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A Proposal for a System of Economic and Social Accounts

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IN recent years, the measurement of economic and social performance has been the topic of many conferences, governmental committees, and special studies. On the one hand, there has been a growing feeling that the national economic accounts are deficient in many dimensions, that the traditional concepts are inadequate for dealing with the types of economic and social problem with which we are now confronted, and that considerable extension of the accounts is required in order to make them relevant to today's problems. On the other hand, the relative success of national economic accounts in providing a framework for analysis of the behavior of the economic system has been held up as a model of the kind of systematic framework needed for noneconomic information about our society and it is argued that we should get on with the task of developing social indicators and social accounts independently of the economic accounts.

These two approaches to the development of social information are more closely related than might at first appear. It is now being realized that the extension of the economic accounts to make them more relevant cannot stop with the adjustment of the economic accounting framework to cover imputed transactions or social costs in the deterioration of the environment, and other monetary measures. The extended accounts must by their very nature grapple with the demographic and social characteristics of the population. Problems relating to health care, education, income of the aged, and discrimination require the introduction of nontransactions information rather than merely more comprehensive coverage of actual and imputed transactions. Furthermore,

those who are concerned with the development of social indicators and social accounts recognize the importance and relevance of related economic information. Thus, poverty as a social condition is directly related to income received. The level and change in government expenditures on education and health and the distribution of these benefits over the population are relevant to social as well as economic analysis. It thus becomes obvious that social accounts cannot be conceived of as sets of information distinct from the economic accounts, but must be highly intertwined with the economic accounts.

It is in this context then that we propose to examine current developments in economic and social measurement, and to propose an economic and social accounting system which can serve as a tool of both economic and social research and can provide the basis for monitoring the behavior of the social as well as the economic system.

CURRENT DEVELOPMENTS IN ECONOMIC AND SOCIAL MEASUREMENT

The Extension of Economic Accounts

During the past 35 years, national income measurement has developed from the estimation of a summary measure of the nation's income to a comprehensive reporting of the transaction flows among the different sectors of the economy. In this process, the economic constructs have themselves become broader. The framework has been expanded to take into account the role of government in the economy, and the concept of gross national product has replaced that of national income as the central measurement of the system. By and large, however, the present economic accounts record—and are intended to record—market transactions. The imputations which are made for nonmarket transactions such as owner-occupied housing, imputed interest, and produce grown and consumed on farms are relatively minor elements, introduced into the accounts for the sake of symmetry and completeness. Nonmarket activity, even when of a productive nature, has been largely disregarded. Kendrick [1] has challenged this basic procedure, and has made estimates which extend the accounts to include such things as the services of housewives, compensation for students, imputed rentals on capital goods held by households, institutions, and governments, and intangible investment including such things as education and training, research and development, and costs of rearing children. Such imputations, Kendrick maintains, are needed if we are to analyze the growth

which has taken place in a given economy, or compare the levels, structures, and rates of growth of different economies. The broader concept of economic production including nonmarket activity is needed, he argues, since the boundary between nonmarket and market activity changes with the development of society. Thus, if only market activities are taken into account the movement of women from housework into the labor force would overstate the amount of growth taking place. Conversely, an increase in the educational activity of a society would dampen its growth if students are removed from the labor force and their activities as students are not counted as having value.

Another study in extending the traditional economic accounts is being undertaken by Robert Eisner and his associates [2] in their estimation of nonincome income—i.e., transaction flows which individuals consider to be income, but which are not reflected in the present national accounts measures. One of the major elements on which Eisner is focusing is the income generated by changes in capital values. Capital gains provide a substantial amount of unearned income, but this is not included in either business or personal income in the national accounts. Any understanding of the income distribution or measurement of income inequality should take into account this major source of unearned income. In the business sector, Eisner focuses on the difference between the depreciation which is charged and the economic depreciation which actually takes place. Since it is of benefit for businessmen to charge off depreciation as fast as they are allowed to for tax purposes, the estimates in the national accounts are substantially higher than the economic depreciation which is taking place. Finally, Eisner, like Kendrick, is interested in measuring the contribution of consumer durables such as automobiles to the flow of services available in the economy. In principle, these extensions are very worthwhile indeed, and conceptually they can be introduced quite easily into a national economic accounting framework. Recently, we have proposed that the present U.S. national income accounts should be revised to recognize some of these imputations explicitly [3]. How far one wishes to go in the inclusion of nonmarket activity through imputed transactions depends in part on the degree of confidence one has in the possibility of valuing nonmarket activities.

It has been proposed by Thomas Juster [4] that the deterioration of the physical and social environment be measured and entered into the accounts to yield more significant measures of economic and social welfare. Logically this is an extension of the type of estimation under-

taken by Kendrick, but obtaining the type of information required to introduce meaningful valuations poses considerable problems. It remains to be seen how such measurements can be made.

However, even if such extensions of the macroeconomic accounts were successful and relatively complete, the resulting set of information would still fall short of what is required for a comprehensive economic and social accounting system. All of these proposed extensions rely upon stating everything in terms of dollar valuations, thus insisting that the transactions formulation appropriate to economic activity is the relevant one for all social and economic problems. This approach gives relatively little explicit consideration to social and demographic characteristics, or to differential behavior of different groups in society. Thus, questions of discrimination, provision of economic opportunity, crime, and health are left relatively untouched except insofar as they are reflected in the monetary estimation of social gain or loss.

The Development of Social Indicators

Concern with domestic social problems and social unrest in recent years has stimulated a widespread interest in social indicators among both academic social scientists and government statisticians. In the United States a plan was proposed to prepare a social report parallel to the Economic Report of the President, produced by the Council of Economic Advisers. For a number of reasons this publication did not materialize, but there is still in the planning stage a publication on social indicators intended to cover the fields of income distribution, employment, education, health, housing, public safety, and recreation and leisure. It is too early to say precisely what this publication will contain, but it is likely to be quite similar to *Social Trends* [5], published by the Central Statistical Office of the United Kingdom.

As Claus Moser of the CSO [6] points out, strictly speaking such collections of tables are social statistics, rather than social indicators; and there is, unfortunately, no clear indication in the literature as to precisely how the term "social indicators" should be defined. A number of characteristics have been suggested. Thus, for example, it is sometimes suggested that a social indicator should be a weighted composite index number—an aggregate of many subseries, much in the way the gross national product represents many different transactions flows. Others view social indicators as a normative concept, not dissimilar, perhaps to the sort of temperature-humidity comfort index used by weather forecasters—a measure that would reflect the quality of life. Still others

feel that social indicators should reflect the outputs of societies rather than merely the inputs in different social areas. Thus, for example, in the case of education and health services social indicators should evaluate the accomplishment, rather than merely show the resources utilized. Most of the discussion of social indicators assumes that they should be comprehensive in coverage, and to the extent that they are based upon partial information such partial information is considered to be a proxy for the more general concepts. Finally, those who are most concerned with social accounts would maintain that the social indicators must be part of a structure or system of social statistics, much in the same way that the economic constructs such as national income are an integral part of the structure of economic accounts.

Moser recognizes that at the present time social indicators and social accounts are not parallel with the economic indicators and economic accounts. He argues that economic accounts and indicators were developed in parallel, with feedback between the theory and the measurement resulting in the present close interconnection. In his view, the same process may be expected to evolve with social accounts and social indicators, and sociological theories about society relating to specific fields and sectors, occupational mobility, education, mental health, etc., can gradually be built up. Such theories would give insight into social change and suggest how to manipulate policy instruments for the improvement of social conditions.

It cannot be denied that the interaction between empirical research and the development of theory is important. However, it does not follow that such an interaction will lead naturally from social indicators to social accounts. Economic indicators were developed separately from the national economic accounts, and in fact had little if any impact upon them. Thus, freight car loadings, bank clearings, retail sales, pig iron production, cattle slaughtered, and electric power generated existed as time series data to indicate changes in specific kinds of economic activities long before the national economic accounts, or any of the national income aggregates, were developed, and they still exist today, in a form unrelated to the national economic accounts. The development of the national economic accounts reflected an attempt to generate a unified treatment of transactions flows in an accounting framework. The statistical work was greatly influenced by the Keynesian model, and the development of macroeconometric models was in turn greatly influenced by the statistical estimation processes. The economic constructs that emerged from this process were the product of both theo-

retical and empirical research, but they bore little or no relation to the pre-existing economic indicators. Unfortunately, most of the social indicators which have been suggested are more nearly parallel to the economic indicators than they are to the economic constructs of the national accounts. Like the economic indicators, their units of measure are widely different; some may be in tons, others in dollars, others in percentages. There does not seem to be at the present time any systematic set of indicators which are related to a formal underlying structure of social accounts.

