, depending on assumptions about substitutability between natural and humanly created capital. This will force deeper discussion of the substitutability issue, which lies near the heart of present economic theory.

We are very grateful to the Brundtland Commission for their fine work on this critical issue and suspect that they were not unaware of the difficulties we have raised, but rather chose wisely not to try to go too far too fast. In legitimating the concept of sustainable development they have made it easier for others to press the issue further. We hope that the international development banks and agencies will not abandon the ideal of sustainable development as its radical implications are realized. However, we hope they will abandon the oxymoron "sustainable growth," which is beginning to function as a thought-stopping slogan.

From GNP to a Measure of Economic Welfare

Without claiming to devise a comprehensive measure of social welfare, it may still be possible to develop a convincing measure of the positive contribution of the economy to social welfare. This is the goal of Nordhaus and Tobin in the construction of a Measure of Economic Welfare (MEW). However, this goal was for them a means to another goal, namely, the demonstration that the consensus among economists is correct, and that the existing GNP correlates sufficiently well with economic welfare to make it unnecessary to use the instrument they devise! This is their clear conclusion despite their early statement that "maximization of GNP is not a proper objective of policy" (Nordhaus and Tobin 1972, p. 4). We will ignore this puzzling contradiction and describe their careful work on a new indicator, the MEW—in which they "attempt to allow for the more obvious discrepancies between GNP and economic welfare" (p. 6).

Nordhaus and Tobin begin with the GNP and make three types of adjustments: "Reclassification of GNP expenditures as consumption, investment, and intermediate; imputation for the services of consumer capital, for leisure, and for the product of household work; correction for some of the disamenities of urbanization" (p. 5). With the exception of environmental costs and benefits they covered all the questions raised in the 1971 Conference on Income and Wealth mentioned above. We will follow their argument in summary.

GNP is a measure of production, not consumption, whereas economic welfare is a matter of consumption. Hence, the first task is to separate consumption from investment and intermediate expenditures. This entails the deletion of depreciation, as is already accomplished in the NNP. Beyond this, Nordhaus and Tobin consider the effects of treating all durables as capital goods but find that this has little effect. More important is the result of allowing for government capital and reclassifying education and health expenditures as capital investments.

An especially interesting adjustment follows from the recognition that welfare correlates with per capita consumption rather than with gross consumption. To sustain per capita consumption for a rising population, some portion of the NNP must be reinvested. Nordhaus and Tobin accordingly subtract from NNP for this purpose to gain a "sustainable" per capita consumption figure. We will quote only these sustainable MEW figures.

The authors also note that some expenditures are regrettable necessities rather than contributions to welfare. In this category they place the costs of commuting to work, police services, sanitation services, road maintenance, and national defense. The assumption is that when more people spend longer periods driving to work, the increase in the GNP does not mean that more human wants are being satisfied. And so with the others. These figures are, accordingly, subtracted.

The second task is to make appropriate imputations for capital services, leisure, and nonmarket work. The latter two have a very large effect on the statistics, and there is no one indisputable method for valuing them. Nordhaus and Tobin propose three methods. The question is whether leisure and nonmarket activity are affected by technological progress. The authors prefer the measure that leaves the value of leisure

unaffected by technical progress even though nonmarket productive activity is so affected. We will report only the statistics generated by this choice.

The third task is to consider urban disamenities. Nordhaus and Tobin recognize that there are negative "externalities" connected with economic growth and suggest that these are most apparent in urban life. "Some portion of the higher earnings of urban residents may be simply compensation for the disamenities of urban life and work. If so we should not count as a gain of welfare the full increments of NNP that result from moving a man from farm or small town to city" (p. 13).

We now have before us the full range of adjustments made by Nordhaus and Tobin. One or another may appear inappropriate to some. For example, it may be argued that police protection is a contribution to welfare, and that it should not be deleted. The counterargument, however, is convincing if our purpose is to compare welfare over time. The increasing cost of police protection does not imply that we are less vulnerable to crime than we were in the past. Should the social situation change so that much less protection were needed, this should not be regarded as a reduction of economic welfare.

The real question is whether the list of regrettable necessities is sufficiently inclusive. As Nordhaus and Tobin recognize, "the line between final and instrumental outlays is very hard to draw. For example, the philosophical problems raised by the malleability of consumer wants are too deep to be resolved in economic accounting. Consumers are susceptible to efforts of producers. Maybe all our wants are just regrettable necessities; maybe productive activity does no better than to satisfy the wants which it generates; maybe our net welfare product is tautologically zero" (pp. 8–9).

