GNP and Economic Welfare

by Frederick R. Strobel

The Sixties were an unprecedented period of sustained economic growth, despite the minor recession early in the decade. Real output, adjusted for price increases, rose at an annual average of over 5 percent and unemployment fell steadily. However, this economic growth was accompanied by a renewed questioning of its net benefits. Rapid growth was attacked for its undesirable side effects such as pollution and wasteful land use. Criticism was eventually directed at the concept of Gross National Product, the chief measure of economic growth.

Initially Gross National Product was conceived as a means of measuring a nation's economic activity. However, since increased economic activity is usually associated with rising standards of living or economic well-being, GNP growth has often been linked with increased economic welfare. This article examines the general concept and definition of GNP as currently computed and assesses its effectiveness as an indicator of economic welfare. It also examines two other concepts which, while abstracting from the GNP calculations, try to measure economic welfare rather than economic activity.

What is GNP?

GNP has become part of most vocabularies as the final market value of goods and services an economy produces annually. GNP for 1972 and 1973, using the spending approach, is shown in Table 1. Under this form of GNP accounting, the value of goods produced closely approximates spending on final goods and services.[1] Estimates of four major categories—personal consumption expenditures, gross private domestic investment, net exports, and government purchases of goods and services—are summed to equal total GNP. To remove price effects, GNP can be divided by the Implicit Price Deflator to yield GNP in 1958 or "constant" dollars. Constant dollar or "real" GNP in 1973 grew 5.9 percent; in other words, the real growth rate was 5.9 percent.

[1]The exception to this equality will be the net change in inventories.

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Items included in GNP are generally measurable by market transactions since they yield a market price or a wage. Home-produced services, for example, are not counted in GNP. But if a homeowner pays a painter $700 for labor and $50 for paint, the full $750 is included under personal consumption in the GNP accounts. If he paints the house himself, only the price of the paint—$50—is included. Moreover, GNP accounting makes no distinction between "more desirable" or "less desirable" goods and services (provided they are legal). Pondering whether to spend $8 on a bottle of Tennessee whiskey or on a book on child rearing, the consumer need not worry what effect his purchase has on GNP. Consumer sovereignty reigns; either purchase will raise GNP by $8. Published quarterly at annual rates, GNP and the GNP accounts are probably the most widely used set of statistics in current economic analysis.

Because the production of goods and services creates income, GNP can also be estimated using the income approach. This involves summing payments to producers of goods and services (factors of production). Totaling wages, proprietors' income, rent, corporate profits, interest, indirect business taxes, and depreciation will then approximate Gross National Product as presented in Table 1. Using this approach, the $700 payment to the painter mentioned before is usually counted as proprietors' income. The income approach to computing GNP not only provides a statistical check on the accuracy of the GNP total calculated through the spending method but also supplies additional information for economic analysis.

The use of GNP accounts in economic analysis was further expanded during the Sixties by the development of econometric models. Today, many of the well-known models produce a computerized forecast of the GNP accounts in detail.[2] These models, some incorporating as many as several hundred equations, often project GNP using both spending and income approaches. In addition, they relate GNP projections to those of other economic variables.

TABLE 1

U. S. GROSS NATIONAL PRODUCT
(Spending Approach)

	$ Billions	
	1972	1973
Personal Consumption Expenditures	726.5	804.0
Durable goods	117.4	130.8
Nondurable goods	299.9	335.9
Services	309.2	337.3
Gross Private Domestic Investment	178.3	202.1
Fixed investment	172.3	194.2
Nonresidential	118.2	136.2
Structures	41.7	48.4
Producers' durable equipment	76.5	87.8
Residential structures	54.0	58.0
Nonfarm	53.5	57.4
Farm	.6	.6
Change in business inventories	6.0	8.0
Nonfarm	5.6	7.3
Farm	.4	.6
Net Exports of Goods and Services	-4.6	5.8
Exports	73.5	102.0
Imports	78.1	96.2
Government Purchases of Goods and Services	255.0	277.1
Federal	104.4	106.6
National defense	74.4	73.9
Other	30.1	32.7
State and local	150.5	170.5
Gross National Product (GNP)	1,155.2	1,289.1
GNP Implicit Price Deflator, 1958=100	146.1	153.9
GNP in 1958 "Constant" Dollars	786.1	831.8
Real Growth (Percent Change in Constant Dollar GNP)	6.1	5.9

Source: U. S. Department of Commerce.