Social Matrices as Social Accounts

Richard Stone has proposed an integrated system of demographic, manpower, and social statistics which can be linked with the national economic accounts [7]. The basic framework of the system consists of a standard matrix, the marginal vectors of which contain the opening and closing stocks, and the entries in which show the flows connecting them. For the purposes of analysis, Stone uses a life sequence approach, tracing changes of state from birth to death in different aspects of life. In particular, he concerns himself with education, employment, social mobility, health, delinquency, family relationships, and migration and tourism. The social matrix for a given sequence provides information on how a beginning population changes during a period and what its state is at the end of the period. Thus, for example, a social matrix concerned with education can show for each age group the educational status of individuals, how that status changes, and what the final result is at the end of the period. To a limited extent, additional characteristics can be entered into the table. For example, it is quite possible to provide additional information in a social matrix on education to take into consideration the effect of grades received by students on their progression through the educational system. Similarly, information can be entered on the socioeconomic background of individuals to see its effect on progression through the education matrix.

As Stone himself points out, however, there is a severe limitation on the number of variables and classifications which can conveniently be handled in a social matrix. If, for example, one wishes to study the interaction of 10 variables in a sociodemographic matrix, and each of these variables contains 10 classifications (both very small numbers to characterize the sociodemographic system), the number of cells in the matrix is 10^{10}, or 10 billion. Given the size of the populations of most

countries and the natural clusterings, most of these cells would of course be empty. Stone trims his problem down to manageable size by allowing variables to interact only on a pair-wise basis. This is, of course, a severe restriction for any multivariate analysis.

Integration of the social matrices with each other and with the national economic accounts is achieved by linkages through common classification systems or through subdivision of a total in one system in another system. Thus, the linkage between different tables may be quite close in some cases, where the elements of one matrix correspond quite closely to the elements in another matrix, and in other cases may be very loose, the two matrices merely dealing with the same population.

The matrix form for subsystems appeals to Stone in large degree because he conceives of his analytic models in terms of regular or absorbing Markov chains. In other words, he analyzes the change in the structure of a subsystem over time by applying transition coefficients to the various cells in the matrix. Subsystems which are linked but are not fully integrated with each other must be so drawn up that for most purposes they do not need to interact. As Stone suggests, it may be useful to combine a number of subsystems into a sequence: for instance, learning activities, earning activities, and inactivities can be combined to form an active sequence tracing human progression from birth through education and employment to retirement and finally death.

How well does such a statistical system meet the general needs for analyzing social and economic problems? The design of Stone's proposed integration of social and economic accounts is highly dependent on the uses to which the accounts are expected to be put. These uses in turn are a direct reflection of the context within which a particular analyst views the social and economic problems which confront a society. As social and economic problems shift or different analysts view these problems differently, the design of the statistical system will be affected. Different classifications, pair-wise subsystems, and linkages will be required. Just as no single set of cross tabulations of a census is satisfactory for all users, it is difficult to envisage a single system of economic and social matrices and submatrices which would meet the data requirements relevant to the wide range of existing social and economic problems. Movement toward any significant degree of generality would result in explosion of the matrix approach. In this sense, thus, Stone has not really provided a general solution for the integration of social and economic data, but rather a specific solution for a particular analytic use.

Balance Tables and Social Accounts

A somewhat related concept of social accounts utilizing balance tables has been suggested by Margaret Mod [8]. In her view, social accounts should be drawn up to cover such things as the level and distribution of the population's earnings and incomes, the level and pattern of the population's consumption, traditional social care, e.g., care for children, the aged, mothers, infants, and other forms of social security, health, education, the training of manpower, and housing conditions. In her view the system should be open-ended, to draw in other areas of special importance. The essential characteristic of the social accounts is that although they are still macro, they go deeper into detail than the national accounts in the same fields. Social accounts are thus more disaggregated than the national accounts according to object, purpose, institutional form, and strata of the population. Mod's social accounts, unlike Stone's social matrices, are not conceived as a technique of analyzing social change; rather they are more akin to Moser's social indicators which attempt to depict current social conditions. Unlike both Stone and Moser, however, Mod feels that there should be an underlying social statistical system of a micro nature containing detailed information on individuals and households. In such a context, of course, it becomes extremely debatable whether the macro social accounts or the micro statistical system is the basic element. On the one hand, the macro social accounts define the scope and elements of information required in the basic statistical system. On the other hand, the micro statistical system once defined would be capable of generating many different macro systems of aggregate accounts, and in a substantive sense is more basic and unchanging than the macro accounts. What Mod does point out is that some crystallization of the micro statistical system into an aggregated form is required if the basic information is to be applicable to the depiction of social circumstances.

Microdata Sets

In the early 1960s the Norwegian Central Bureau of Statistics initiated the development of a system of personal data files. In 1964 an identification number was assigned to each inhabitant covered by the 1960 population census, and the assignment of such numbers has been continuously maintained since 1964 as part of the current population registration. The number comprises eleven digits. The first six refer to date of birth, and the following three digits distinguish persons born on the same date and at the same time specify sex. The last two digits

are check digits. These personal identification numbers are used for almost all Norwegian statistical surveys and censuses of persons. In addition, the identification number system has been adopted by administrative agencies such as the tax authorities, national social insurance, health administration, school administration, the courts, etc. The existence of the personal identification number permits the linkage of individual records over time and from different sources.

The original impetus to the creation of the personal file system was the need to satisfy general and special requests for tailor-made statistics. By maintaining the original data in micro form, special tabulations could be made as needed. In particular, the need for regional information for such things as planning, communication, transportation, and pollution control required recasting the data in different forms and the flexibility of the files of individual data meant that these needs could be met. By accumulating information for the same individual over time, longitudinal studies were made possible. The main application to date has been in the estimation of the structure of demographic models. Given the development of a personal data file system, Aukrust and Nordbotten [9] point out that it can be useful for the development of socio-demographic models in a wide variety of fields, such as demography, economics, education, labor relations, social medicine, consumer behavior, criminology, election research, economic geography, etc. In other words, a single general file containing information on individuals and households can be used for a wide variety of problems. As hospital files, social security files, and criminal records, as well as specialized statistical surveys are folded into the information base, more and more types of information become available.

Given such a microdata base, it would always be possible to generate the social matrices suggested by Richard Stone. Conversely, however, given Stone's social matrices it would not be possible to generate the microdata base which underlay it. Stone [10] recognizes that if a continuously updated comprehensive system of individualized data were available, his social matrices and the necessity for dividing life into sequences and the subsequent restrictions they impose would be irrelevant. In terms of practical reality Stone argues, however, that most countries are a long way from such a system, and any system of this type would be expensive, technically difficult, and not without its political dangers.

At first blush, this line of reasoning is very persuasive. In a country such as the United States, with a population of over 200 million, the

maintenance of individualized files for every aspect of an individual's life is not a practical alternative. The cost of developing and maintaining such a system would be very substantial, and the technical problems of getting cooperation and coordination from all of the statistical agencies and administrative organizations in a highly decentralized statistical system are formidable. The fact that many of the statistics in large countries are based upon sample data would further reduce the value of linking information for the same individual, since in most cases different individuals are covered by different samples, and thus the information contained in the different samples cannot be directly linked through personal file identifiers. Finally, the privacy issue which Stone implicitly raises is already a major difficulty, and would surely in the case of the United States make the development of a personal file system politically unattainable.

The impracticability of a comprehensive personal file system for large countries does not, however, vitiate the usefulness of microdata sets per se for analytic uses. In any specific area, it is possible to use an appropriate sample of data precisely as Aukrust and Nordbotten propose to use the Norwegian personal file system. Sampling theory permits the use of relatively small bodies of information to achieve the same analytic results as would be obtained using complete sets. Besides reducing costs, furthermore, sampling can be used to solve the privacy question, since identification of specific individuals can generally be omitted from the sampling records.

Using different samples which were developed for different purposes does have the disadvantage that, unlike the personal file system, information for a specific individual from different sources and time periods cannot be brought together. There are, however, techniques for getting around this problem. Where there is a substantial overlap of the same type of information in different samples, a synthetic matching of data can be carried out, in which the data for individuals from one sample are imputed to similar individuals in a second sample, upon the basis of relationships observed in the first sample. Generally speaking such imputation should be done on a stochastic basis, so that the means and variances of the imputed information will match those in the original data. What is in effect being done by such a procedure is to map information from one sample onto the data of another sample to derive a new synthetic data set that is a union of the information in the two original samples, in such a way that the resulting data set will have the same statistical characteristics as each sample independently.

The development of synthetic data sets will often be difficult, since the information reported in different samples will be different and inconsistent. Decisions will then have to be made about which information should dominate under what conditions in the new synthetic data set. But such problems are not new to national accountants. In making estimates for various segments and components of the national accounts, a variety of different sources are used. Many sources conflict with each other, and the task of the national accountant to a major extent is that of resolving the inconsistencies in the sources and integrating the information into a single consistent set of figures.

