SOCIAL CHALLENGES TO ECONOMIC ACCOUNTING AND ECONOMIC CHALLENGES TO SOCIAL ACCOUNTING

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The question addressed in this paper is: Why can't we have a good measuring rod of the economic and social performance of our society? The answers are basically positive but lie mostly in the direction of (1) avoiding simplistic solutions such as turning the national income accounts into a measure of social welfare and (2) providing the elements of an information strategy to obtain such a measure or more accurately such a *set* of measures.

The proposed information strategy highlights five activities: (1) the presentation and analysis of welfare outcomes, an activity which is analogous to but broader than "social indicators"; (2) social accounting which includes economic accounting, demographic accounting, and time-use accounting; (3) model building and operation which, unlike accounting, are concerned with behavioral or causal relationships used to explain and project welfare outcomes; (4) hypothesis testing to develop new insights into economic and social behavior; and finally (5) the building and maintenance of a data base required for carrying on the aforementioned four activities.

I. INTRODUCTION

This paper is about the social implications of economic activity and the economic implications of social activity. Our limited concern with this vast subject is to clarify certain measurement issues arising from the challenge to compilers of national income and product accounts to be more responsive to human welfare concerns and the challenge to social welfare advocates to be more attentive to economic constraints. Clarification of the measurement issues arising from these two challenges should be helpful to those presently working toward an improved integration of economic and social information.

Welfare outcomes have so many dimensions, and the connections with economic and social phenomena are so diverse that, in the opinion of this paper, attempts to impute such outcomes to the economic accounts usually perform a disservice to the accounts and make no appreciable contribution to the study of welfare. A general point emphasized in this paper is that the national income accounts measure output from the point of view of a producer, not a consumer. Economic production is an input to consumption, leading to a broader outcome which may be called welfare. There would be little sense in combining such an input measure with the broad measure of outcome, or abandoning the input measure by changing it in order to approximate the outcome measure, particularly if it is possible to have separate measures and we shall see that it is. Keeping economic production measurements distinct and relating them to welfare measurements would seem to be the better approach, both for defining welfare objectives and for using the measure of economic output as a tool for social

Note: This paper is an outgrowth and substantial modification of one prepared for the U.S. National Academy of Sciences entitled "Welfare Dimensions of Productivity Measurement", which is included in National Research Council, *Measurement and Interpretation of Productivity*, Washington, 1979.

betterment. The paper illustrates this and related points in specific activities and then draws out the implications for economic and social measurement.

II. Distinctions Between Economic Production and Welfare Outcomes in Specific Activities, Briefly Noted

Production and consumption. The national income and product accounts provide measures of "personal consumption expenditures", but not of consumption.[1] Personal consumption expenditures are, strictly speaking, the market value of goods and services delivered by producers to consumers. While the activities of consumers in buying and using the goods purchased (e.g., driving to the shopping center, cooking at home) are reflected in the accounts, say through consumer purchases of fuels, the accounts are not concerned with the actual *use* or using up by consumers of the goods and services they buy. These and other points are discussed in more detail later to show how far welfare outcomes extend beyond the strict boundaries of economic production and the ways these outcomes and economic production may usefully be related.

Health. One of the most controversial areas of measurement in which a distinction is drawn between production and welfare or consumption objectives is in connection with health facilities, including pharmaceutical companies, hospitals, and medical services generally. In the production view, these facilities, like any other economic facilities, use labor, equipment and plant, materials, and fuels to deliver goods and services to consumers. In real terms, these goods and services are measured as quantities of products, each valued by their market price. The definition of these quantities often becomes troublesome, particularly for medical services. Questions are frequently raised about the imperfections of the "market" in determining relative prices for both goods and services.

Welfare dimensions treatable beyond the production boundary are noted later, for example, the "effectiveness" of these health facilities in actually promoting health, or the factors or inputs beyond economic production which also contribute to health, and, finally, the measurement of health outcomes *per se.*

Safety. The national income accounts, under General Government, measure the activity of the criminal justice system by counting the compensation paid to police, judges, wardens, parole officers, etc. Such a measure could be improved if we could count the activities actually performed and weight them by their costs. But even so, these accounts do not and should not measure the "output" of public safety. The national accounts appropriately provide a basis for measuring the resources allocated to promoting public safety in the community and in industry. But the public safety itself must be measured separately outside the national income boundary.

As in the case of health, certain extensions are noted subsequently, e.g., the "effectiveness" of public safety facilities in promoting safety, the forces other than public safety facilities which affect safety, and the measurement of safety *per se.* Lest we build up false expectations, however, we should make clear that we are

[1]The only measures of consumption in the national accounts are for goods consumed in the production process, including capital, materials, and fuels consumed in production. When the accounts refer to consumption, however, it is not the contrast to production but to investment or saving.

not seeking to provide quantitative and conceptual solutions to these three dimensions or extensions. We seek simply to illustrate the logical distinctions that separate them and in so doing clarify our measurement objectives.

The physical environment. The physical environment is a material input to production and a source of life and recreation to persons. In turn the environment is altered by these activities for good or ill. The measurement issues involving these linkages are:

(1) Measuring the value of the environment and its changes to production and persons.