GNP as a Welfare Indicator

Encompassing so many different areas of economic activity, GNP is often used as a measure of economic welfare. For example, one study shows that between 1953 and 1963, real GNP growth of about 3 1/2 percent was necessary to keep the unemployment rate from rising.[3] If the same relationships were to hold true today, a growth rate of less than $3^1/_2$ percent would not create enough jobs to absorb a labor force which expands with population. In other words, the unemployment rate would increase. Linking GNP growth rates to unemployment rates is one way GNP is used as a welfare indicator. By the same token, intolerable inflation frequently accompanies extremely rapid real economic growth, causing a loss in economic welfare.

Since output creates income, we can also draw welfare implications from the income side of the GNP accounts. A rise in per capita income is often considered desirable. But per capita income figures alone say nothing about how that income is distributed, which has implications for economic welfare.

Shortcomings of GNP as a Welfare Indicator

Even the effectiveness of GNP's prime function, which is designed to measure economic activity, has been questioned. The construction of GNP figures involves difficult estimating procedures and value judgments. These criticisms can also be applied to its service as a welfare indicator.

GNP is further criticized for not allowing for "externalities," i.e., items that fall outside the price system. For example, the pollution given

[2]See "Econometric Models—What They Are and What They Say for 1971," F. R. Strobel and W. D. Toal, **Monthly Review,** Federal Reserve Bank of Atlanta, March 1971.

[3]Arthur M. Okun, "The Gap Between Actual and Potential Output," **The Battle Against Unemployment,** W. W. Norton and Company, New York, 1965, p. 17.

off by an industrial plant is a cost to society. Yet, if the offending company were made to produce in a nonpolluting way, it might conceivably be forced out of business, the product discontinued, and GNP reduced. But general welfare may be increased. One can think of many similar examples. The benefits enjoyed by users of a city-operated park may far exceed the dollar cost of building and operating it. Yet only the money spent by the local government on it is included in GNP; benefits to users are not measured or included.

More indirect exclusions from GNP, loosely classified as externalities, are such tenuous concepts as leisure and happiness. A rising GNP does not necessarily mean increased leisure time for the average American. GNP does not measure the cost to economic welfare of such items as additional commuting time, hours worked, and the increasing necessity for two-job families. More people owning second homes, camping vehicles, boats, etc., may indicate more leisure for some Americans, but the GNP does not indicate who is buying these goods or who in society is producing these leisure-time products.

Another criticism of the GNP computation is the exclusion of home-produced services. For example, a housewife's services are not included in the GNP. But if she gets a job and hires a maid, both the maid's and her services are then counted. Defenders of the present computation method counter that most of these exclusions are difficult to calculate. However, critics reply that if the rental value of home-owner occupied houses can be estimated and included in GNP, a housewife's services should also be computed.[4]

Criticized for its exclusions, GNP is also taken to task for what it includes, for example, the so-called "defensive" expenditures: police and law enforcement, personal security expenses, pollution control, and national defense. Critics charge that GNP should not include government expenditures to fight rising crime since these reflect a deterioration in the quality of life. A similar argument might be made for burglar alarm systems in private homes—practically nonexistent years ago but increasingly common today. Spending for pollution control is similarly questioned, since in part this money is spent to correct previous unwise business or government practices, thus tending to overstate gains in output.

Arguments against including national defense spending in the GNP accounts, similar to those made against including police and law enforcement, purport that a growing GNP boosted by heavy military spending increases the danger of global war and reduces the quality of life. Proponents of including defense expenditures claim defense deters wars and averts the disruptions of a wartime economy.

Defense spending is a large item in the total Federal budget included in GNP accounts, totaling $73.9 billion in 1973, or 69 percent of total Federal purchases of goods and services (see table 1).

TABLE 2
INFANT MORTALITY AND FERTILITY RATES
(Nations with Per Capita Income Greater than $1,000)
1971

	Infant Mortality Rate (Deaths per 1,000 Births)	Birth Rate (Per 1,000 Female Population Age 10-49)
Sweden	11.1	54.4
The Netherlands	11.1	67.6
Finland	11.8	47.5
Japan	12.4	59.9
Norway	12.7	65.0
Denmark	14.2	53.2
France	14.4	60.5
New Zealand	16.5	80.4
United Kingdom	17.9	62.0
Canada	18.8	58.7
United States	19.2	59.3
Ireland	19.6	87.2
Belgium	19.8	64.0
Luxembourg	22.5	47.9
Germany (Federal Republic of)	23.2	55.4
Austria	26.1	56.9
Italy	28.3	58.9
Kuwait	39.4	190.0

Source: **Statistical Yearbook 1972,** Statistical Office of the United Nations.