The major question which needs to be faced is not whether a complete personal file system is desirable or feasible, but whether microdata sets can provide the necessary conceptual and analytical basis for a system of social and economic accounts. As already suggested, unless it is possible to link the basic social information with the economic information in the context of the economic system as a whole, the objective of developing a satisfactory framework for the study of economic and social problems will not be met, and we may be forced to continue to use a separate system of national economic accounts, ad hoc social indicators, cross tabulations of data, Stone social matrices, and various kinds of unrelated microdata sets. This then is the question we try to examine.

A PROPOSAL FOR A SYSTEM OF ECONOMIC AND SOCIAL ACCOUNTS

In the evolution of national economic accounting, there has always been an implicit recognition that the macroeconomic accounts were an aggregation of the income accounts of decision-making units in the economy. The national income originating in the enterprise sector was conceived of as an aggregate of the wages, salaries, dividends, and profits recorded in the income statement for each enterprise. Personal income reflected income received by households, and thus included not only the wages, salaries, and dividends received, but also the transfer payments such as social security benefits, welfare, veterans benefits, etc., which the household received. Thus, each sector viewed income as it appeared in terms of the accounts of its own decision-making units.

Although conceptually the national economic accounts reflect this view of the accounts of enterprises and households, they traditionally have been more concerned with the development of the economic constructs rather than with providing systematic accounts for the differ-

ent sectors of the economy. Thus, for instance there is no explicit enterprise sector in the present form of the U.S. accounts. The information for the enterprise sector is contained in the national income and product account, along with information for other sectors. The personal income account, while largely composed of information relating to individual households, also contains the income and outlay of nonprofit institutions. The government sector is perhaps the only sector in which the accounts do actually reflect the income and outlay recorded for the different levels of government.

The explicit recognition of enterprises, households, and government as decision-making units with income accounts and saving and investment accounts would not require major changes in the form of the national economic accounts. An outline of a set of national income accounts which present sector accounts and provide some of the extensions proposed by Kendrick and others is shown in the appendix to this paper. What is involved in these accounts is the setting up of an income and outlay account for the enterprise sector, the transfer of nonprofit institutions from the household sector to this new enterprise sector, and the provision of saving and investment accounts for each sector.

The reorganization of the national economic accounts along these lines permits the development of a new type of information base. Once it is recognized that an account for a sector represents an aggregation of the accounts for reporting units composing that sector, it is possible to focus attention on the individual reporting unit. At the level of the individual reporting unit, new types of information can be introduced. Thus, for a given household, demographic information on the age, race, and sex of each of the members of the family, together with social information such as education, occupation, health, place of residence, and place of work can all be recorded, as well as the economic information on the household's income and expenditures and their assets and liabilities. Although it is true that the economic accounts of the household sector aggregate only the transactions information, the nontransactions information is not irrelevant for analytic purposes, and can be used in conjunction with the economic information in a variety of ways. If the social and demographic information described above were available for each household in the nation, it would be possible, for example, to obtain distributions of income by size for specific socioeconomic groups. Thus, the differential in income by race and age could be studied for different regions of the country. Such an analysis requires the integration of economic and social data and is capable of producing information of an

aggregated nature which is directly pertinent to the problem of racial discrimination.

As was pointed out in the discussion of personal files, it would, of course, not be possible to obtain an income statement and balance sheet, together with a rather complete set of demographic and social information, for every household in the nation. The size of the data set would be appallingly large. However, the same analytic results can be achieved with a sample of households rather than complete coverage. If the sample is sufficiently large and representative, analyses performed on it will give approximately the same results as would analyses with the full set of all households. What is in fact being proposed is that the economic and social accountant develop a microdata set of households which when appropriately weighted will generate the accounts for the household sector of the national economic accounts and at the same time will have attached to each household unit in the microdata set the important demographic and social characteristics that are needed for social accounts. The microdata set for households thus would become the basic statistical system underlying the national economic accounts, and would permit the utilization of interrelated demographic and social information for households.

For the enterprise sector, many different kinds of enterprises need to be recognized. Corporations, noncorporate farm and nonfarm enterprises, government enterprises, and nonprofit institutions all play a very different role in the producing sector. Yet they all have income statements and balance sheets, together with other characteristics such as industry, location, ownership characteristics, kind of production facility, etc. One level of disaggregation below the enterprise also needs to be recognized. Many enterprises have more than one establishment, and the operating statements for each establishment should be an integral part of the microdata set underlying the enterprise sector. This data structure is well recognized in the *Annual Survey of Manufactures,* for example, where operating information is collected for each establishment, each establishment is linked with the enterprise owning it, and headquarters information is provided for each enterprise. Although in the case of enterprises social information is considerably less important than for households, there are questions of pollution and environment to be considered, and to the extent that information can be obtained on the nature and characteristics of the labor force of different enterprises or establishments, such questions as discrimination could be analyzed. Much of the benefit of having microdata available at the

establishment level, however, would lie in the economic, rather than social, analysis which could be carried out. For example, the analysis of prices, costs, and productivity at the establishment level can provide considerable insight into the mechanism of inflation and growth. Establishment and enterprise microdata can also provide the basis for the study of mergers and industrial concentration.

Regional Information

The need for regional information is increasing substantially with the growth of governments' concern with economic and social conditions within specific regional areas and the need for administration of economic and social policy affecting these areas. Unfortunately, there is no single system of regional classification that can satisfy all users. For a great many problems, the definition of a regional unit must depend upon economic, demographic, social, or environmental criteria. The Standard Metropolitan Statistical Area (SMSA), used for much of the federal statistical system, is based on density and population size. But in many cases more homogeneous groupings are needed. Thus, for example, a Standard Metropolitan Area may contain both high income areas and low income areas. The latter might be eligible for federal assistance programs if it were independently defined, but cannot receive aid when it is averaged with a high income area. In other cases, broader areas are required. Thus, a river basin which is being considered for economic development must encompass a broader area, based on geographical proximity. Market areas are still another regional grouping desired by business groups interested in the establishment of plants or retail outlets. Those in charge of administering political units such as school districts, cities, and states, need yet different sets of regional information. They are properly concerned with knowing the economic and social characteristics of their constituencies so that they can make realistic budget estimates and evaluate the impact of their policies.

This substantial and highly diverse demand for different kinds of regional information can only be met if it is possible to generate the large variety of regional information needed through different aggregations drawn from a detailed data base. At the level of the individual reporting unit, address information provides the basis for geocoding systems which can map individual data into any desired regional boundaries. Both the U.S. and Canadian governments have been preparing such geocoding systems, but even without such sophisticated codes the zip codes contained in addresses provide an extremely useful basis for lo-

cational aggregation. If adequate microdata sets exist for households, enterprises, establishments and governmental units, each of which is geographically located, it would be possible to develop any required regional aggregations. The microdata sets required to yield satisfactory regional information will need to be very much larger than what would be needed on a purely national level. Nevertheless, given the capabilities of modern computers and the kind of information available, this locational dimension is feasible. Furthermore, the kinds of problem with which we are faced demand such information. Certainly problems relating to environment and pollution cannot be considered except in terms of their regional dimension. But similarly the wide difference in the economic and social condition of the population in different regions has important consequences for the governmental activity needed. The adequacy of schools, the availability of employment, health, the condition of housing, and crime all have important regional and locational dimensions which need to be considered.

THE DEVELOPMENT OF SYNTHETIC MICRODATA SETS FOR ECONOMIC AND SOCIAL ACCOUNTS

The development of synthetic microdata sets has already been undertaken by a number of different research workers independently. The impetus to such developments has arisen usually because of the inadequacy of existing aggregated data for a specific problem in which the researcher was involved. Although this type of research is still in its early stages, there has been sufficient experience and research output to indicate the basic methodology involved and the potentiality of the data files for analyzing economic and social problems.

Data Files of the Household Sector

The Office of Business Economics of the Department of Commerce is now engaged in creating a microdata file for the household sector of the national accounts, specifically designed for estimating the size distribution of income. Edward C. Budd [11] has reported on the progress of this work, and described in some detail the technique used to create a synthetic microdata set for the household sector. The project was undertaken because the methodology previously used for estimating the size distribution of family personal income could not provide the kind of social and demographic breakdowns needed for the evaluation of economic and social policy. The old methodology relied upon published tabulations and cross tabulations of different kinds of information from

a large variety of sources. Further disaggregation or alternative breakdowns were not possible, given the basic data. The decision to develop a synthetic microdata set for households stemmed from the realization that such a data set once created could be used to provide any desired form of income distribution. Four basic sets of microdata files were used. These were the March 1965 Current Population Survey, the 1964 Sample of Personal Income Tax Returns, the 1962 Federal Reserve Board Survey of Financial Characteristics of Consumers, and the Internal Revenue Service Audit Study for 1963. The first step in the process was to match statistically, record by record, information for similar households in the Current Population Survey and the sample of personal income tax records. Corrections were made to this file using the IRS audit file. After this, the merged file was matched, record by record, with the FRB Survey of Financial Characteristics. At various stages in the process, comparisons with the national income control totals were made, so that the degree of underreporting or other biases could be estimated. The need for corrections to insure consistency between the macro and micro data does not, of course, always mean that the error is in the micro file. In some instances the development of the microdata sets may well lead to an improvement in the aggregate figures.

