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GREEN NATIONAL INCOME, MEASURES OF WELFARE, AND IDEOLOGICAL BIAS

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ABSTRACT:

This paper considers the question of whether it is possible to develop indicators of social or economic welfare that are free of the ideological beliefs of their designers. It compares a number of such indicators, including Gross Domestic Product, the Nordhaus and Tobin Measure of Economic Welfare, the Index of Social and Economic Welfare, and the Genuine Progress Indicator. In making these comparisons, it suggests two possible approaches to designing indicators. On the one hand, researchers may attempt to create value-free indicators from which social or economic welfare could be deduced. On the other hand, they may have a priori convictions about trends in social or economic welfare and design their indicators - deliberately or unintentionally - to ensure that the resulting measures conform to what they already believe. To the extent that indicators follow the second pattern, they may be effective advocacy tools, but should not be perceived as objective measures for tracking social development or the impacts of public policy. For those who seek unbiased indicators, the most optimistic expectation may be that those who design them will describe their convictions up-front, to ensure that the indicators are not used as if they were completely neutral measures of welfare.

1. INTRODUCTION

The national income accounts are often criticized on the grounds that Gross Domestic Product (GDP) is not a satisfactory measure of welfare. As is often pointed out, GDP goes up when expenditures to clean the environment go up, whereas welfare drops because of the harm caused by pollution and the allocation of resources to cleanup that could be spent on more enjoyable things. GDP does not capture the value of labor that is not paid for, particularly the labor of women who work in the home. It goes up because of crime, legal battles, and an array of other social phenomena that are not usually thought to contribute to welfare. In wartime the GDP goes up, and although in the short run war may appear to be better than the alternatives, few people would argue that it contributes to welfare.

This problem has been considered by people from a range of perspectives, including economics, national income accounting, environmental advocacy, and others. A number of strategies have been proposed to deal with it. The first proposal often made is that the national income accounts should be adjusted so that they will provide a measure of welfare rather than income. However national income accountants, including those designing the forthcoming revised System of Economic and Environmental Accounting (SEEA), have consistently decided not to attempt to measure welfare rather than output in the environmental accounts. This decision stems from several concerns. One is that the environmental accounts should, insofar as possible, be compatible with the conventional national income accounts, and using them to measure output rather than welfare would not accomplish that goal. Another is that the accountants do not feel they know how to measure welfare in an objective way.

In light of that decision, it is interesting to consider the measures developed by other analysts who seek to meet the welfare measure demands that will not be met by the SEEA. This paper considers some of those measures, looking at how the measures are constructed, what they suggest about welfare, and the ideological orientation of their designers. The process behind this paper has been essentially inductive; it began with an examination of measures of welfare, which in turn led to the unfortunate conclusion that they seem to be designed to substantiate the instinctive beliefs of the analysts who designed them. This suggests that if our interest is in developing an objective standard by which to measure proposed actions, welfare measures cannot help us. If, however, our interest is in developing a measure with considerable appearance of analytical rigor with which to justify our *a priori* convictions about those proposed actions, welfare measures may be quite useful.

2. MEASURES OF ECONOMIC WELFARE

2.1 NORDHAUS AND TOBIN

One of the earliest and best known measures of economic welfare has just that name - Measure of Economic Welfare, or MEW - and was developed by Nordhaus and Tobin in the late 1960s. (Nordhaus and Tobin, 1973) Instead of following the national accounts goal of measuring production, Nordhaus and Tobin sought to develop a measure of consumption, which they saw as a reasonable proxy for economic welfare.

To calculate MEW they made several changes to the standard national income calculations. First, they excluded from the calculation of income several values that they felt did not contribute to direct consumption. Some of these, termed instrumental expenditures, or "regrettably necessary inputs" to other

activities that capture the full utility of the inputs, were considered intermediate rather than final consumption. This category included expenditures for commuting, police, sanitation, road maintenance, and national defense. Treating them as intermediate consumption had the effect of deducting them from the calculation of an adjusted GDP designed to measure welfare.