Having said this, they ignore the problem. The same problem has been briefly considered and dismissed by Denison and Jaszi, who believe that regrettables or defensive expenditures *should* be counted as final consumption, as is currently the case (Jaszi 1973). All expenditures, they argue, are basically defensive: thus food expenditures are a defense against hunger, clothing and housing expenditures defend against the cold and rain, and so forth—and even expenditures on churches defend against the devil! Clever though this riposte may be, it misses the point—namely that "defensive" means a defense against the *unwanted side effects of other production,* not a defense against normal baseline environmental conditions of cold, rain, and so on. It is not the case that "our net welfare product is tautologically zero." Defensive expenditures are only those that were "regrettably made necessary" by other acts of production, and consequently should be counted as costs of that other production; that is to say, counted as intermediate rather than final goods.

We are now ready to consider the results of Nordhaus and Tobin's new MEW. What is of special interest to us is how it correlates with GNP, since the question of whether growth of GNP indicates improved economic welfare motivated the whole study. First, we will quote the conclusion of Nordhaus and Tobin, and then we will examine the figures on the basis of which they make their judgment: "Although the numbers presented here are very tentative, they do suggest the following observations. First, MEW is quite different from conventional output measures. Some consumption items omitted from GNP are of substantial quantitative importance. Second, our preferred variant of per capita MEW has been growing more slowly than per capita NNP (1.1% for MEW as against 1.7% for NNP, at annual rates over the period (1929–65). Yet MEW has been growing. The progress indicated by conventional national accounts is not just a myth that evaporates when a welfare-oriented measure is substituted"[1] (p. 17).

When their findings are more carefully examined for time frames other than the full period from 1929–65, the relatively close association between growth of per capita GNP and MEW disappears.[2] For example, between 1945 and 1947, per capita GNP fell about 15% (from $2,528 to $2,142) while per capita sustainable MEW rose by over 16% (from $5,098 to $5,934). Of course, this is the period of demobilization after World War II, so no conclusions should be drawn from this short-term negative relationship. Yet the presumption that the growth of GNP could be used as a reasonable proxy for MEW growth does not find confirmation in other periods either. From 1935 to 1945, per capita GNP rose almost 90% (from $1,332 to $2,528), while per capita sustainable MEW rose only about 13% (from $4,504 to $5,098). More significantly, during the postwar period, 1947–65, when neither depression nor war nor

1. In fact the growth rate of per capita MEW from 1929 to 1965 was only 1.0% per year, as opposed to 1.1%. The correct evaluation can be found in table 18 on p. 56 of Nordhaus and Tobin's study.

2. We have chosen to compare per capita MEW with per capita GNP rather than with per capita NNP as Nordhaus and Tobin have done. We do this for the sake of consistency with other studies (especially the one by Zolotas, discussed below). The differences in annual growth rates are not large, though the growth of per capita NNP is slightly slower than for per capita GNP.

recovery had a major impact on growth rates, per capita GNP rose about 6 times as fast as per capita sustainable MEW.[3] (Per capita GNP grew by 48% or about 2.2% per year, while per capita sustainable MEW grew by 7.5% or about 0.4% per year.) Moreover, if we assume, as Nordhaus and Tobin did in one of their options, that the productivity of housework has not increased at the same rate as the productivity of market activities, then per capita sustainable MEW actually registers a decline of 2% during the period 1947–65. Alternatively, we might consider the growth of per capita sustainable MEW in the absence of any imputation for leisure or household production because, as Nordhaus and Tobin admit, "Imputation of the consumption value of leisure and nonmarket work presents severe conceptual and statistical problems. Since the magnitudes are large, differences in resolution of these problems make big differences in overall MEW estimates" (Nordhaus and Tobin 1972, p. 39).

If that imputation is omitted, per capita sustainable MEW grows by 2% from 1947 to 1965. In any case, whether the appropriate figure for the change during that period in per capita sustainable MEW is 7.5%, 2%, or −2%, each of these results suggest that in fact "the progress indicated by conventional national accounts is . . . just a myth that evaporates when a welfare-oriented measure is substituted" (1972, p. 13). With their own figures, Nordhaus and Tobin have shed doubt on the thesis that national income accounts serve as a good proxy measure of economic welfare.

Nordhaus reflected again on the significance of his work with Tobin five years later. His interpretation of the results was unchanged: "Although GNP and other national income aggregates are imperfect measures of the economic standard of living, the broad picture of secular progress that they convey remains after correction for their most obvious deficiencies" (Nordhaus 1977, p. 197).

He had still failed to remark upon the lack of similarity between the growth of MEW and GNP during the last 18 years of the period that he and Tobin had reviewed.