Other Measures of Well-Being

Although the United States has the highest per capita income in the world, its quality of health is allegedly poorer than that of some less wealthy nations. Spending more on health care services relative to GNP than any other country, one might expect the U. S. to have one of the lowest infant mortality rates; however, it ranks only eleventh among the countries listed in table 2. Similarly, while Sweden leads with an average life expectancy of 74.19 years, the United States ranks eighth, at 71.10 years, behind such nations as Japan, Canada, and France. In this way, GNP dollar amounts spent on medical care might be misleading as to the quality of health in the United States.

Many other such economic and social indicators are available, though none command the attention of the single aggregate GNP. The Department of Health, Education, and Welfare in 1969 published the results of an exploratory effort to develop a set of social indicators. Entitled "Toward a Social Re-

[4]Much of the difficulty with this argument involves the use of the term "services of a housewife." Perhaps the argument should revolve around the cost of keeping a house clean, which is the primary function of a maid; the services of a housewife extend far beyond merely cleaning house. Nordhaus and Tobin use the term "housekeeping."

port,"[5] it begins: "The nation has no comprehensive set of statistics reflecting social progress or retrogression. There is no government procedure for periodic stock-taking of the social health of the nation. The Government makes no social report." Citing several deficient areas such as health, social mobility, physical environment, poverty, public order, and safety, the report recommends a set of social indicators be developed, not merely as a by-product of administrative accounting procedures, but for public policy use. It recognizes the value of GNP statistics because they provide an aggregate measure and meaningful detail. But as for social statistics, "the trouble is that the weights needed for aggregated indexes of other social statistics are not available except within particular limited areas."

More recently, the government released *Social Indicators, 1973*.[6] A 245-page statistical volume describing U. S. social conditions and trends, it is the first of its kind published by the Federal Government. Covering health, income, and education, the report represents a start toward a more extensive social indicator system.[7] Data are restricted to objective conditions, are not weighted toward any single index of economic and/or social welfare, and contain no international comparisons. Nonetheless, it is an important effort since it gathers many welfare-related statistics into one volume.

The "Measure of Economic Welfare"

To help overcome the shortcomings of GNP as a welfare indicator, William Nordhaus and James Tobin of Yale University have constructed a welfare index based on national income accounts but aimed at measuring economic welfare.[8] One obvious defect of GNP, according to the two authors, is that it is an index of production and not consumption, which in their opinion is the goal of economic activity. With this in mind they have rearranged, reclassified, and imputed terms to design an index better reflecting consumption rather than production but utilizing the GNP framework.

In computing the Measure of Economic Welfare (MEW), they begin with personal consumption spending from the national income and product (GNP) accounts. They then reclassify several GNP expenditures to fit their consumption (welfare) theory. Capital goods such as automobiles and housing are counted in GNP in the year in which they are purchased. Nordhaus and Tobin initially leave out these purchases, instead including them in a separate wealth formation estimate.[9] Into wealth formation they also add education and health expenditures as capital investments. Government durable goods purchases such as public buildings are treated similarly. They then add to personal consumption the services drawn from this net stock of wealth, based upon the time such assets will yield services.[10]

A second major adjustment is the exclusion of "instrumental expenses." These are defined as activities that are not directly sources of utility, such as police services, sanitation, road maintenance, and national defense. While Nordhaus and Tobin admit these expenditures are "among the necessary overhead costs of a complex industrial nation," they have no *direct* bearing on consumption. Without denying that "given the unfavorable circumstances that prompt these expenditures, consumers will ultimately be better off with them than without them. . . the only judgment we make is that these expenditures yield no direct satisfaction."

A third major category of adjustments is the imputation of values for items measuring the quality of life and nonmarket productive activities (such as housekeeping services) which are estimated and added into the MEW.