Second, the calculation of MEW deducted expenditures for education and health care from final consumption, because the authors viewed them as investments in human capital rather than direct consumption. It also shifted purchases of consumer durables from final to intermediate consumption, for similar reasons. Nordhaus and Tobin also increased the conventional measure of consumption of fixed capital (CFC) to estimate a sustainable level of CFC per capita, taking into account anticipated population growth. They distinguished between two different MEWs, *actual MEW*, calculated from conventional CFC, and *sustainable MEW*, calculated from the increased measure of CFC. Their sustainable level of CFC reflected a conviction that higher investment levels would be needed to sustain income, rather than the concern about natural resource depletion that leads to the equivalent of higher CFC estimates in the environmental accounts. Finally, they subtracted a share of the income gap between urban and rural dwellers, which they interpreted as compensation for the disamenities of urban life rather than a contribution to economic well-being.

Nordhaus and Tobin did not make any adjustments to address environmental concerns. Regarding depletion of natural resources, they explicitly assumed that manufactured capital could make up for any shortages that might occur if natural resources were no longer available. Some of the harm caused by pollution may implicitly be included in their urban disamenity adjustment, although they do not present it that way. Finally, they continue to treat expenditures on pollution prevention by producers as intermediate consumption.

Nordhaus and Tobin added items in as well as deducting from them in calculating MEW. Most important among the increases were imputations for the value of nonmarketed productive activity and leisure time. Imputing values for these items greatly added to the difficulty of the task of developing the indicator, because there is no agreed-upon way to estimate these values. Nordhaus and Tobin valued leisure time and nonmarketed work based on prevailing wage rates in 1958. They estimated three different variants of the value of nonmarketed services and leisure, each based on different assumptions about how the value of these two activities might respond to changes in the productivity of labor due to technological change.

The authors estimated the values of both actual and sustainable per capita MEW for seven time points between 1929 and 1965, in constant 1958 dollars. The imputations for nonmarket activity and leisure constitute by far the largest share of the differences between trends in MEW and in NNP over that time period, as shown in Table 1 (on the next page). The differences among the methods for estimating those imputed values are also major. Under all assumptions, MEW is more than twice personal consumption, and the value of imputed leisure alone is greater than personal consumption. The other changes are virtually insignificant in comparison with leisure and nonmarketed activity.

Table 2 compares NNP with the different values of MEW. Under the lowest-change assumption (Option A), actual MEW per capita rose 17.8% between 1929 and 1965, while under the highest-change assumption (Option C) it rose 123.6%. Over the same time period per capita NNP rose 87.5%, all calculated in 1958 dollars.

Table 1. Components of MEW, in 1958 \$billion

Year	Personal Consumption	Household Investment	Leisure		Nonmarket Activity		Urban Disamenity	Actual MEW	
			Option A	Option C	Option A	Option C		Option A	Option C
1929	139.9	-23.2	339.5	162.9	178.6	85.7	-12.5	641.7	372.2
1945	183.0	-21.4	450.7	331.8	207.1	152.4	-18.1	823.5	649.9
1954	255.7	-50.8	523.2	477.2	231.9	211.5	-24.3	968.7	902.3
1965	397.7	-91.0	626.9	712.8	259.8	295.4	-34.6	1208.0	1329.5

Source: Nordhaus and Tobin, p. 518.

Table 2. MEW per capita compared with NNP, in \$1958

Year	Actual MEW per capita		Sustainable MEW per capita		NNP per capita
	Option A	Option C	Option A	Option C	
1929	5268	3056	5225	3012	1545
1945	5861	4626	5488	4252	2401
1954	5943	5536	6023	5615	2305
1965	6208	6832	6195	6819	2897

Source: Nordhaus and Tobin p. 519

The authors conclude from these results that MEW and NNP track together fairly well, so although the actual values differ widely, NNP is an acceptable indicator of trends in economic welfare, and there is no need to develop a separate indicator for that purpose.