(2) Measuring the abatement of pollution—its costs and benefits.

Measuring the generation of pollution and the economic costs of its abatement can be undertaken within the established boundaries of the national economic accounts. Measuring the benefits of pollution abatement goes beyond the accounts, as does measuring the "asset" value of the environment.

Distribution. Among the most important welfare outcomes of economic and social activities is the distribution of rewards and punishments. Economic rewards include income from production, from ownership of wealth, and from transfer payments. Social rewards include, among other things, status achievement, which combines occupational, educational and income components. Punishments would be concerned with differences in the intended or unintended inflictions of harm such as inequality in application of the law, differences in the incidence of damage from pollution, differences in victimization from crime, and other such inequalities.

We limit our discussion of these manifold linkages in this paper only to income distribution. But this outcome entails numerous economic and social linkages. Thus, its discussion serves the general purpose of this paper to explore significant linkages between economic and social phenomena and, most importantly, the measurement strategies they imply.

We illustrate linkages between and among economic and social phenomena arising from concern with income distribution with reference to the following analytic questions:

(1) What explains differences in income from work (i.e., wage rates)?

(2) What is the economic and social role of transfer payments?

(3) What are the consequences of a given income distribution upon the economy and society?

Our objective is not, of course, to attempt to answer these questions but to show that these questions point up significant linkages between economic and social phenomena as well as help define the boundaries between them.

Work and use of time. Distinctions and linkages between an economic accounting and welfare context are found both on the job and in the home. These linkages, which are rich and varied, are described here, mainly to explore those linkages themselves and in addition to show that keeping the measurement of production activities distinct from welfare outcomes improves our ability to make both production and welfare choices.

Suppose that two enterprises achieve the same GNP output in a given time, but in the one, conditions are more pleasing to the workers than in the other. Should we impute some added value to the output of the firm with the better

working conditions? Our answer here is, "no". Nevertheless, measures are needed to relate one set of outcomes to the other in order to provide the basis for sensible decisions. A major and difficult issue is the determination of effects upon economic productivity of improved job satisfaction. The economic and welfare dimensions of these questions, as in the earlier cases noted above, are explored further. The extended discussion enters into a wider context than the domain of market work. It includes "nonmarket work" and other uses of time.

III. Measurement of Welfare Outcomes and the Linkages with Economic, Social, and Environmental Activities and Resources

The complexities surrounding welfare outcomes are suggested by the following sets of questions:

A. How are welfare outcomes to be defined? For example, what is an appropriate definition of health? Of working conditions? Of safety? Is the locus of all definitions to be found at the *individual* level? Are there appropriate *system* definitions of welfare outcomes? Are definitions of welfare necessarily prescriptive?

B. How are these outcomes to be measured? Need they always be expressed in money terms? What is the relation between objective and subjective measures? What should be the period of account, one year? a lifetime?

C. What is the relation between welfare outcomes and economic activities? Social activities? The environment? Can these outcomes be expressed as functions of economic, social, and environmental inputs? What are the feedbacks from welfare outcomes to these inputs?

D. Can measures of welfare outcomes be organized into a summary? a system? Does the measurement of use of time provide properties for an integrative framework? What other possibilities are there for integration? What is the relation between integration at the micro- and macrolevel?

Lest this vast array of questions appears to boggle the mind, a repeated reminder is in order. We do not seek to give definitive answers to these questions—some of them cannot be definitively answered at this stage of the art. We pose them in order to suggest the range of measurement choices needed in the effort to integrate social and economic information. These questions illustrate the fact that attempts to measure welfare dimensions open many doors into a rather vast and perhaps boundless realm—a realm in which the economic accounts play a strategic and vital but limited role.

The accompanying diagram is most appropriately related to the third set of questions listed above. But it also serves as an overview of the discussion to follow.

The diagram has several advantages. It highlights the key position of "welfare outcomes" which serves to suggest that just as the national income and product accounts lead to a measure of "final output" so should our integrated measures of social and economic activities point to eventual "outcomes" or measures of "performance". But "outcome" has a broader connotation than "output" as we shall see.

The diagram also has the advantage of suggesting the manifold linkages and feedbacks between the phenomena comprising the different boxes. While the

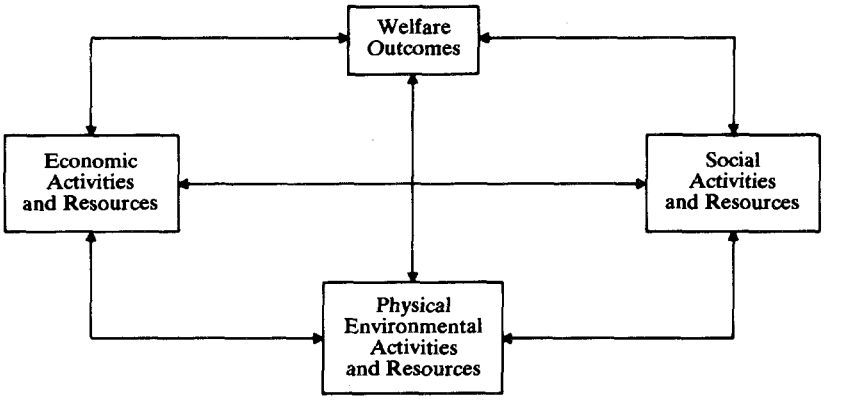

Diagram 1. Economic, Social, and Environmental Interactions

national accounts tend to circumscribe a "closed system" of balances—e.g., payments to the factors of production equal receipts from purchases of products; savings equal investment; the value of inputs equals the value of outputs, etc.—the diagram suggests that perhaps there is "no closed system".