A final major adjustment subtracts what Nordhaus and Tobin term the "disamenities of urbanization." Although acknowledging that economic growth delivers much in the way of new products and higher living standards, they recognize such growth increases urbanization. This brings increased costs of traffic congestion; air, water, and noise pollution; higher crime rates; and similar externalities common to urban life. To compensate for these urban disamenities, they subtract from the MEW total estimates of income differentials necessary to hold people in areas of denser population, since urban incomes are significantly higher than nonurban ones.

These computations and an adjustment for capital formation discussed below produce what Nordhaus and Tobin label a sustainable measure of economic welfare. From 1929 to 1965, when Net National Product grew on average 3.1 percent annually, the Measure of Economic Welfare

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[5] **Toward a Social Report,** p. 7.

[6] Executive Office of the President: Office of Management and Budget, **Social Indicators, 1973,** U. S. Government Printing Office, Washington, D. C., 1973.

[7] The areas covered are: health, public safety, education, employment, income, housing, leisure and recreation, and population.

[8] William Nordhaus and James Tobin. "Is Growth Obsolete," **Economic Growth,** National Bureau of Economic Research, New York, 1972, pp. 1-80.

[9] Estimates of wealth are those developed earlier by Goldsmith, Kendrick, T. Schultz, and Machlup. Estimates of services from wealth are based on the work of Juster. For full references, see "Is Growth Obsolete," pp. 30-31.

[10] Thus a refrigerator with an expected ten-year life would count 10 percent of the purchase price in annual consumption.

TABLE 3

Similar Approaches To Computing A Welfare Indicator

Nordhaus-Tobin and the Japanese Economic Planning Agency

Add:
Personal consumption
Government consumption
Services of consumer capital goods
Services of government capital goods
Value of leisure time
Value of nonmarket productive activity
(1) Total plus items

Nordhaus-Tobin subtract from (1):	The Economic Planning Agency subtracts from (1):
Private instrumental expenditures	Durable goods purchases
Durable goods purchases	Maintenance cost of environment
Other household investments	Environmental contamination
Costs of urban disamenities	Losses caused by urbanization
To form a Measure of Economic Welfare (MEW)	To form a Net National Welfare (NNW) Index

Note: All computations are in constant dollars/yen.

grew at a somewhat slower pace, 2.3 percent. On a per capita basis, NNP rose by 1.7 percent annually and the MEW by 1.0 percent. Thus Nordhaus and Tobin conclude that while the U. S. standard of living has increased both in the aggregate and on a per capita basis over that period, it did not increase as much as the output of goods and services.

The Net National Welfare Index

The Economic Planning Agency of the Japanese Government has recently produced an interim report on the conceptual framework of a Net National Welfare (NNW) Index similar to the Nordhaus-Tobin MEW.[11] Its expressed purpose is to provide a policy goal complementary to the GNP accounts.

As in the MEW, consumption is the key welfare indicator in the NNW Index with, however, some differences. For example, the NNW groups educational, health, and medical expenses under the current year's government consumption; the MEW includes these in capital formation. Similar to the MEW, though, judicial and police, general administrative, and defense expenditures are excluded from government spending. Durable goods purchases, commuting, and personal business expenses are excluded from personal consumption, and, like Nordhaus and Tobin, the Japanese add back services from personal durable goods on an accrual basis. Also, services from government durable goods purchases are prorated over time, based on these assets' useful lives. Value of leisure time[12] is an additional item in the NNW; nonmarket activities such as housekeeping are also added in. This estimate is based on the average female worker's wage.

The major minus items are, first, environmental maintenance costs, which include normal government expenses such as water and sewage treatment. A second major adjustment is for environmental pollution damages, the estimated cost of damage not presently being corrected (automobile exhausts, industrial pollution, etc.). When the government does spend the funds necessary to correct such damages, this expense is also excluded from NNW but under environmental maintenance costs.

A third major adjustment is for losses related to urbanization. Here, where Nordhaus and Tobin calculate income differentials under the broader category of "disamenities of urbanization," the Japanese exclude two smaller categories. First, they adjust for losses attributable to the deterioration of commuting environment, based on the premise that commuting more than 60 minutes daily results in "physical fatigue and mental pain." Commuting hours exceeding 60 minutes per day are multiplied by the average wage, and the resulting value is subtracted from the NNW total. Also subtracted is an estimated dollar value loss caused by traffic accidents, based on compensation paid for personal injuries. (The basic approaches of the Japanese NNW Index and the Nordhaus-Tobin MEW Index are shown in table 3.)