2.2 OTHER ECONOMIC WELFARE MEASURES

The Nordhaus and Tobin work influenced the development of a number of other measures of economic welfare. One is the Index of the Economic Aspects of Welfare (IEAW), developed by Xenophon Zolotas and estimated for the United States. (Zolotas, 1981) His measure actually combines economic issues like those in the Nordhaus and Tobin measure with some of the social concerns captured by Daly and Cobb's Index of Social and Economic Welfare, discussed below. Like the others, he takes personal consumption as a point of departure. He handles consumer durables much as Nordhaus and Tobin do. He then subtracts half of intermediate expenditures for advertising from final consumption on the grounds that advertising expenditures do not contribute to economic welfare, but serve only to increase consumption without affecting welfare. Unlike Nordhaus and Tobin, Zolotas does adjust his welfare measure for environmental costs. He argues that market prices for non-renewables are too low because they don't include the costs imposed on future generations by current consumption (the user cost), and because developed countries purchasing raw materials were able to control the prices they would pay to developing country suppliers. He therefore adds 6% to intermediate consumption of non-renewable resources, reducing value added and income in the industries using them. He also subtracts out half of actual expenditures on pollution prevention and all of the estimated damages generated by pollution that is not prevented. He deducts one half of private medical expenditures, on the grounds that they are an unfortunate consequence of the stress of modern life, rather than a contribution to welfare. He deducts half of private educational expenditures regarding them as investment rather than consumption.

Zolotas also adds a number of items to personal consumption to derive IEAW. He imputes value to the service flows from publicly-owned capital like schools and from consumer durables. He estimates a value for non-marketed household services, assuming that it takes five hours per day, 365 days per year to run a household, and valuing it at the average urban wage rate. He also estimates a value for leisure time. Here he makes a distinction between regarding leisure as final consumption, in which case its value does not change with changes in productivity, and regarding it as an intermediate input into recreation, in which case its value does change with productivity growth. He chooses the former, which leads to a lower value for free time than the latter approach. In parallel with the treatment of private expenditures on health and education, he adds in one half of public expenditures in each of those areas.

Zolotas calculated the IEAW for each year from 1950 to 1977. Like the Nordhaus and Tobin results, the imputed value of leisure time dominates the results. However, where Nordhaus and Tobin find MEW is consistently at least twice NNP, Zolotas's EAW-index is only slightly higher than GNP, and the gap declines over time. (We cannot compare the trends in the indices themselves over time, since the Nordhaus and Tobin data are per capita and the Zolotas data are totals.) The lower values in the IEAW than the MEW are largely due to much lower estimates of the value of household services and leisure time. For example, Nordhaus and Tobin estimate leisure in 1965 to be worth either 625 or 712.8 billion 1958 dollars, whereas Zolotas estimates it at only 451 billion 1972 dollars. The impacts of resource depletion and pollution are still negligible compared to leisure, however.

Table 3. Index of Economic Aspects of Welfare, in \$1972 billion

Year	GNP	Private Consumption	Household services	Leisure time	Resource Depletion	Pollution damages	EAW-Index
1950	533.5	338.1	143.4	368.4	-0	-23.0	795.3
1955	654.8	395.1	179.9	387.0	-2.5	-30.5	893.3
1960	736.8	453.0	215.2	412.0	-12.1	-37.5	997.6
1965	925.9	558.1	249.3	451.2	-24.0	-52.7	1129.7
1970	1075.3	668.9	270.1	485.6	-40.3	-58.2	1262.5
1975	1202.3	774.6	264.4	526.9	-40.2	-65.8	1362.1

Source: Zolotas 1981, pp. 106-107

The major lesson from this work is the sensitivity of measures of economic welfare to the choice of methods used to estimate them. In particular, the values selected for leisure time and nonmarketed activity dominate the indicators as a whole. Nevertheless, the importance of leisure time, and the sensitivity to methods used to estimate the value of leisure, are clear across both measures. In comparison, the deductions in IEAW for depletion and pollution damages have considerably less impact. Moreover, both MEW and IEAW track fairly well with conventional indicators, suggesting that a separate measure of economic welfare is not needed.