"Welfare outcomes" in the diagram have the following properties:

(1) They are the measures of economic and social performance affecting the health and security, broadly defined, of the population.

(2) The term "outcome" is intended to include both *outputs* as well as *inputs*. For example, the high cost of living, generally, or more particularly as in the United States, the high cost of medical care, is of social concern and should be separately recorded and explained.

(3) Outcomes could be measured *objectively*, say, in terms of a measure of longevity and *subjectively*, say, in terms of a person's own perception of his or her health status. Each measure would of course serve a different or related purpose.

(4) For some purposes a period of account longer than a year, and in some cases a lifetime dimension, could be useful for measuring opportunities to live out a healthy and secure life. Many persons perceive their well-being in terms of probable future outcomes and are willing to forego present for future satisfactions, say, during a period of career training. A lifetime view helps put into perspective changes in well-being over many life stages rather than during a particular point in time. It introduces a dynamic dimension to the study of well-being by measuring changes over the life cycle and over time.

(5) Finally, welfare outcomes could have a *system* dimension as well as an individual one. Many "states of society" transcend the objective and subjective states of individuals *per se*, and it goes without saying that some "states of society" are preferable to others. We regard an income *distribution*, for example, as having a system connotation. This is because some distributions are preferred over others, not only because the financial position of certain groups will be improved by one distribution compared with another, but also because one is deemed to provide more social viability or stability as perceived by policy makers or interested citizens.

Another example of a *system* dimension of welfare can be seen in regard to the general condition or vitality of a city or neighborhood. A city such as Calcutta

which is regarded by many as a "dead" city transcends the measurable plight of its individual inhabitants. Measuring a city's viability is a challenge to urban economists, sociologists, and other social scientists.

Types of Linkages

The connections leading to and from "Welfare Outcomes" very broadly suggested in diagram 1 can be categorized in terms of causal or behavioral linkages, accounting identities or constraints, and connections involving costs, benefits, and trade-offs. We discuss each type of linkage or relationship in turn.

By "*causal*" or *behavioral linkages*, I mean explanations of outcomes which may be expressed mathematically in terms of elements in a function, or in terms of some hypothesis. For example, a person's health is expressible as an outcome or function of his or her age, nutrition, exercise, education, income, access to medical care, and physical and environmental social factors. The outcome could be a consequence of a deliberately planned outcome (a production function) or a result of happenstance—unplanned or unintended. Moreover, as we shall note, the function need not always have the welfare outcome as the dependent variable since welfare outcomes can have important influences upon as well as be influenced by economic, social, and environmental factors.

Accounting relationships are the identities ideally described in the national economic accounts but also evident in demographic and time budget accounting.

In economic accounting, the presentation of balances or of double-entry bookkeeping for sectors of the economy or for the nation as a whole shows, the necessary equality between incomes paid to the factors of production and outlays for the purchases of the products produced, that between industry inputs and outputs, and between sales and acquisition of assets. Taken as such, there is no indication in these balances as to whether or not the economy has in some sense performed "better" or "more efficiently" in one time period or another.

This isn't to say there is no "welfare" use for these balancing entries. In addition to providing tests of consistency in the different entries and making sure there are no omissions or double countings, these identities provide the basis for analysis of the fundamental economic constraints that limit economic and social activities. Indeed it was in good part this very use that was the major impetus for establishing the official national accounts in the U.S., U.K., and other countries—so that the strains from war production would be made explicit in accounting for all the military and nonmilitary needs and resources. That is to say, the accounts were needed to determine whether plans for total civilian and military output would be in line with resource requirements of manpower materials, fuels, etc. and to what extent incomes generated from "guns and butter" might exceed that for "butter" alone.

In addition to a strictly accounting feature there are, of course, final outcome or performance measures, namely GNP, or net national product (NNP), or personal consumption expenditures which are "accounted for" in a consistent and balanced manner.

Similar features are found in population accounting and in accounting for the use of time described later.

In sum, accounting systems provide for a balanced, consistent accounting for those totals which are pertinent to well-being and in so doing reveal significant constraints which arise for any set of outcomes, whether planned or unplanned.

Linkages involving trade-offs, costs, and benefits are associated with choosing among alternative courses of action and involve relating desired outcomes with various costs. Two examples help clarify this point. A person may choose between working longer hours and thereby having more GNP-type goods, or working less and having more time for other activities, say, more time with one's family. Society is now faced with the choice of investing additional capital to enhance productivity of GNP-type goods and yielding more pollution, or investing in additional antipollution devices to obtain cleaner air, thereby giving up some amount of GNP-type goods.