A similar effort in creating a microdata set for households has been undertaken by Benjamin Okner [12] of Brookings, in order to obtain an improved data base for the Brookings Tax Model. The original Brookings Tax Model had used a microdata set of personal income tax returns, but this of course contained only households that file tax returns, and the omission of data for people not required to file distorts the distribution at the low end of the income scale. In 1967, the Office of Economic Opportunity conducted through the U.S. Bureau of the Census a sample survey of 30,000 households with income information for the year 1966 and supplemental financial and demographic data. Okner used this sample as a frame, and constructed a new merged data file adding information on individual tax returns from the 1966 tax file for 87,000 individuals. The first step in the process was to analyze the SEO (Survey of Economic Opportunity) file to determine the characteristics of the household which could be used as a basis for selecting an actual return from the tax file to link with an individual in the SEO family. The characteristics which were used were (1) the marital status under which the return was filed, (2) whether the head or spouse of the tax unit was 65 or over, (3) the number of dependent exemptions in the unit, and (4) the reported pattern of income. In almost all cases

the actual selection of a tax file return was done by the computer using tightly prescribed rules for defining an acceptable match. The resulting merged data file thus provided each SEO household with an income tax return which was consistent with the data in the SEO file about that household. Furthermore, since the tax returns were selected from the actual tax file, the new merged file contained all the information in the original tax file, except that the sampling frame of the SEO file was accepted instead of that of the original tax file.

Although both the OBE and the Brookings microdata sets for households have emphasized the income dimension, they were both created because of the need to link the income of the household to its other social and demographic characteristics. They represent attempts to switch from an income classification of reporting units to a demographic classification. The principles involved in the creation of these synthetic data sets can equally well be applied to other bodies of information about households. Data on the spending patterns of households contained in the Survey of Consumer Expenditures collected by the Bureau of Labor Statistics are prime candidates for integration into the microdata set for households. On a more regular basis, the monthly Current Population Survey collected by the Bureau of the Census can provide current updating of information on households at the microdata level. These samples are an extremely valuable statistical source of information on what has taken place in the immediately past period. Over the longer term, matched sets of data in the Social Security files contain information on the mobility of individuals in terms of both residence and employment, together with changes in wages. Recently, in order to obtain a longer longitudinal perspective, the Office of Economic Opportunity has initiated a special panel survey which reports exhaustively on a sample of 5,000 households over a period of five years.

The increasing demand for microdata files for individuals and households has been explicitly recognized by the Bureau of the Census in connection with the 1970 census. The Census Bureau is making available a series of six Public Use Samples, each containing individual records for 2 million people (a 1 in 100 sample). In order to prevent disclosure, different kinds of information have been suppressed in the different samples, since obviously if the exact address and full set of family characteristics were given for a household its identification would be complete. Such comprehensive samples of the population, however, provide the necessary basis for establishing microdata sets on individuals and households in 1970.

Since in the United States different samples of households do not contain the same individuals, synthetic matching must be the general practice. As already noted, this procedure avoids the question of privacy of the household, since by definition the synthetically matched records do not refer to any actual household. The major question which remains, however, is whether microdata sets derived by synthetic matching will be satisfactory for the analytic uses for which they are designed.

Synthetic matching is essentially imputation, and the validity of imputation depends on how the imputed information is related to information already known about a particular case. If there is no relation between the information which is being imputed and the known characteristics of the individual, a stochastic imputation which relates information from two files on a random basis would be satisfactory in the sense that the means and variances of the imputed information would correspond to those of the original files, and the lack of correlation among the various characteristics would be preserved. For most characteristics, however, there are major interrelationships which must be preserved in the imputation process. Thus, in the Brookings and OBE studies, the income and family composition information contained in the one file had to be closely matched with income and dependency information in the second file. To disregard these common elements of information would do violence to the matching procedure. Thus, overlapping relevant characteristics between files are needed to insure valid imputation. Where these are lacking there may be no adequate basis for merging the files. The problem of determining what information is relevant, i.e., how specific information in one file is correlated with information in another file, may not be soluble solely on the basis of internal evidence in the files themselves. In such cases separate studies can be developed to provide such linkages. At the present time the federal government has under way a special link project that is attempting for a given sample to match identical individuals in tax data, social security data, and census data. Such exact matching projects can serve as a basis for synthetically matching data from these three files. In other cases, it may be necessary to collect a special sample which does cover for each observation in the sample all the items of information contained in the various files to be merged.

Data Files for Enterprises and Establishments

With respect to the enterprise sector, the situation is somewhat paradoxical. On the one hand, large corporate enterprises are required to file

public reports relating to their income and balance sheets, and this information is made available to the public as part of the services of the Securities and Exchange Commission. On the other hand, Census data relating to enterprises and establishments is considered extremely confidential, and is not available either to the general public or to the rest of the government except in a tabulated form which does not divulge identifiable information on any single establishment or enterprise. Nevertheless, within the Census Bureau the potentiality for creating extremely useful microdata sets on establishments exists, and some work has been done in this area.

As part of the Census monograph program, research workers have been allowed to analyze the basic census records. In this connection, a microdata set of the manufacturing establishments covered by the *Annual Survey of Manufactures* was created which showed their year by year change over an extended period [13]. Because the data are available at the individual establishment level, it has been possible to compute for each individual establishment the changes in real value added, deflating both inputs and outputs, to analyze such factors as productivity and price-cost behavior, in relation to other factors during various periods of inflation and recession. The technical problems caused by changes in the computers and procedures used by the Bureau of the Census, and the need to insure confidentiality throughout the entire project have caused this type of research to go very slowly indeed. However, other studies involving the analysis of industrial concentration, regional and industry growth, mergers, and research and development have all made good use of the microdata files available in the Bureau of the Census.

There are in addition related files on enterprises and establishments in other government agencies. The Bureau of Labor Statistics, the Internal Revenue Service, the Federal Trade Commission, and the Federal Reserve Board all have extremely valuable sets of information. Although some exact matching of these files has been done, for example the Internal Revenue files with Bureau of the Census files, for the most part these sets of data remain unrelated.

In addition to the data held by the government, there are private sources of microdata files. The Compustat tapes of Standard Statistics Corporation embody much of the income statement and balance sheet information filed with the SEC, in addition to other related data. These files provide quarterly information for each major corporation going back as far as 1948. Dun and Bradstreet provides credit and other information on individual establishments, and links these individual establishments

with their parent firms. The Compustat tapes have furnished corporate data for many Ph.D. dissertations and some use has also been made of establishment data from various sources. For example, Robert Leone [14] of the NBER has studied the mobility of manufacturing establishments in the New York area, and Charles Berry [15] has studied the changing composition of firms and establishments (birth, death, merger, etc.) based on a Fortune sample. Michael Gort [16] is studying diversification and integration using both firm and establishment data.

All this activity suggests a need for bringing together known public information about individual firms and establishments. This process will be facilitated by the government's proposed register of firms and establishments. This register presumably will be comprehensive, and will indicate the name, location, and type of activity of each firm and establishment in the economy.

Other Bodies of Microdata

Various other major sets of microdata exist. Some of these fit directly into the national economic accounts, and others form special subsets delineating areas of special interest for social and economic policy. The Census of Governments contains information on the budgets and activities of state and local governments. This is a substantial microdata set, involving over 80,000 governmental units, as well as reports on other specific groups in the fields of health and education. Institutions of higher learning, hospitals, and medical programs, both public and private, generate large bodies of microdata. Some of these sets of data relate to the institutions that enter the national economic accounts as enterprises or government units; others relate to individual households. Finally, there are large bodies of data which relate to international trade and the balance of payments. While these data even at their most disaggregated level usually do not refer to decision-making units and do not constitute microdata sets in the same sense, the highly detailed information on imports and exports by commodity and country collected by the United Nations represents a valuable body of highly detailed information.

Implementation of Integrated Economic and Social Accounts

The task of implementing an integrated system of economic and social accounts cannot be left to individual research workers. To do so would mean leaving major statistical gaps because of limited resources, and continuation of the fragmentation that characterizes much of the present situation in the area of social information. What is needed is the

same sort of development that occurred with the macroeconomic accounts. Although the national income estimates were initially developed by private researchers, the federal government has assumed full responsibility for implementing the national economic accounts and keeping them up to date. It was not until this happened that the comprehensive accounting framework was devised, and over time, the quality and the amount of information provided by the national economic accounts has increased substantially. It would indeed be unthinkable to turn the task back to private organizations.