3. MEASURES OF SOCIAL WELFARE

3.1 INDEX OF SOCIAL AND ECONOMIC WELFARE

Critics of the national income accounts have moved further away from them to design measures of social rather than economic welfare. One well-known measure that has been tested in a number of countries is the Index of Social and Economic Welfare (ISEW), developed by Daly and Cobb (1994) and estimated

for the United States for each year from 1950 to 1990. The ISEW is a monetary indicator that takes consumption data from the national income accounts as a point of departure, and then makes a series of modifications as follows:

Point of departure: Personal consumption from the national income accounts. Daly and Cobb critique personal consumption as a welfare measure, because its relation to welfare depends to a large extent on the cost of living in the region where each person lives. However, the data are not available to adjust consumption data by location, so they do not make any changes to address this problem.

Income distribution: The same unit of consumption contributes more to the welfare of a poor person than a rich person, so Daly and Cobb divide the consumption data for each year, adjusted to include taxes and subsidies, by an index of income inequality. That inequality index is greater than one through the 1950s, reducing the value personal consumption. It drops below one for most of the 1960s and 1970s, and then rises above one at the start of the 1980s.

Unpaid household labor (and leisure time): Daly and Cobb estimated a value for unpaid household labor, estimated based on the average wages of domestic workers, and add that to the growing index. Unlike Nordhaus and Tobin, however, they do not add in an estimated for the value of leisure time. They chose to leave it out because both the uncertainty its measurement and its potential contribution to the index are so great that they don't want to swamp all other elements of the index. Of course that decision to omit it is as much a value judgment as any one approach to measuring it.

Consumer durables: Like the MEW, the ISEW subtracts purchases of consumer durables from consumption, but adds in an estimate of the services they provide.

Highways and streets: Daly and Cobb exclude most government expenditures from the ISEW. Some they consider to be defensive, and therefore they do not feel they contribute to welfare. Others are services provided in return for a fee, which is already included in personal consumption. The road network, however, falls into neither of those categories, so they add in an estimate of the services it provides. (Interestingly, they do not discuss the fact that in the United States, national defense was used to justify major federal subsidies to the interstate highway system.)

Health and education: Unlike Nordhaus and Tobin, Daly and Cobb do not consider these to be investments in human capital, because they do not feel that an empirical link has been shown between either of them and labor productivity. Instead, they feel that both sets of expenditures are partly made for defensive reasons and partly made for their direct contribution to welfare. The portion that contributes to welfare should be in the ISEW. They therefore add in half of all government expenditures for health and education to the index, and subtract half of all personal expenditures from consumption. The health portion of the defensive expenditure deduction corresponds in some sense to the MEW deduction for the disamenities of urban life.

Commuting: Daly and Cobb subtract an estimate of commuting expenses. Nordhaus and Tobin included these within their urban disamenity adjustment, so the two indices are similar in this respect.

Household defensive expenditures against pollution: Daly and Cobb subtract an estimate of this item from consumption.

Damage due to auto accidents: Daly and Cobb subtract this from consumption.

Environmental issues: Daly and Cobb subtract out estimates of the damages caused by done by water, air, and noise pollution, as well as the loss of nonmarketed wetland services. They also subtract

estimates of resource depletion for farmland and non-renewable resources, and of the costs imposed by global environmental problems including climate change, radioactive waste and ozone depletion. ISEW includes many types of environmental cost not captured by IEAW or MEW, which not surprisingly leads to higher estimates than the other studies. In addition, in valuing depletion Daly and Cobb do not discount future losses, so of course their depletion values are higher than those of IEAW.

Net capital formation: Daly and Cobb add in gross capital formation less consumption of fixed capital, adjusting it for population and productivity growth following a procedure similar to that of Nordhaus and Tobin.

Foreign investment: Daly and Cobb assume that to be sustainable a country must provide its own investment capital rather than relying on foreign investment. They therefore add in domestic investment abroad and subtract out foreign investment at home. If the net investment overseas is negative, this decreases ISEW; if it is positive, it increases it.