Thus costs include, in these two contexts, the foregoing of material goods and services as presently measured in the national accounts, or alternative uses of time.

IV. An Information Strategy

We have thus described three types of linkages: the explanatory links that make outcomes actual, the accounting links that make outcomes possible, and the linkages involving choices among outcomes that indicate what may have to be given up if a given course of action is followed.

In our view, no single system of information can provide the data and analysis for these manifold linkages. Rather than seek some simplistic answer through a single index of welfare, as would be obtained from some extended welfare-oriented measure of GNP, or some all-embracing information system, we look instead toward a reasonably integrated "information strategy".[2]

The "strategy" sketched in diagram 2 helps to put the many efforts of economists, sociologists, social psychologists, and political scientists into perspective and lends some cohesiveness to them. It should also give useful perspective to the efforts by the United Nations in its work on integrating and improving the analysis of economic and social statistics.

A principal feature of this diagram is the highlighting of three accounting systems, as follows:

(1) The economic accounts which include the income and product accounts, input–output matrices, flows of funds, and eventually national and sector balance sheets. These accounts have the function of accounting for the production of goods and services, the usage of materials and natural resources, and the financing of all these activities. The latter includes financial flows, transfers of income and of assets, and their revaluations. We believe these accounts should be improved for the purpose of accounting for production and its finance rather than as welfare measures. Their use in welfare studies should be concerned with analysis of the provision and distribution of material goods and services to the population and of the constraints to the general improvement of well-being. Some measurement recommendations are noted later.

[2]I used this term "information strategy" in an earlier paper given before the Eleventh in this series of Conferences in Nathanya, Israel, in 1969. But this paper differs in many ways from the earlier one.

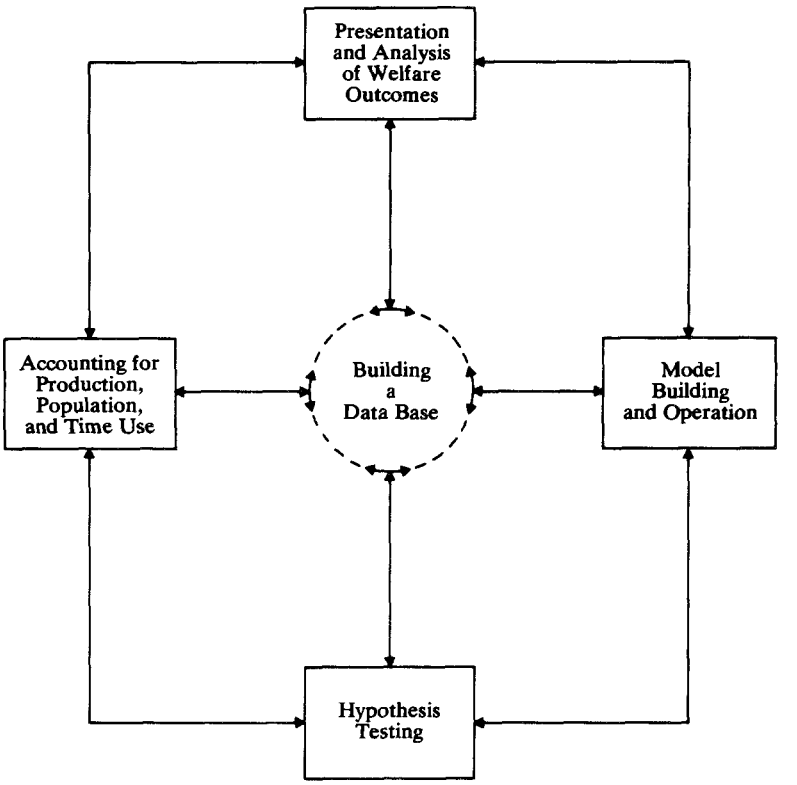

Diagram 2. An Information Strategy

(2) The second set is exemplified by the Social and Demographic Accounts (SSDS) formulated by Richard Stone for the UN. The SSDS, insofar as it applies to demographic accounting, essentially provides for a system of balancing entries of inflows and outflows of the population of a given geographical area from one period to another. Thus, a "stock" of persons at the beginning of the year minus exits plus entries equals the stock at the end of the year. Such a stock might be the total population, or subsets of the population in a given state, say at school, or work or retirement, ill or well, and so forth.

(3) The third set we identify as accounting for the use of time by persons and households. This third set might be considered a subset of the second. But there are advantages in viewing it separately since it involves a different constraint (time constraint vs. a population constraint as in the SSDS) and a different numeraire.

The time-use accounting provides a constraining total which indicates that if the 24-hour day is spent more on working for market wages, then less time will be available for other activities, for example, child care. These time studies seek *qualitative* as well as quantitative measures, in terms of different levels of satisfaction for different types of time use. In a sense, data on such qualitative dimensions could lead to inferences about what types of time use persons would seek to minimize (e.g., travel time to work) and which to maximize (e.g., I let the reader decide these types).