If the government is to undertake the responsibility for developing and maintaining an integrated system of economic and social accounts, however, several major changes will need to be made. First, the macroeconomic framework will have to be modified to be consistent with synthetic microdata sets for households, enterprises, and other units. This would be quite possible without significantly disrupting the present national economic accounts or other types of macro information. Second, the government must be empowered to use its own information for statistical purposes. The present decentralized federal statistical system makes the creation of synthetic data sets difficult, since the different agencies responsible for different portions of the data guard their own portions zealously on the ground of preserving confidentiality and privacy. It is highly debatable whether any minor modification in the present organization of the statistical system will be sufficient to achieve the needed access to information. Nevertheless, even within the bounds of the present situation much could be done, if modest cooperation could be obtained among the Bureau of the Census, the Office of Business Economics, the Bureau of Labor Statistics, the Social Security Administration, and the Internal Revenue Service. In other countries, where central statistical offices exist, progress is being made in unifying the statistical system in terms of economic and social data.

The privacy question with respect to household information can be handled by the development of synthetic data sets. In other areas where disclosure is a problem, e.g., establishment and enterprise data, other techniques may have to be used to provide access to important microdata sets and at the same time preserve confidentiality. One promising approach has been suggested by both the Bureau of the Census and the Social Security Administration. Once the basic microdata files containing confidential information are created within the appropriate government agency, test samples with dummy information having statistical characteristics similar to the actual data could be provided to users, so that they

could develop and test computer programs which could then be run on the actual files. The agency would undertake to run the programs for the private researcher, and give him the results after examining them for disclosure. For many types of research, this would give the individual researcher access to information sufficient to test hypotheses or to carry out simulations. This does, of course, presuppose that the microdata set exists in clean, consistent, and edited form, and that the computer facilities in the federal government can be made available to private users on a reasonable basis with respect to both timing and cost.

Although the discussion of implementation so far has been in terms of the accounts for the United States, the proposed system of economic and social accounts utilizing synthetic microdata sets is, of course, relevant to other countries as well. The acceptance of such a system does imply, however, that central statistical offices must change their approach to place primary emphasis on maintaining in usable machine readable form the micro information which they receive on households and enterprises. As has been noted, the Norwegian Central Statistical Office has already taken this view in the development of their statistical file system for individuals. Ivan Fellegi and Simon Goldberg [17] of Statistics Canada have recognized that the storage of the most detailed microdata provides a capacity for retrieval of an almost infinite variety of unanticipated cross-classifications and aggregations consistent with confidentiality requirements, and consequently they recommend basing the development of the nation's statistical system on microdata. Within the confidentiality restriction, they also recognize the value of record linkage, and are interested in experimenting with "pseudo-linkage" of different microdata sets. This view of the statistical data base is in contrast with the older approach taken in many statistical offices that certain designated cross-tabulations of data constitute the primary basis of the statistical system.

The development and use of microdata depends upon the existence of a computer which makes the storage and processing of large amounts of data feasible. Even with punched card technology, the retention and use of large bodies of data were not feasible due to the cost of storage and handling. Cross-tabulation and aggregation were necessary to reduce the data to a manageable form.

The proposed system of economic and social accounts is not solely pertinent to those highly industrial countries that already have extensive statistical systems. Even in countries with large nonmarket sectors and inadequate statistical coverage, using microdata sets to develop economic and social accounts is a valid technique. Almost every country in the

world now has computers available to it, and it is of benefit to use the computer to handle those areas of government activity which involve substantial data processing. Thus, tax returns, social security records, census records, and foreign trade statistics will be among the first records to be computerized. In addition, sample surveys of consumer budgets, agricultural production, and unemployment may be made from time to time. Given these kinds of information there is considerable value in creating and maintaining microdata sets in machine readable form. With such sets of microdata available, it becomes more feasible to create satisfactory macroeconomic accounts for the nation, and at the same time to relate these economic accounts to important demographic and social data.

IMPLICATIONS OF THE SYSTEM FOR ECONOMIC AND SOCIAL RESEARCH

It is quite reasonable to ask how the proposed system of economic and social accounts can be used. This sort of question has been a constant embarrassment to national economic accountants with respect to national economic accounts. Unfortunately, there is no magic process by which a given set of information can be used to produce answers to major problems. While it is true that macroeconometric models abound which make use of the information in the national economic accounts, few national economic accountants would wish to claim that this use is the major justification for the existence of national accounts. The record of success in this area has been too slim to justify the tremendous expenditure on the development of the basic data. Instead, the ultimate justification is that the national economic accounts provide a systematic record of what takes place in the economy in much the same way as records for the firm indicate what is happening within the firm, and although there is no magic way of processing business accounts to forecast the future of the firm or to automatically provide solutions to all of the firm's problems, the information in the accounts is essential to the operation of the business.

It is not enough, however, merely to state that the system of economic and social accounts provides comprehensive and systematic information on the operation of the economy and the society. One wishes to know just what fruits can be expected from the new type of information which were not available heretofore. For this purpose, it will be useful to look at some of the studies which have already been mentioned to see precisely what they have produced or can be expected to yield.

The work on the distribution of income being carried out by the Office of Business Economics will when completed provide extremely valuable information on the distribution of income for different demographic and social groups. Although Roosevelt's one-third of a nation was a dramatic and politically satisfying social indicator, a much clearer delineation of the nature of poverty and the injustice of inequality is needed for the development of social policy designed to change these conditions. We have fragmentary evidence from tax returns, from poverty samples, and from census data about different aspects of the distribution of income, but these different sets of information have not been successfully brought together and matched against the control totals for the nation as a whole. Until this is done, considerable confusion will exist as to what the situation actually is since we will be able to get different answers from what appear to be contradictory sets of information, and thus will be unable to resolve the central questions regarding poverty and inequality.

The Brookings Tax Model has already proven itself to be of major value. The Internal Revenue Service now uses a related tax model to determine the impact of changes in the tax laws and the effect of different economic conditions on tax payments. The recent merging of nontaxpayers into the tax file will greatly improve the usefulness of the model for examining broader changes in the tax law [18].

A related use of microdata sets for evaluating transfer income programs was undertaken by the Commission on Income Maintenance Programs, and this work is being further extended at the Urban Institute by Nelson McClung [19] and his associates. Much of the work on evaluating transfer incomes has been done on the samples derived from the Survey of Economic Opportunity, but this work is now being extended through the use of Current Population Survey files, National Health Interview Surveys, personal income tax returns, Federal estate tax returns, and longitudinal panel surveys. The purpose of these studies is to determine how different transfer income proposals would work out both in terms of the people they would benefit and the costs they would entail. The technique used is simulation, in which each individual case is examined in terms of the criteria of the proposal which is being evaluated. This sort of research is extremely valuable in enabling the policy maker to compare the costs and benefits of different proposals. Although past results have been very useful indeed, a considerable improvement can be expected in the future as the data base expands and the sophistication of the simulation models increases.

A somewhat related area of concern is the simulation of social security systems and the projection of the distribution of income of the aged. James Schulz of Brandeis University has undertaken research in this area in conjunction with the Social Security Administration. Schulz's initial models [20] were concerned with aging the population in 1960 to the year 1980, and examining the implications of present private pensions combined with the social security system in relation to the distribution of income of the aged in 1980. Schulz was particularly interested in how changes in vesting of pensions and in provisions of the social security law would affect the income distribution twenty years hence. More recently, Schulz has used his basic model to compare the performance of different social security systems [21], specifically the West German and Swedish, to indicate for the same population how these systems would perform relative to the U.S. system. Such analyses as these are very useful in trying to evaluate how substantially different social security systems compare with one another under ceteris paribus assumptions.

A more ambitious general purpose microanalytic simulation is being undertaken by Guy Orcutt [22] and his associates at the Urban Institute. This model is more comprehensive and exhaustive than anything undertaken previously. The basic information is a microdata set of households, but considerable attention is focused on the demographic aspects of the household, i.e., birth, family formation, marriage, divorce, intergenerational transfers, and death. Furthermore, the micro model is being embedded in an auxiliary macro model concerned with such things as aggregate unemployment rates, changes in price levels, and growth rates. Unlike the analyses discussed above, Orcutt's microanalytic model is conceived of as a general economic tool which can be used for a wide variety of purposes, both for simulating the effect of economic policy and for analyzing economic and social conditions. This work is a logical extension of the development of an integrated economic and social accounting system.

The Role of the Computer in Economic and Social Research

The need for computers in the creation of the microdata base has already been discussed. It is equally true that the use of the data base for economic and social research would not be possible without the advances which have been made in computer technology. The simulations described above require substantial data processing and computing capacity. The increase in the power of computers and the sharp decline in computational costs are having a major impact on economic and social

research. Unfortunately, these changes are so recent that research methodology has not had time to adapt to them fully. Most graduate students in the major universities have some programming experience, but it is still true that a predominant number rely solely on regression packages and time series analysis of aggregated data to carry out their research. The increasing availability of microdata sets within the past few years coupled with the improvement in computers, however, is having a major influence, and new Ph.D. theses are increasingly using microanalytic models and simulation techniques.