Net National Welfare: Japan

Although Nordhaus and Tobin decided that the similarity between MEW and GNP sufficed to drop pursuit of the former as an independent measure, others have taken up where they left off. Their work attracted interest in Japan, and a team of leading economists developed a measure of Net National Welfare (NNW). Although based on the work of Nordhaus and Tobin, this measure differs in several respects. The Japanese study does not dismiss considerations of environmental damage, and it includes an item for the cost of highway accidents. On the other hand, it makes no imputation for housework or leisure.

The Japanese team presented figures for the period 1955–70. This was a period of extremely rapid growth in the Japanese economy, and, by any measure, the economic welfare of the Japanese people rose. Indeed, the correspondence between the growth rates of per capita NNW and per capita Net Domestic Product (NDP) was high from the beginning and increased over time. Per capita NNW grew at 6.3% per year from 1955 to 1960, while per capita NDP grew at 8.9% per year during the same period. During the last five years of their study period, 1965–70, the gap closed. Per capita NNW grew at 13.5% per year, and per capita NDP grew at 14.9%. The contrast between this close association between NNW and NDP in Japan and the lack of one between MEW and GNP in the United States may be due either to real differences in national experience or to the differing methodologies used in the studies. Since we have only summary figures for the Japanese study, we were unable to determine the relative importance of those two possibilities.

Economic Aspects of Welfare: Zolotas

The most recent proposal for a measure of economic welfare is the Index of the Economic Aspects of Welfare (EAW index) proposed by Xenophon Zolotas in his book, *Economic Growth and Declining Social Welfare* (1981). Zolotas differs from Nordhaus and Tobin by more sharply focusing on the current flow of goods and services and by largely ignoring capital accumulation and the issue of sustainability. Also, he considers only changes in aggregate national welfare rather than in per capita welfare.

Despite these major conceptual differences, the largest items in his EAW are much like those in MEW: personal consumption and imputa-

3. Interestingly, though Nordhaus and Tobin calculate the growth rate of per capita NNP and per capita sustainable MEW for the period 1929–47 and 1947–65 (see table 18 on p. 56 of their text), they never refer to the remarkable difference between those two periods in their discussion. To do so would have required them to explain why the growth rate for per capita sustainable MEW had flattened out, even as per capita NNP kept rising.

tions for leisure and household services. EAW resembles MEW in a number of other ways as well. Like the MEW, EAW subtracts the cost of commuting to work as a regrettable necessity. It deducts expenditures on consumer durables and public buildings and adds the imputed annual services derived from them. EAW treats most educational expenditures as investment rather than consumption, but unlike MEW, it does not reintroduce investments under the category of sustainability. Zolotas merely omits consideration of investment as a factor in welfare altogether. Another difference, minor by comparison, is the deduction in EAW of half the cost of advertising, on the assumption that only half of it provides a valuable information service to consumers.

Environmental damages enter only very obliquely into MEW as an imputation for urban disamenities. Zolotas, by contrast, directly addresses the issue by deducting half the pollution control costs for air and water pollution and all of them for solid waste. (His aim is to subtract only those antipollution expenditures that are paid for by private parties rather than by the government, since the former are classed as intermediate and the latter as final expenditures). He also subtracts the estimated damage cost of air pollution. Finally, because he believes that much of the increase in medical expenses has been necessitated as a response to greater environmental stresses, he subtracts half of the per capita growth in real health care costs both public and private.

EAW is the first index to include a figure for resource depletion. Zolotas recognizes that this is particularly controversial, so he regularly gives his summary conclusions with and without this figure. Nevertheless, his procedure is based on the standard economic view that nonrenewable resources should rise in price at a rate equal to "the long-term interest rate plus a premium for risk and user cost." Since resource prices have not in fact risen at that rate, Zolotas reasons that the market does not function properly at setting prices for the optimal depletion of resources. Thus, as part of EAW, he deducts the difference between actual resource prices and imputed prices derived from the long-term interest rate and an estimated risk premium.

In order to compare EAW with MEW, we have calculated the former on a per capita basis. Given the significant difference in the elements included and excluded in the respective calculations, the results are surprisingly close. From 1950 to 1965, per capita growth of EAW was around 9% for the full period, or .57% per year. During the closest comparable period for MEW, 1947–65, per capita sustainable MEW grew by approximately 7.5%. That amounted to .4% per year. In other words,

both increased less than one-third as rapidly as the 2.2% per year growth of per capita GNP from 1947 to 1965. Furthermore, Zolotas carried his statistics down to 1977. From 1965 to 1977, the approximately one-to-three ratio of the growth of per capita EAW and GNP remained the same as during the earlier period. Per capita EAW grew at .71% per year while per capita GNP continued to increase by 2.2% per year. Thus the gap in the growth rates of EAW and GNP continued, although it remained less than the gap between the growth rates of MEW and GNP in the earlier postwar period.