While present studies set the time constraint as a 24-hour day, it is also useful to analyze the constraint on a lifetime dimension. The accounting for time used during an expected span of life is in its infancy. This writer is planning with the University of Michigan, presently engaged in time budget studies of use of the 24-hour day, to make a study of time use over the lifespan.

Each of these accounting systems has a numeraire: money in the economic accounts, persons in the SSDS, and time units in the time "budgets". This permits an accounting for totals which are *outcomes* of the accounting systems, say GNP or NNP or personal consumption expenditures in the national accounts, the number of persons ill or well in the SSDS, or the time spent in "leisure" in the time budget studies. These accounting systems do not merely *provide* totals; they account for them by counting all relevant elements in the total.

But it should be clear that in providing measures of outcomes they *merely account for* the totals; they do not present a causal or behavioral set of relations. For example, the national accounts do not explain investment, either its level or changes; they merely account for the various sources and uses of inputs which become the value of the production of plant and equipment. A behavioral analysis requires a model in which the dependent variable is investment or its change, and the independent variables might be, say, capacity utilization, expectation of future rates of return, and interest rates. Similarly, the SDDS does not explain fertility behavior; it merely accounts for births for various groups and circumstances. Finally, in the case of an accounting for time use, explanations why some families spend more time in child care than others require a behavioral model.

To the far right in diagram 2, the "Model Building and Operation" activities are concerned, in good part, with behavioral or causal relationships. Their use in providing statistical explanations for key indicators, for projections, and for simulation of changes based on alternative policies give them potentially a significant position in an overall information strategy. From the point of view of this paper, the important matter to stress is the flexibility with which models can *combine economic and social variables in their equations*—depending, of course, on availability of data. Unlike the accounts, which must be constructed by means of broad identities, models incorporate not only these identities but what is most important, they include behavioral relationships as well.

Social scientists have almost from "the beginning" been concerned with the causal connections between economic and social factors. It could be argued, however, that as the disciplines became more clearly defined and the interests more specialized, less crossing over occurred of economic, psychological, social, and political analyses.

In recent years, for over a decade or more, there has been an increasing amount of interdisciplinary work. Studies of social mobility defined in terms of degree of status achievement as measured by income, occupation, and education have been increasing. Fertility models which incorporate economic as well as more traditional demographic factors have become almost standard. Similarly, models of income inequality are increasingly concerned with social structure and changes in addition to the usual neoclassical economic variables. Models of personal satisfaction and perceived well-being on the job, in the home, and in the neighborhood are being increasingly concerned with the intersection with

objective, largely economic conditions and circumstances. Similar concerns between economic circumstances and other variables are of increasing interest in models of political processes and voter participation. The world-wide inflation in many quarters is giving rise to concern about the effects of inflation on social stability. And so on.

Thus far, econometric models have combined the disciplines of economic accounting, economic theory, and mathematical statistics. There is not yet a body of social theory available to develop more comprehensive models of household behavior which would bring about a greater unity with social-type variables as well. But these aforementioned partial models of social behavior which link economic and social factors are showing much promise.

The effort to *test key hypotheses* and to develop new insights into economic and social behavior is an area of basic research shown at the bottom of the diagram. Such research provides the parameters or coefficients for models, sharpens the choice of indicators of outcomes, and improves upon the structure of accounting systems. It should serve to clarify our choices among welfare outcomes.

An essential feature of such research is to extend our understanding of the behavior of persons, households, firms, and other organizations, including governmental organizations. We have numerous notions and hypotheses concerning the effects of governmental action; for example, the effects of education and training on individuals, the impact of income supports on incentives, or the effect that monetary policy has on firms, governments, and households. It takes basic research to test such hypotheses, through controlled observation. Such tests of hypotheses also provide parameters of "production functions". That is to say, research provides the basis for inferring what in fact is produced as a result of a government program—at least it tries to do this.

Other work in this area of information activity includes design of social experiments: e.g., to test a negative income tax. The methods of observation in all these tasks will likely require more than simulation of aggregate econometric models or microanalysis of existing cross-sectional survey tapes. They will need to involve highly ingenious sampling of behavioral units over time—including longitudinal type studies, which are on the increase.

The center portion of the diagram, "data base", is a product of the activities of data collection, filing, and access—all needed (a) to record the essential outcomes of economic and social activities; (b) to meet the tests and organizing principles of consistent definitions and constraints set in good part by accounting systems; (c) to provide the bits of evidence needed for testing hypotheses; and (d) to supply the data needs for explaining and projecting changes in outcomes via models of social and economic behavior.

Basic data are beset by errors, not only of a sampling nature, but a host of errors of nonresponse, interviewer bias, respondent dishonesty, and others. The seriousness of the latter-type errors is lessened when the data are used to obtain measures of central tendency—means, medians, or broad aggregates. They, as well as sampling errors, are also "corrected" at macrolevels by the constraints set by accounting systems. For example, data on population by age can be "verified" and to a degree "adjusted" when the numbers in a given age group from one

census are checked 10 years later to see if the number of those showing up in the later census are in line with the number of expected survivors and net migrants. Similar checks of consistency of data from economic censuses are made with input–output accounts to check out the details of the origin of purchases and the destination of sales of the nation's output of materials and finished products.