The Function of Social Indicators

The discussion in this paper has concentrated for the most part on the macroeconomic accounting system and its relation to microdata sets containing both economic and social data. Little has been said about the place of social indicators in the system. Unfortunately, no one to date has devised a convincing set of social indicators which has a formal, cohesive structure.

The discussion of social indicators in the first part of this paper pointed up the unsatisfactory nature of ad hoc and conceptually unrelated social indicators. Nevertheless, social indicators of some sort are very much needed. Information in highly disaggregated form such as microdata sets is of little direct use to the policy maker without the intermediation of the research worker. The solution to this problem is to develop macro social indicators which are systematically based on aggregation of the data in the microdata sets of the economic and social accounts. Such social indicators need to do more than present a summary of the raw information; they must also provide a context for the information. Thus, for example, with regard to poverty, the percentage of poverty households in different cities or regions, or in terms of different races, can show the relative importance of the problem in different situations. Similarly, changes over time in poverty can show whether poverty is being successfully reduced in different places or among different groups. Most of such social indicators will not have the kind of short run interest which economic indicators possess. Monthly and quarterly economic data are needed because economic fluctuations can be significant in the short run. Social indicators, on the other hand, tend for the most part to reflect structural conditions in the society, and usually cannot be expected to show significant month to month change. But their breakdown in terms of regions and demographic and social groups is substantially more important.

In summary, it is useful to view social indicators as derived from the economic and social accounts. To the extent that there is a macro structure among the social indicators, it will exist mainly because different social indicators are based on the same or related microdata sets, and thus are consistent with each other. Social indicators will also have a role in shaping the content of the economic and social accounts. The need for specific macro social indicators will logically lead to the inclusion of the relevant information in the microdata base. Conversely, the availability of specific microdata can suggest types of social indicators which might otherwise not be thought of. In this manner the joint evolution of social indicators and of economic and social accounts can take place and provide for monitoring the society and carrying out basic research on economic and social problems.

APPENDIX: THE PROPOSED NATIONAL ECONOMIC ACCOUNTS FOR THE UNITED STATES, 1966

TABLE 1

The Proposed System: National Income and Product Account for the US, 1966
(billions of dollars)

INCOME ORIGINATING		FINAL EXPENDITURES	
1.1 Enterprise Sector	529.0	1.13 Consumption	590.0
a. Employee compensation	359.1	a. Households	435.7
b. Self-employed compensation	40.0	1. Market	339.4
c. Imputed interest on plant and equipment	50.0	2. Nonmarket	96.3
d. Net operating surplus	79.9	b. Government	125.1
		1. Market	73.1
1.2 Government Sector	92.6	2. Nonmarket	52.0
a. Employee compensation	76.6	c. Enterprises	29.2
b. Imputed income from development and durables	16.0	1.14 Gross Capital Formation	308.2
		a. Households	100.2
1.3 Household Sector	38.4	1. Development	12.7
a. Nonmarket production	.9	2. Housing	17.2
b. Imputed income from development and durables	37.5	3. Other durables	70.3
		b. Government	81.2
1.4 National Income	660.0	1. Development	40.0
		2. Structures	24.2
1.5 Capital Consumption	165.5	3. Other durables	17.0
a. Depreciation	122.5	c. Enterprises	126.8
1. Enterprises	55.6	1. Development	26.0
2. Government	16.0	2. Structures	35.1
3. Households	50.9	3. Other durables	52.3
b. Amortization	43.0	4. Change in inventories	13.4
1. Enterprises	16.0		
2. Government	20.0	1.15 Exports	37.3
3. Households	7.0	1.16 *Minus:* Imports	36.4
1.6 Gross National Product at Factor Cost	825.5	1.17 Gross Domestic Product at Market Prices	899.1
1.7 Business Transfers	2.7	1.18 Factor Income From Abroad	5.7
1.8 Business Consumption	18.0	1.19 *Minus:* Factor Income Sent Abroad	1.5
1.9 Indirect Taxes	65.1		
1.10 *Minus:* Subsidies	5.4		
1.11 Statistical Discrepancy	−2.6		
1.12 GROSS NATIONAL PRODUCT AT MARKET PRICES	903.3	1.20 GROSS NATIONAL PRODUCT AT MARKET PRICES	903.3

TABLE 2a

The Proposed System: Enterprise Income and Outlay Account for the US, 1966
(billions of dollars)

2.1	Enterprise Consumption	29.2	2.6	Enterprise Income	529.0
	a. Business consumption	18.7		a. Corporate	360.4
	1. Mass media support	13.0		1. Employee compensation	275.9
	2. Provision of consumption goods	5.7		2. Net interest paid	−2.4
	b. Nonprofit consumption	10.5		3. Imputed interest on corporate net assets	40.0
	1. Religious	5.0		4. Corporate net profits	46.8
	2. Health, education, welfare	3.5		b. Noncorporate	139.2
	3. Other	2.0		1. Employee compensation	59.2
2.2	Payments to Households	489.3		2. Net interest paid	11.2
	a. Employee compensation	359.1		3. Self-employed compensation	40.0
	b. Interest paid	40.9		4. Imputed interest on noncorporate net assets	15.0
	c. Dividends	20.5		5. Noncorporate net profits	13.8
	Plus: (d + e)			c. Government enterprises	11.3
	d. Proprietor and rental income	79.1		1. Employee compensation	8.0
	e. Adjustments	−10.3		2. Surplus	3.3
	Or *plus:* (f + g + h)			d. Nonprofit institutions	14.0
	f. Self-employed compensation	40.0		1. Employee compensation	16.0
	g. Imputed interest on noncorporate assets	15.0		2. Net interest paid	−2.0
	h. Net noncorporate profits	13.8		e. Rest of the world	4.2
2.3	Direct Taxes and Other Payments	41.8		1. Corporate profits	3.3
	a. Corporate profits tax	34.5		2. Net interest	.9
	b. Government enterprise surplus	3.3	2.7	Transfers to Nonprofit Institutions From Households	6.5
	c. Interest paid to government	4.0	2.8	Enterprise Receipts Expensed	20.7
2.4	Retained Enterprise Income	35.2		a. Business consumption	18.0
	a. Undistributed corporate profits	27.7		b. Business transfers to nonprofit institutions and consumer bad debts	2.7
	b. Corporate profits adjustments	6.4	2.9	Interest Paid by Consumers	25.3
	c. Retained nonprofit income	1.0	3.0	Interest Paid by Government	13.9
2.5	PAYMENTS AND RETAINED INCOME OF ENTERPRISES	595.4	3.1	RECEIPTS OF ENTERPRISES	595.4

TABLE 2b

The Proposed System: Enterprise Capital Formation Account for the US, 1966
(billions of dollars)

2.10 Development Expenditures	26.0	2.15 Enterprise Capital Consumption	71.6
a. Research and development	18.0	a. Depreciation	55.6
b. Education and training	8.0	1. Corporate	39.0
		2. Noncorporate	15.6
2.11 Durables Expenditures	87.4	3. Nonprofit institutions	1.0
a. Structures	35.1	b. Amortization	16.0
b. Other durables	52.3	1. Corporate	12.0
		2. Noncorporate	4.0
2.12 Change in Inventories	13.4	2.16 Retained Income	35.1
		a. Corporate	34.1
2.13 Net Foreign Investment	2.2	b. Nonprofit	1.0
		2.17 Net Borrowing From (+) or Lending to (−) Other Sectors	+24.9
		a. Households	+17.7
		b. Government	+ 7.2
		2.18 Statistical Discrepancy	−2.6
2.14 GROSS ENTERPRISE CAPITAL FORMATION	129.0	2.19 GROSS SAVING AND NET BORROWING OR LENDING BY ENTERPRISES	129.0

TABLE 3a

The Proposed System: Government Income and Outlay Account for the US, 1966
(billions of dollars)

3.1	Consumption	125.1	
	a. Current expenditures	73.1	
	b. Imputed services of development and durables	52.0	
	1. Imputed interest	16.0	
	2. Capital consumption	16.0	
	3. Amortization	20.0	
3.2	Subsidies	5.4	
3.3	Transfers to Households	41.2	
	a. Social insurance	29.1	
	b. Other insurance and pensions	5.6	
	c. Public assistance	4.3	
	d. Other	2.2	
3.4	Transfers to Abroad	2.3	
3.5	Current Surplus	48.4	
3.6	GOVERNMENT CURRENT OUTLAYS AND SURPLUS	222.4	
3.7	Indirect Taxes		65.1
	a. Sales		17.7
	b. Excise		13.2
	c. Property		24.3
	d. Other		9.9
3.8	Direct Taxes and Other Payments by Enterprises		41.8
	a. Corporate profits tax		34.5
	b. Surplus of government enterprises		3.3
	c. Interest		4.0
3.9	Tax Payments by Households		113.4
	a. Social insurance contributions		38.2
	b. Income taxes		75.2
3.10	Transfers From Abroad		*
3.11	Imputed Income From Development and Durables		16.0
	a. Development		6.0
	b. Durables		10.0
3.12	*Minus:* Interest Paid		13.9
3.13	GOVERNMENT RECEIPTS		222.4

NOTE: An asterisk denotes less than 0.05.