This set of adjustments gives the value of ISEW. Table 4 shows key components of ISEW, including those that permit comparisons with some of the values from MEW and IEAW. The comparisons are interesting, albeit very rough. The household investment figures as a share of personal consumption are in the same ballpark, though the MEW investment figures are a somewhat larger share than the ISEW ones. The value of leisure is not added to ISEW; the comparison with MEW reminds us of what an overwhelming figure it is in the economic measures. Household labor is above personal consumption in MEW in the earlier years, and drops below it in the 1950s. It is consistently below personal consumption in ISEW. The drops in household labor towards the end of the twentieth century presumably reflect the changing composition of the labor force; this is not picked up by MEW, since it was only calculated through 1965.

Table 4. Components of ISEW, in 1972 \$billions

Year	Personal Consumption	Consumer durables (household investment)	Leisure	Nonmarket Activity (household labor)	Cost of Commuting	Resource Depletion	Other environmental costs
1950	337.3	-42.6	0.0	311.4	-9.0	46.8	134.9
1960	452.0	-51.4	0.0	354.0	-11.3	77.7	187.4
1970	672.1	-89.1	0.0	402.4	-17.4	157.0	272.1
1980	931.8	-137.5	0.0	457.3	-28.6	221.2	374.1
1990	1,265.6	-234.6	0.0	519.8	-34.6	312.6	472.4

Source: Daly and Cobb pp. 462-3

As Table 5 shows (below), per capita ISEW is consistently substantially lower than per capita GNP, and the growth of ISEW is considerably slower than that of GNP. The difference between ISEW and the two economic indicators in this regard stems both from not adding a value for leisure and from the rapidly increasing environmental costs. In particular, the leveling off of ISEW after 1970 is attributable to the steady increases in environmental costs.

Table 5 . Comparison of ISEW and GNP for the United States, 1950-1990

Year	ISEW (\$1972 billions)	ISEW per capita (\$1972)	GNP (\$1972 billions)	GNP per capita (\$1972)
1950	380.2	2496.9	534.8	3512.2
1960	514.1	2845.6	737.2	4080.3
1970	682.1	3326.6	1085.6	5294.3
1980	773.5	3396.3	1475.0	6476.7
1990	818.2	3253.1	1950.8	7755.9

Source: Daly and Cobb 1994, p. 462

3.2 GENUINE PROGRESS INDICATOR

The environmental research institute Redefining Progress regularly calculates an indicator based on the ISEW, the Genuine Progress Indicator (GPI). (Anielski and Rowe, 1999) In most respects, their calculations follow the same process as Daly and Cobb. However, they have made several revisions to the ISEW calculations that consistently lower the resulting indicator. They subtract an estimate of the direct costs caused by or incurred to prevent crime, based on data from the Department of Justice. They estimate the costs of "family breakup," in which they include direct costs of divorce (lawyers, counselors, dual households), the impact of divorce on children (\$10,904 per child in 1992 dollars), and the social cost of television watching (\$0.44 per person-hour in 1992 dollars). They acknowledge that the last two items are somewhat arbitrary, but expect they are conservative guesses.

The GPI also differs from the ISEW in certain aspects of its treatment of time use. Like the ISEW, it imputes a value for household labor but not for leisure time. Unlike the ISEW, the GPI actually subtracts an imputed cost for the decline in leisure time relative to a 1969 baseline year, when the amount of leisure time was the highest on record. Similarly, it subtracts a measure of underemployment, or the hours that unemployed people or part-time workers would have liked to have worked but were unable to. Both leisure and underemployment are valued based on prevailing wage rates, although the value of underemployment is assumed to rise with labor productivity while leisure does not.

These deductions for time are open to question. Subtracting out the loss of leisure below the 1969 level when the value of that leisure was not included in the first place raises a question of how GPI will be calculated if leisure rises up above the 1969 level. Presumably a positive value for leisure would be added in at that point; otherwise the measure would be inconsistent. However, this raises the question of why only leisure above a somewhat-arbitrary baseline has positive value, but leisure up to that level has no value. It implicitly seems to suggest that the 1969 level of leisure is a right as basic as air to breathe, and therefore need not be added into a measure of welfare; if so, anything below it could be treated as a loss.