To the extent that basic data are being used increasingly at the microlevel, the nonsampling errors are particularly severe. Although the theory of sampling is generally well developed, both the theory and practice of the control of nonsampling errors are in their beginning stages, though improving rapidly. As microdata are used increasingly to build up totals for the accounting systems and to provide the basis for testing and simulating microbehavior in basic research and in modeling, the feedbacks between improving reliability and analytical usefulness should move along.

V. Some Applications and Recommendations

I do not want to give the impression that this "strategy" is fully worked out and that all the steps needed to implement the various elements are clear cut. In my view, what may be worth trying is an organized effort, or series of such efforts by a congenial group of social scientists from several disciplines in accounting, model building, in economics, sociology, social psychology and political science to assign major priorities and begin to implement some core activities in (a) linking the three accounting systems, (b) determining the core data base strategies, and (c) undertaking some behavioral studies of objective and subjective states in a few key areas of life. I recognize that such a mixed group might have difficulties working together but I think the difficulties are becoming smaller. I leave it to such a group to lay out the agenda. Before a group of national accountants and economists, such as in this Association, however, I offer a few suggestions more in line but still somewhat beyond the more limited interest of this group.

The suggestions are made in the context of economic accounting, demographic accounting, and time-use accounting. By implication the suggestions carry over to data base building and modeling.

(a) *Economic accounting.* One of the most useful ways that the economic accounts, as measured in the traditional way, contribute to analysis of welfare problems is in the analysis of *income distribution.*

Advance in economic productivity, in the traditional production sense, is a means of improving material living conditions for everyone. In its absence, increased real income for some can only come at the expense of reduced income for others. The way the term "welfare" is most commonly used today, in connection with the "welfare" or transfer system, makes it evident that increases in economic productivity are a crucial element in social welfare policy.

The welfare of the dependent population, notably the children, the infirm, the retired, and the poor, is vitally affected by the productivity of those who produce the nation's food, clothing, housing, medical care, and other GNP-type goods. The "dependency ratio" is often calculated as the ratio of the number of dependents (various classes of nonworkers) to the number of maintainers or

workers. However, each maintainer should not be counted without change over time as one person. This is because changes occur in the relative importance of high and low productive employees, hours of work per person and in output per person-hour. The last mentioned factor has been the most important over a long period of years. Output per hour of workers doubled in the 25-year period, 1947–1972. While the number of dependents increased, as did their benefits, the "ability" of a worker to support these welfare benefits also increased. Only through further increases in productivity, translated into increases in real compensation per hour, can these transfers to the dependent population be increased in real terms, without reducing the real incomes of the working population. The slowdown in recent years in the trend rate of productivity growth gives rise to added social concern in the context of problems facing the U.S. welfare system.

The importance of productivity in the "real" financing (as distinct from fiscal or monetary financing) of welfare policy is clear. However, productivity is a two-way street. While increased productivity supports increases in welfare benefits, increases in the burden of income or payroll taxes to support welfare benefits affect the productivity of workers, either by affecting working time (e.g., early retirement) or the quality of effort, or through the alleged fiscal effects of social security financing in retarding the growth of capital investment. A full economic and social analysis of the impact of the transfer and tax system on economic productivity and vice versa is still not at hand. I can think of few more important recommendations that I could make for basic welfare research in income distribution tied in with our economic and demographic accounts than for clarifying this two-sided issue of "dependency".

Many other issues in income distribution analysis could be elaborated upon, especially concerning the forces making for large inequalities, but this would require another paper. I particularly recommend a *dynamic* approach to the study of income inequality. This means looking at the *change* in inequality within and between given age groups as they pass through their main life stages. Two years ago before this conference, in York, England, I presented a paper on this subject and it was published in the Review of Income and Wealth in June 1978.

The present definition of income as given by the national accounts should of course be extended for a full welfare analysis of income distribution to include realized capital gains. This need not, of course, affect *total* national income or product, only its distribution.

There is a class of welfare outcomes including the environment, health, and safety in which limiting the national economic accounts to a strict production boundary increases rather than inhibits their usefulness for welfare analysis and for integration with social measurement.

Take the case of two electric powerplants delivering the same value of kilowatt hours of combined industrial, commercial, and residential energy to a given area in a given time. One, however, causes less environmental damage than the other because it installed equipment to reduce the discharge of harmful wastes into the air and water. Should the GNP of the cleaner plant be adjusted to show higher output than that of the dirtier one?

The same sort of question could be raised regarding two hospitals or two criminal justice facilities wherein the compared facilities have the same GNP output but one is more effective in promoting health or reducing crime.