TABLE 3b

The Proposed System: Government Capital Formation Account for the US, 1966
(billions of dollars)

3.13	Development Expenditures	40.0	
	a. Research and development	10.0	
	b. Education	20.0	
	c. Health	10.0	
3.14	Structures Expenditures	24.2	
	a. Buildings	8.9	
	b. Highways and streets	8.3	
	c. Other	7.0	
3.15	Other Durables Expenditures	17.0	
3.16	GROSS GOVERNMENT CAPITAL FORMATION	81.2	
3.17	Capital Consumption		36.0
	a. Depreciation		16.0
	b. Amortization		20.0
3.18	Current Surplus		48.4
3.19	Net Borrowing From (+) or Lending to (−) Other Sectors		−3.2
	a. Households		4.0
	b. Enterprises		−7.2
3.20	GROSS SAVING AND NET BORROWING OR LENDING BY GOVERNMENT		81.2

TABLE 4a

The Proposed System: Household Income and Outlay Account for the US, 1966
(billions of dollars)

4.1	Tax Payments	113.4	
	a. Social security	38.2	
	b. Income taxes	75.2	
4.2	DISPOSABLE INCOME	506.8	
4.3	Consumption	435.7	
	a. Current expenditures	339.4	
	b. Nonmarket production	.9	
	c. Services of development and durable goods	95.4	
	1. Imputed interest	37.5	
	2. Capital consumption	50.9	
	3. Amortization	7.0	
4.4	Transfers to Nonprofit Institutions	6.5	
4.5	Transfers to Abroad	.6	
4.6	Current Saving	64.0	
4.7	PERSONAL CURRENT OUTLAY AND SAVING	620.2	
4.8	Payments by Enterprises		489.3
	a. Employee compensation		359.1
	b. Interest payments		40.9
	c. Dividends		20.5
	d. Self-employed compensation		40.0
	e. Imputed interest on proprietor net assets		15.0
	f. Proprietor net profits		13.8
4.9	Compensation of Government Employees		76.6
4.10	Transfers From Government		41.2
	a. Social insurance		29.1
	b. Other insurance and pensions		5.6
	c. Public assistance		4.3
	d. Other		2.2
4.11	Transfers From Abroad		*
4.12	Income Originating in Households		38.4
	a. Nonmarket production		.9
	b. Net imputed income		37.5
	1. Owner-occupied housing		23.5
	2. Automobiles		5.0
	3. Other durables		7.0
	4. Development outlays		2.0
4.13	*Minus:* Interest Paid		25.3
4.14	PERSONAL INCOME		620.2

NOTE: An asterisk denotes less than 0.05.

TABLE 4b

The Proposed System: Household Capital Formation Account for the US, 1966
(billions of dollars)

4.14 Development Expenditures	12.7	4.17 Capital Consumption	57.9
a. Health	5.0	a. Depreciation	50.9
b. Education	6.7	1. Owner-occupied housing	7.9
c. Other	1.0	2. Automobiles	18.0
		3. Other	25.0
4.15 Durables Expenditures	87.5	b. Amortization	7.0
a. Owner-occupied housing	17.2	1. Health	3.5
b. Automobiles	29.9	2. Education	3.0
c. Other	40.4	3. Other	.5
		4.18 Current Saving	64.0
		4.19 Net Borrowing From (+) or Lending to (−) Other Sectors	−21.7
		a. Enterprises	−17.7
		b. Government	− 4.0
4.16 Gross Capital Formation by Households	100.2	4.20 Gross Saving and Net Borrowing or Lending by Households	100.2

TABLE 5

The Proposed System: External Transactions Account for the US, 1966
(billions of dollars)

5.1 Exports	37.3	5.6 Imports	36.4
5.2 Factor income from abroad	5.7	5.7 Factor income to abroad	1.5
5.3 Transfers to households	*	5.8 Transfers from households	.6
5.4 Transfers to government	*	5.9 Transfers from government	2.3
		5.10 Net foreign investment	2.2
5.5 Receipts From Abroad	43.0	5.11 Payments to Abroad and Net Foreign Investment	43.0

NOTE: An asterisk denotes less than 0.05.

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COMMENT

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Those responsible for the program probably made a mistake in choosing me to discuss the Ruggles' paper. Interesting discussion is engendered by dissent rather than accord, and I find myself in substantial agreement with their approach. Indeed, when I read the paper I found myself becoming impatient with an attempt to explain the virtues of synthetic microdata sets when I was already persuaded.

I have been associated with three major research projects that have used synthetic microdata sets to simulate the direct effects at the individual level of three proposed policy changes—tax reform, a revision of the unemployment insurance system, and an evaluation of alternative negative income tax systems. In each case the analysis was greatly strengthened by the simulations. In each case the simulations would not have been possible without the use of synthetic microdata sets. There is no doubt in my mind that many issues can only be approached at the micro level and that micro analysis can be greatly advanced by creating microdata sets either by merging data pertaining to the same individual unit from several sources or by inferring data about that unit from other sources.

Having given this testimonial to the general approach, I would like, however, to point out that in some respects the Ruggles' paper does not go very far. They are, of course, on firm ground when they suggest that the units for which microdata sets should be created are the basic decision-making units in each of the major sectors of the economy—the household, the business establishment, and governments. (It is not so obvious what should be done about "the rest of the world.") And as

long as one adheres to the concept of income used in the formulation of the national accounts there would seem to be no reason in principle why it should not be possible to make estimates at the micro level that are reconcilable with the macro level estimates with which everyone is familiar. If each of the units had a detailed descriptive code, and if the same data were accumulated for the same units over time, microdata sets that did nothing more than encompass the national accounts concepts of income would be enormously valuable for analytic purposes.

What makes me uneasy about the Ruggles' proposal is that it is not clear on what basis they would discriminate between the data to be included and the data to be excluded from their proposed microdata sets. There is, in short, no conceptual framework beyond that of the national accounts. Yet they describe their proposal as a "system of economic and social accounts." Just what does this phrase mean? To me, what they have described is a system of micro income and expenditure accounts that would be supplemented by any other microdata that could be obtained—demographic, health, education, social security, credit, labor force, crime, and so on. To call this potpourri a system of economic and social accounts seems to me to be going rather far. Just what is a "social account"?

While the modern computer makes it technically feasible to store, retrieve, and process enormous quantities of data, and the cost of doing so continues to fall dramatically, these operations are still not free goods. Some hard choices are going to have to be made between the information to be retained and the information to be discarded. Without some conceptual framework how are we to decide?

A conceptual framework that appeals to me is shown in Table 1. This pro forma balance sheet includes not only marketable assets and financial liabilities but the present values of all expected lifetime flows of benefits and costs. I would suggest that the microdata base for individuals and families should, in principle, include the *flows* of dollars and the imputed dollar values of the flows of tangible goods and services.

The flows of psychic costs and benefits and the flows of benefits derived from collective consumption obviously cannot be valued objectively. It is here that so-called social indicators have a role. Changes in certain indicators can be used as proxies for changes in benefits and costs that cannot be valued directly. If we assume that the individual adjusts his portfolio over time in order to maximize his *perceived* net worth, changes in individual behavior are attributable either to changes in tastes and preferences or changes in perceived relative prices. If, on

TABLE 1

Individual Wealth: A Comprehensive Formulation

Assets and Claims [present value (p.v.) of expected lifetime benefits]	Liabilities and Obligations [present value (p.v.) of expected lifetime costs]
Marketable assets	Financial liabilities, not elsewhere stated
Dollar value of current holdings	
P.v. of expected imputed income in kind	Other obligations
P.v. of expected imputed psychic benefits derived from perceived prestige based on conspicuous wealth or market power [a]	To relatives and other individuals
	P.v. of expected dollar outlays
Human capital	P.v. of expected imputed outlays in kind
Gross return	P.v. of expected imputed earnings or leisure foregone
P.v. of expected earnings	P.v. of expected imputed psychic costs in conforming to behavioral standards of others, less psychic benefits (pride) in conforming to own behavioral standards
Dollar amounts	To governments (local, provincial, and federal)
Imputed income in kind	P.v. of expected dollar amounts of taxes and losses resulting from expropriations
Imputed psychic benefits derived from prestige, esteem, and pride associated with the individual's occupation [b]	P.v. of expected imputed earnings or leisure foregone under conscription
P.v. of expected "leisure"	P.v. of expected imputed psychic costs in conforming to law, less psychic benefits (pride) in conforming to own behavioral standards
Imputed earnings foregone	To voluntary associations
Imputed psychic benefits derived from prestige associated with conspicuous indolence	P.v. of expected dollar outlays
Deduct	
P.v. of expected "subsistence"	
Dollar costs	