The treatment of underemployment seems to entail a more explicit double counting. Supposing employment drops, and people who used to be fully employed have to work part time and are considered underemployed. Before the drop, the accounts (or the GPI) included all of their employment, or all of the consumption they undertook with the resulting income. When they shift to part-time, their consumption will drop, and this will show in the accounts and in GPI. The deduction for underemployment, by subtracting the income they no longer earn after we have already subtracted the purchases they no longer make with that income, deducts a second measure of their reduced employment.

For both leisure and underemployment, the GPI calculations may be more meaningful if they are understood not as the direct losses of leisure and income, but as additional negative externalities resulting

from those losses. The GPI's developers suggest that the loss of leisure and underemployment create social costs in the form of increased stress, crime, suicide, and other undesirable results. These deductions may actually be proxies for those costs rather than direct measures of the lost leisure and income. However, the crime impacts at least should already be captured by the crime element in the index, and there is no *a priori* reason why the negative externalities of underemployment should be valued at the foregone wages.

Table 6 shows the results of GPI calculations from 1950 to 1997. Bear in mind, in comparing with Daly and Cobb's ISEW figures for the same time period, that GPI is calculated in 1992 rather than 1972 dollars, so all figures are much higher in the GPI than in the ISEW. The comparison in trends will have more meaning than the comparison of absolute values. Like ISEW, GPI starts lower than GDP (or than GNP, in the Daly and Cobb work), and grows more slowly. The gap between GPI and GDP widens much more over the time period, however, than does the gap between ISEW and GNP.

Table 6. Genuine Progress Indicator 1950 to 1997

Year	GPI (\$1992 billions)	GPI per capita (\$1992)	GDP (\$1992 billions)	GDP per capita (\$1992)
1950	8,10.0	5,319.4	1,611.3	10,581.8
1960	1,229.4	6,804.8	2,262.9	12,525.0
1970	1,788.3	8,721.2	3,397.6	16,569.5
1980	1,984.0	8,731.6	4,615.0	20,310.3
1990	1,973.2	7,910.6	6,136.3	24,600.3
1997	1,745.3	6,521.1	7,269.8	27,163.0

Source: Anielski and Rowe 1998, pp. 52-54

The gap between GPI and GDP, and the much greater gap than between ISEW and GNP, is only partially explained by the new deductions introduced in the GPI calculation. Table 7 shows the contributions of various items to GPI and compares their total impact with the growing gap between GDP and GPI. The new items did increase in share over the time period, accounting for just under 6% of the gap in 1950 and just over 8.5% in 1997. Their importance has increased, therefore, but is not overwhelming. The combined environmental adjustments account for most of the gap between GPI and GDP, although their share in the gap peaked in 1970 and was at its lowest in 1997.

Table 7. Components of the Genuine Progress Indicator

Year	Cost of Crime A	Family Breakdown B	Loss of Leisure C	Under- employment D	Total deductions (A+B+C+D)	Combined environmental. impacts.	GDP - GPI
1950	-8.1	-15.0	-10.1	-13.3	-46.5	-603.5	801.3
1960	-11.2	-26.7	-5.3	-25.9	-69.1	-874.8	1,033.5
1970	-16.0	-40.4	-2.3	-50.1	-108.8	-1418.7	1609.3
1980	-23.9	-52.8	-122.7	-93.3	-292.7	-2015.1	2,631.0
1990	-28.6	-54.8	-184.6	-165.7	-433.7	-2744.1	4,163.1
1997	-28.4	-58.8	-263.6	-122.3	-473.1	-3291.1	5,524.5

Source: Calculated from data in Anielski and Rowe 1998, pp. 52-54

4. CONCLUSIONS

This discussion of the calculation of welfare measures suggests several interesting conclusions. First, the difficulty of agreeing on uniform standards for measuring welfare is all too clear. Plausible arguments can be offered for many different conceptual approaches to measuring welfare, including measures that are in direct contradiction to each other. Moreover, some elements of a welfare measure are highly subjective. For example, some analysts may consider divorce to indicate a decrease in welfare, whereas others may assume that people would not divorce unless they felt they were even worse off if they remained married. In that case the divorce option permits higher levels of welfare than were possible before divorce was an acceptable option. This kind of problem is one reason why no one measure of welfare has been adopted or granted with anything like the authority of the income accounting indicators.