The answer we propose to the above question is "no". We see only confusion when a national accountant imputes a value for safety, for mortality, for clean air, to the output of police services, medical services, and electric power plants, as part of the measure of production of these facilities. We could, of course, measure the "net effect" of production by these facilities upon some specified outcome—say the effect of a given surgical treatment on survivorship after appropriate allowance for other factors affecting survivorship. This type of basic research or functional analysis is, of course, to be encouraged, but it is clearly not an accounting question.

Note two features to such "net effect" analysis. One is that no money valuation is required in this analysis of the outcome; i.e., no prices and quantities need be assigned to survivorship. The other feature is that other factors must be accounted for which are not part of the inputs of the GNP-producing facility. In the surgical treatment case the "other inputs" which are significant in the survivorship outcome would include the life styles of the patients, differential effects of the environment, and their past and prospective health. None of these "other factors" are included among the inputs of the surgical facility. To impute a welfare output without including the full range of corresponding inputs would not make sense.

Similarly, in the cases of the cleaner electric power plant, the more effective police facility, and the case of the factory with the more pleasant work conditions (mentioned earlier in Part II) it would be unsound to adjust the GNP value of production by assigning to it an imputed value of the specified welfare outcomes. This is so not only because the welfare-related *inputs* are outside the bounds of the production system but because the outputs or externalities are also multiple and outside the production system.

This argument against imputation in a GNP measure should not imply that it is never appropriate to impute some value to some specified welfare outcome. In cost-benefit analyses, for example, such an imputation may be necessary. In the power plant case, for example, the cost of the installed equipment to reduce pollution could be equated to the value of kilowatt hours foregone as a result of diverting an equal value of investment to this use from that of increasing electric generating capacity. The benefit to society of the cleaner air and water would need to be reckoned in money values to determine the net benefit.

In this type of analysis, the most useful measure of GNP would be the one based on kilowatt hours (without imputation) since it is the GNP foregone that determines the cost of the pollution abatement activity. Thus it is the *relation* between the cost and the benefit that is important. Simply adding the two together makes little sense.

(b) *Demographic accounting suggestions.* In our view, the SSDS should be viewed mainly as an accounting system rather than as a highly detailed behavioral model. As an accounting system it can set the broad lines of consistency and balance of population stocks and flows. What those broad lines should be could form an interesting project of the UN Statistical Office. The main difficulty with

the SSDS that most observers have noted, including Richard Stone, is the fact that the matrices delineating the stocks and flows from one period to another cannot handle a large amount of detail because of the exponential increase in the requisite number of cells within the matrices as the margins of the matrices become more detailed. I think this difficulty would be considerably lessened if the detailed behavioral explanations, simulations, and projections were left to specialized behavioral models and broad demographic accounting were left to the SSDS.

Some specialized studies of linkages for national budget analysis could be used within the framework of the SSDS to project costs and requirements for certain services, say health services. Such projections would have been highly useful in the United States before Medicare was instituted. The SSDS could have provided the broad framework for accounting for the probable number of beneficiaries and needs (i.e., the population of the eligible elderly patients and their needed services) and for the probable volume of required medical services of manpower, facilities, medicines, etc. But even here the help of detailed behavioral models would have been necessary.

(c) *Time use accounting.* Many controversies over the valuation to be put on time spent by persons and households can, we believe, be seen more clearly if national accounting questions are kept distinct from matters of personal choice and from causal explanations of behavior.

The first basic distinction that should be made is between (a) the accounting question of the value to be placed in GNP-type goods and services which are produced in the home or in a nonmarket setting, and (b) the personal choice question of what value a person places on his or her activities, whether it be market or nonmarket work or other time use.

In the accounting question, the analytic interest is in accounting for all the goods and services produced outside the enterprise sector which by and large are substitutes for what might have been produced in that sector. These goods and services include food produced for home consumption, personal and household furnishings, cooking, sewing, providing services of transportation, education, child care, volunteer services in hospitals, schools, and so forth.

In this accounting setting, the value to be placed on these goods and services should be the value that the market would place upon them in producer prices, however difficult to determine in some instances. It should *not* be the value placed upon these activities by the person performing them. This suggested treatment is similar to that regarding production for consumption of products of agriculture, fishery, and forestry, employed in present national accounting practices, and in the UN System of National Accounts (SNA).

The only difference between present practice and the suggestion in this paper is that the concept be extended to the many other GNP-type goods and services mentioned. This extension is needed if a full accounting is to be made of the secular changes in the composition and volume of GNP-goods and services regardless of what sector produces them. Such extensions might be done, however, only on an infrequent basis, certainly not more frequently than annually, perhaps best for quinquennial or decennial intervals.

The value which persons themselves place upon their own time is a different question from the GNP-accounting question. It is one of distribution and choice and, unlike the accounting question, does not lend itself to a national aggregate that ought to be added to GNP.