Conclusions

In this chapter we have shown that the national product, whether gross or net, is not identical with true national income and that subtracting indirect business taxes from NNP, as is done in the National Income Accounts to arrive at "national income," still does not give us a true measure of national income. True income is sustainable, and to calculate this Hicksian income would require a quite different approach.

This chapter has also shown that there is a marked difference between what the GNP measures and economic welfare, and that the latter has been growing much more slowly than the former as measured by the two proposals that have been made for judging the U.S. economy. A defender of the continuing use of GNP as a guide to policy could argue that, even so, economic welfare *has* advanced along with GNP. If *any* advance in the welfare measure is truly a gain, and if increase of GNP tends to promote that gain, it is still desirable to increase GNP. The recognition that it takes a great deal of increase in GNP to achieve a small improvement in real economic welfare could be used to argue that ever greater efforts are neeeded for the increase of GNP.

To counter such a claim two points need to be made. First, there are social and ecological indicators that seem to be adversely affected by growth of GNP. Not all of these are dealt with in any of the welfare measures. This is especially true of many of the pervasive externalities.

Second, the major reason that the welfare measures show some growth as GNP grows is that they incorporate the largest element of the GNP as a part of their own statistics. That is private consumption. These welfare measures assume that the more goods and services that are consumed by the public, the better. For example, excessive consumption of tobacco, alcohol, and fatty foods are all counted positively. Few suppose that these actually add to welfare, but the task of sorting

out approved and disapproved expenses would be formidable indeed. Furthermore, economists generally regard any effort to make such distinctions as elitism of a sort they reject. However a person spends money in the market is assumed to be in the interest of satisfying that person's wants, and no further consideration of value is possible. We are not arguing against the necessity of assuming for these statistical purposes that consumption in general must be positively appraised. But we do think it well to point out that it is this inability or unwillingness to make judgments of this sort that allows welfare measures to advance even a little as GNP advances a lot. The small advance in welfare held to accompany the larger advance in GNP might well disappear if the most questionable items were deleted from the private consumption column.

This survey does not suffice to establish a way of measuring economic welfare. Closer examination of decisions that must be made in any such index shows how large the arbitrary element is. Any measure would abstract from many features of actual economic welfare and its use would lead to ignoring the degree of abstraction involved. The very existence of a measure *invites* the fallacy of misplaced concreteness. But whether a new measure should be devised and used, or whether measured welfare is a will-o'-the-wisp that should be abandoned, the results make clear that GNP does not come close enough to measuring economic welfare to warrant its continued use for that purpose. To use it as if it were a significant indicator of economic well-being—much worse of well-being in general—is an egregious instance of the fallacy of misplaced concreteness. The movement from GNP to Hicksian income faces many similar problems, but since the goal is more modest the difficulties are correspondingly less. Hicksian income (maximum sustainable consumption) is inherently more measurable than economic welfare. Although the aim of Hicksian income is not a measure of welfare, but rather a practical guide to avoid impoverishment by overconsumption, the component of sustainable consumption looms large in most welfare indexes. One would therefore expect a significant positive correlation between Hicksian income and most welfare indexes. Also since natural capital depletion and defensive expenditures are among the most difficult categories to measure, the operational advantages of Hicksian income over our Index of Sustainable Economic Welfare (Appendix) should not be overstated.

4

Misplaced Concreteness: *Homo Economicus*

Homo economicus as the Basis of Price Theory

The most important abstraction basic to contemporary economic theory is that of *Homo economicus* from real flesh and blood human beings. No one doubts that considerable abstraction is involved. But most economists believe that for the purposes of their discipline no harm is done. They are confident that they know enough about human behavior from their model without examining actual human behavior in detail. In this chapter we will examine this abstraction as it functions in economic theory in order to determine to what extent it leads to the fallacy of misplaced concreteness.

Homo economicus attains its sharpest delineation in the theory of exchange value or price. Here there are two assumptions. First, it is assumed that the individual's total wants are insatiable. But second, as individuals acquire particular goods, their desire for additional consumption of that good, called the utility function of that good, diminishes. Marginal analysis, the cornerstone of neoclassical economics, is based on this latter insight combined with the recognition that price is determined by marginal utility. This means that the price one will pay for a commodity is what an additional unit of that commodity is worth to us, given the amount we already have. One is likely to be less interested in a third dish of ice cream than in the first, or the tenth pair of shoes than the second. If one already has five neckties but only one shirt, one will pay considerably more to acquire a second shirt than a sixth necktie. At some point, one will have all one wants of some commodity and will lose interest in acquiring more at any price.

This is a sound basis for economic theory, and we affirm the value and validity of marginal analysis. But price theory takes a second step that is more questionable. The need to be a deductive science capable of quantification leads it to declare that only commodities consumed by an