The sensitivity of the welfare measures to technical rather than conceptual changes in methodology is another reason why it is difficult to standardize welfare measures. As with the conceptual differences among methods, good arguments can be made for a range of different technical approaches, including ones that significantly skew the results in one direction or another. At times choices among approaches are made not because one view really makes more sense than another, but because one view may lead to a more consistent indicator with less erratic fluctuations. While that is reasonable from the perspective of how to design an indicator in theory, it is not necessarily reasonable from the perspective of being sure that the indicator actually measures what we want it to.

This problem also suggests that conceptual or technical approaches to designing green indicators could be influenced by the politics or ideology of those designing them. A comparison of MEW, ISEW, and GPI suggests that the orientation of those developing the measures may have some influence on how they weigh the uncertainties inherent in the calculations against the desire to find a way to capture issues that affect welfare. Nordhaus and Tobin are conventional economists working at a time when concern about the environment was not at all mainstream, and they are openly skeptical of environmentalist arguments. They do not even include any adjustments to address resource depletion, assuming that manufactured capital can substitute for natural resources if they ever really come to be threatened. While they observe the uncertainty created by imputing a value for leisure, they still include it in MEW, which significantly raises the value of the indicator. They then use the resulting parallels between MEW and NNP to argue that conventional national accounts indicators are adequate proxies for welfare and need not be supplemented with other indicators.

Daly and Cobb, on the other hand, began their work with a lengthy series of criticisms of conventional economics and the national income accounts, and take as a point of departure the ecological economists' convictions about resources being limited. They do not impute a value for leisure, which would raise their welfare measure, and do subtract out a whole array of values for harm to the environment. The GPI goes even further, actually subtracting measures for the lack of leisure and employment. Not surprisingly, the resulting indicators suggest that the national welfare is much lower than the MEW would imply.

Welfare measures may indeed be designed to show what the analysts already believe. On one side, we can imagine the complaint that "those environmentalists are off the wall, and when you look at the facts you'll see that the conventional indicators are fine. On the other side, we can imagine hearing that "the world is going to hell in a handbasket, and if you only looked at the right numbers you'd agree."

Without suggesting that the analysts who designed any of these measures made such statements, it is reasonable that they design indicators based on their own convictions about the importance of different social problems. It is probably not a coincidence that researchers who believe society is on an undesirable

path apply methods that lead to an indicator supporting that view, whereas researchers working in a climate where environmental issues were not yet mainstream are more inclined to develop an indicator that leaves them out. At a minimum, this means that when we review such indicators, we must be very careful to assess the extent to which the researchers' social views may have influenced their indicator and its results. More likely, it suggests that it is not possible for anyone with opinions about the state of society or professional links to a particular set of analytical tools to design objective welfare measures. Unfortunately, it is not clear that anyone else would be interested in doing so.

REFERENCES

- Anielski, Mark and Jonathan Rowe, 1999. *The Genuine Progress Indicator: 1998 Update*. (San Francisco: Redefining Progress)
- Daly, Herman E. and John B. Cobb, Jr., 1994. *For the Common Good: Redirecting the economy toward community, the environment, and a sustainable future*. (Boston: Beacon Press)
- Nordhaus, William D. and James Tobin, 1973. "Is Growth Obsolete?" in Milton Moss, ed., *The Measurement of Economic and Social Performance*. Studies in Income and Wealth Volume 38, by the Conference on Research in Income and Wealth. (New York: National Bureau of Economic Research)
- Zolotas, Xenophon, 1981. *Economic Growth and Declining Social Welfare*. (New York: NYU Press)