Recent formulations of the theory of consumer behavior have sought to develop a production function for the household in which the "outputs" are ultimate satisfactions and the inputs are time, human capital, market income, and quantities and prices of market goods. This theory attempts to formulate the problem of choice between how many hours to work for wages and how many hours to devote to consumption and household production (including eating, cooking, cleaning, child rearing, recreation) and to investment in future needs. In principle, this formulation could provide a basis for determining the relative price in welfare terms of an hour of work and an hour of nonwork. Thus far, however, the empirical results have not moved much beyond the assumption that some variant of the prevailing wage-rate is the basis for the exchange. This is unsatisfactory to some, particularly when it is recognized that a housewife who chooses *not* to work for wages probably made the judgment that the value of her time as a housewife was more valuable to her than the income foregone from a market job. The time budget surveys of the University of Michigan, mentioned earlier, should help eventually in resolving some of these issues.

Several issues of an accounting nature and their relations to measurement of welfare outcomes and behavioral analyses arise in connection with time spent at work. Briefly, the difference between a strictly production view of work and a welfare view is that the first regards workers and their working conditions, including working hours, as economic resources or factor inputs to be allocated as efficiently as possible; the second regards working conditions as contributing to the quality of workers' lives by enhancing economic security and a sense of well-being at given jobs.

Among the analytic questions requiring hypothesis testing through basic research are the effects on productivity of such changes as shorter hours and improved economic, physical, organizational, psychological, and physiological dimensions of worker welfare. The welfare side of this to workers themselves is the value placed on the work place, on shorter or longer hours, and on less or more leisure. To society as a whole, both sides of the question, GNP efficiency and individual worker welfare, are pertinent.

It is clear that measuring or seeking to enhance worker satisfaction is most difficult in view of its many highly interrelated dimensions: economic, including adequate pay, long-term security, upward mobility; psychological, including among others, the measurement of "satisfaction" itself, and other variables such as self-esteem, work motivation, monotony, stress, anxiety, depression, sense of participation; physiological, including detailed concerns about and measurement of cardiovascular, endocrine, visual, and other bodily functions; and organizational, including plans for worker ownership, representation in management, rearrangement of tasks or of work modules; and other physical changes to promote health, safety, recreational, and other benefits or amenities of the work place. Testing these variables separately, in combination, or as affecting worker satisfaction (which *has been* relatively successful), and *then* determining their

effect on productivity (which *has not*) is a most exacting scientific task, the difficulty of which is compounded further by differences among workers in their needs and wants in the work place. The task is hard even to begin with, given the problems of cooperation of management, unions, and workers themselves. It is a tribute to social scientists as well as management, unions, and workers that such efforts do go forward and produce beneficial results.

This is a vast and growing subject. Our brief discussion was mainly to point up the manifold dimensions of welfare outcomes, including objective and subjective measurements and their linkages with the national and time accounts. It would seem almost banal to conclude this discussion by insisting that the study of the relation between productivity, as customarily defined in a national accounting framework and welfare; e.g., worker satisfaction, requires that the two measures—efficiency of market output and worker welfare—be separately specified. It is much more important in such analysis to have an improved measure of productivity in the traditional sense than to combine such a measure with quality of work life into a single extended index.

VI. Concluding Question: Should There be a Prescribed List of Welfare Outcomes?

A system of economic and social information should not, in the view of this paper, be regimented to record and assess any fixed or prescribed set of desired outcomes. This is so for several reasons, not the least important of which is the obvious fact that what is desired or of general concern is continually changing.

No sooner did we set about improving our statistical systems for measuring economic growth, indeed even before we achieved a desired degree of success in this regard, concerns shifted to the dangers and inequities of economic growth. And as we set about trying to record the consequences of economic activity on different peoples' lives, aggregate economic concerns reintruded with great force, so that at this writing we find that social programs and environmental protection measures are in some degree taking second place to an anxiety about their costs because of a present overriding concern with inflation.

Even concern with the population explosion in some quarters gave way to concern about implosion—and there too, signs of a possible reversal of the decline in the birth rate seems to be appearing on the statistical horizon, at least in the United States.

Should all concerns today take a second place to concern with energy shortages? At this writing a serious economic recession seems imminent, further intensifying the reemerged concern with economic rather than social concerns.

Many would differ as to what concern to give priority to at any given time—and this is another reason for keeping a flexible view on what a system of information should point to in the way of "welfare outcomes". For some, crime, violence, and victimization are still overriding concerns. The explosive divorce rate in some countries and its impact on family values is considered a fundamental source of concern to some observers. The pervasiveness of drug addiction spreading even among elementary school children is viewed in many quarters with considerable alarm.

What priority should be given to correcting unjust inequities in economic and social opportunities, to improving the quality of life on the job, in the home, and so on?

Transcending any listing of concerns is the view of some that research on economic and social phenomena shouldn't emphasize welfare outcomes at all but be mainly oriented to recording and explicating economic and social structures and their changes.

In what we have discussed, we nevertheless give primacy to "welfare outcomes" as the final output of an information system. What choices, priorities, trade-offs are to be selected by society or by persons in different circumstances should not be prescribed from "above" and probably cannot ever be determined scientifically by a system of social and economic information. But the record and analysis of the interaction among activities, resources, and outcomes should be among the prime objectives of an information system. In this way the information strategy should aid policy makers in choosing between alternatives by indicating which outcomes are the more likely to arise, what costs are likely to be incurred, and how the burdens and benefits are likely to be distributed among the members of society.