[11] "An Interim Report of the N.N.W. Development Committee," Economic Planning Agency, Tokyo, January 19, 1973.

[12] This is computed by multiplying leisure hours by an average wage.

The results of the Japanese NNW Index are similar to the MEW: namely, the growth in national welfare as measured by each index has trailed the output of goods and services. While Japanese growth rates have been nothing short of spectacular, the ratio of NNW to NDP[13] has fallen in recent years. From a high of 1.15 in 1955, this ratio fell to 1.01 in 1965 and plummeted to .92 in 1970. A major reason for this has been environmental pollution, which reduced NNW by 0.2 percent in 1955, 11.6 in 1965, and 13.8 in 1970.

The Sustainable Growth Investment Requirement

The Japanese Government follows an investment addition approach patterned on a concept developed by Nordhaus and Tobin. Basically, there is a computation for the amount of growth in gross investment which would permit per capita consumption to grow at the rate of technological progress. If the amount of investment growth required to achieve this end is less than actual investment, a factor called Net Investment is added to the NNW (or MEW). If, however, the investment growth requirement exceeds the actual amount of investment in the economy, the difference is subtracted, thus reducing NNW.

A Welfare Deflator

A third approach to measuring economic and social welfare from the GNP accounts is that proposed by Robert Lekachman.[14] He suggests a welfare deflator similar to a price index. In contrast to the MEW and NNW methodology, this approach would deflate total GNP in the way GNP is adjusted for price changes. The deflator would be a composite measure of welfare improvement or deterioration. Rather than yielding a GNP in constant dollars, the results would yield an index in real welfare terms. The final results would show an index sensitive on the upside to favorable indicators such as reduced crime and, on the downside, to unfavorable indicators such as greater air pollution.

Evaluation of Welfare Measurements

Many benefits stem from constructing a national welfare index. Perhaps the most obvious are those derived from a systematic approach to measuring economic welfare in an aggregative or total sense. Second, in the attempt to measure economic welfare, statistics from subareas are produced. Measuring nonmarket activities should yield new techniques of economic and social analysis. While these may be in their elementary stages, further research should refine them, bringing more realistic measures and results.

However, one problem accompanying a welfare index is that its construction, as that of the GNP accounts, requires value judgments. While there may not be any more of them, the fact that many are new, as opposed to the GNP accounts, might hinder acceptance of such an index.

Still another, not unrelated problem, is a definitional one. In the Nordhaus-Tobin formulation, economic welfare is primarily a function of consumption. Defense and police expenditures, for example, are excluded, since they do not *directly* improve consumer well-being. Yet one may argue that such expenditures indirectly contribute to economic well-being and that such a measure should take this into account. However, an obvious problem would be one of assigning weights to these contributions.

The problem of value judgments and definitions in computing such an index raises another major question. If an index is to be computed for policy purposes, who should perform the computation? Should it be a government agency, a university, or a private business under contract with the Federal Government? Such an index might differ materially depending upon the viewpoint of the organization constructing it. The Japanese have chosen to follow a government design.

This leads to a further question. Would it be possible, using such an index, to set national goals for improving economic welfare through legislation? Setting such goals is not unprecedented, as witnessed by the Employment Act of 1946. This act made it the continuing policy and responsibility of the Federal Government to foster conditions which will promote maximum employment, production, and purchasing power.

The key to the question of legislated economic welfare goals lies in the simple fact of acceptance. Such an index would have to be developed with the general backing of Congress and the business and academic communities. Any disagreements could be handled by an appreciation of what the index means and what it includes or excludes. For example, if defense expenditures were excluded, then during a wartime or other period of national emergency, welfare growth targets might have to be modified. During a peacetime or "normal" period, growth targets could be set higher. In general, the many problems of developing and using an index of economic welfare do not seem insurmountable. Such an index should not replace the GNP accounts but could lend an important dimension to economic policymaking. ■

[13] Net National Product minus capital formation equals NDP.

[14] Robert Lekachman, "The Income Accounts of Tomorrow," **Survey of Current Business: Fiftieth Anniversary Issue,** U. S. Department of Commerce, July 1971, pp. 119-123. This fiftieth anniversary issue of the **Survey** contains a number of interesting articles commenting on the GNP accounts, their current construction, and suggestions for future improvements.