Imputed outlays in kind
Imputed earnings or leisure foregone
P.v. of expected education costs
Dollar costs
Imputed outlays in kind
Imputed earnings or leisure foregone
Imputed psychic costs in conforming to educational standards
P.v. of expected health costs
Dollar costs
Imputed outlays in kind
Imputed earnings or leisure foregone
Imputed psychic costs of pain and suffering

Claims to transferred benefits specific to the individual
From relatives and other individuals
P.v. of expected dollar receipts
P.v. of expected imputed receipts in kind
P.v. of expected imputed psychic benefits derived from prestige, esteem, or affection accorded the individual by relatives or other individuals
From governments (local, provincial, and federal)
P.v. of expected dollar receipts
P.v. of expected imputed receipts in kind
P.v. of expected imputed psychic benefits derived from prestige or esteem accorded the individual by governments
P.v. of expected imputed outlays in kind
P.v. of expected imputed earnings or leisure foregone
P.v. of expected imputed psychic costs in conforming to behavioral standards of the associations, less psychic benefits (pride) in conforming to own behavioral standards

Net worth

(continued)

TABLE 1 (concluded)

Assets and Claims [present value (p.v.) of expected lifetime benefits]	Liabilities and Obligations [present value (p.v.) of expected lifetime costs]
Claims to transferred benefits specific to the individual (cont.)	
From voluntary associations	
P.v. of expected dollar receipts	
P.v. of expected imputed value of receipts in kind	
P.v. of expected imputed value of psychic benefits derived from the prestige or esteem accorded the individual by the other members of each group of which he is a member	
Claims to share in collective benefits	
P.v. of expected imputed benefits derived from the common property of each of the groups of which the individual is a member: family, neighborhood, community, region, nation, world, voluntary associations, racial-ethnic-linguistic	
Common property includes:	
Quantity and quality of unappropriated natural resources including air, water	
Access to stock of knowledge and the quantity and quality of that stock	
Access to social, cultural, and recreational activities and the quantity and quality of such activities	

Availability of privacy	
Prestige of the group in the eyes of nonmembers, based on the power of the group to influence the decisions of other groups	
Esteem of the group in the eyes of nonmembers, based on conformity of its behavior to their standards	
Pride of the members of the group in the group, based on conformity of its behavior to the standards of the group	

NOTE: In principle, all dollar values are deflated by the expected prices of the basket of goods and services the individual would purchase. Wealth is expressed, therefore, in terms of real purchasing power.

[a] Psychic benefits and costs are subjective and not capable of objective evaluation. Psychic benefits from prestige or esteem depend upon the perceptions of the individual about the perceptions of others and are doubly subjective.

[b] Prestige is defined as the perceived favorable attitude of others arising from the perceived influence of the individual in allocating rewards and punishments to others. Esteem is defined as the perceived favorable attitude of others derived from the perceived conformity of the behavior of the individual to their standards. Pride is defined as the sense of satisfaction enjoyed by the individual, achieved through conforming to his own behavioral standards.

the basis of attitudinal information we can ascertain that preferences have not changed it is possible to infer that perceived changes in relative prices have occurred even though these prices may be intangible benefits and costs.

This suggests that microdata sets should encompass not only the behavioral information associated with portfolio adjustments involving assets and liabilities with intangible benefits and costs (e.g., political activity) but also attitudinal data that would make it possible to infer whether a change in such activity was attributable to changes in preferences (e.g., a change in group standards) or a change in perceived relative prices (e.g., a change in the expected payoff from political activity relative to that of other activities).

This framework is, of course, only one of many possible alternatives. It may well be that superior approaches either exist or can be devised. But the point I want to make is that without some framework it will be impossible to select the information to be included in the microdata sets on a rational basis. We might well end up with much information that is relatively trivial *and* major gaps that could have been filled had the resources been used to better purpose.

Let me conclude with a few comments on Tom Juster's paper. Here I generally agree with the conceptual framework he espouses but question the uses to which he puts it. Surely he is correct in claiming that changes in the national income as estimated in the national accounts are hopelessly inadequate as *the* measure of changes in national welfare. The fact that changes in the interpersonal distribution of income are ignored would seem to me to be a decisive argument even if no other limitations were to prevail—and Juster has shown that there are many others. But I do not believe that the way to reduce the errors involved in a misinterpretation of the national accounts is to adjust the accounts to make them more closely reflect a concept of welfare.

Even if all of Juster's proposed changes were implemented, the changes in "his" national income estimates would not be a valid indicator of changes in welfare either *and* the degree of subjectivity required to formulate them would have risen perceptibly. I would have thought that the best way to avoid the misuse of the national income estimates would be to provide separate series on other dimensions of welfare to which the user could apply his own weights. While one can argue at the margin about the reliability of certain imputations (e.g., leisure), at the far end of the continuum there are some components

of welfare that everyone would agree cannot be valued objectively—e.g., national pride in an equitable distribution of income.

If a scalar measure of welfare is impossible—except for individuals who have identical normative values—is it wise to "improve" the national accounts so that they become a "better," but still hopelessly inadequate, welfare indicator?

ABRAHAM AIDENOFF, Statistical Office, United Nations

I propose to comment on Juster's and the Ruggles' papers in terms of the work of the United Nations on economic and social accounts.

TWO SYSTEMS OF ACCOUNTS

The United Nations has recommended a System of National Accounts (SNA) for use by countries in improving their economic accounts and the international reporting of data; and we are working on a System of Demographic, Manpower, and Social Statistics (SDMS) in order to assist countries to organize, coordinate, and expand these statistics. The two systems will complement one another and cover all the data dealt with by Juster and the Ruggleses. The SNA accounts relate to all economic transactions and stocks of a country; the SDMS is to incorporate data on the welfare of the population and the catering social services—public and private—in a coherent accounting framework. The two accounting systems are to be coupled through the ties between the activities and accomplishments of the social services and their economic costs and resources and through the links between social conditions of the population and their economic situation.

Thus, unlike Juster and the Ruggleses, who propose to construct a single set of economic and social accounts, the United Nations Statistical Office has decided on two distinct, but coupled, systems. We have adopted this approach for two reasons: First, while Juster believes that money values are the most appropriate unit of measurement in social accounts, we find that unlike economic transactions and stocks, a number of important aspects of social conditions are not amenable to objective, meaningful measurement in money units. Second, contrary to Juster, we consider that it is necessary to look at production in a different light in the case of social accounts than in the case of economic accounts.

MULTIPLE UNITS OF MEASUREMENT AND VALUATIONS

Natural (physical) units of measurement are needed—and are used in the SDMS—in order to furnish useful data on such topics as educational attainment and the state of educational institutions, the health of the population and the available medical facilities, the frequency, incidence, and severity of crime, or on how persons use their time and leisure. Certain facets of social conditions and social services may be usefully and objectively measured in money values—and are so measured in the SDMS. However, it would be necessary to impute questionable unit values for this purpose in other instances; and money values would not yield relevant data in a number of still other cases. While the use of natural units of measurement restricts the ability to aggregate the series of the SDMS and to combine the series of the SDMS and the SNA, it does not significantly diminish the usefulness of the data for purposes of dealing with social problems. In the case of the welfare of the population, the major interests are in the circumstances of particular groups of the population and in problems of the distribution of services, benefits, etc., among them. Furthermore, the structure, definitions, and classifications of the SDMS are so designed that the series on the various dimensions of welfare and on the pertinent social services, whether in natural or monetary units, may be correlated, one with the other, and with the data of the SNA.

Social accounts like the SDMS are concerned with the contribution of people's activities to their economic and social welfare, whereas economic accounts like the SNA focus on the production of goods and services for the society. Not only is the scope of the activities covered much wider in the case of the former system (for example, the inclusion of the housekeeping or the recreation of the family members), but the mode and basis of valuation may be different in the case of items covered in both systems. In the social accounts, values are based on the net addition to social welfare (benefits) derived from the production of goods and services, while in the economic accounts, values reflect the activities and costs at the margin of producing the goods and services as well as their utility to consumers. The two sets of values not infrequently differ in the case of such government services as universal education. They may even be different in the case of marketed goods and services because of the differences in horizon between social welfare and individual utility.

SOCIAL INDICATORS

I should like to make an additional general observation before turning to specific aspects of the papers by Juster and the Ruggles. Contrary to the Ruggles' statement that at present there is no systematic set of social indicators which are related to an underlying system of social accounts, social indicators are integrated into the SDMS. They summarize the various series of the accounts of each subsystem in the light of the social concerns attended to in each.

NONPROFIT PRODUCERS

As Juster recommends, the SNA includes full production and capital accounts for government and private nonprofit bodies. The production accounts focus attention on the social and community services these bodies produce and their associated costs. They also furnish a structure for estimating production in constant prices in terms of outputs rather than inputs. We are working on the question of constant-price estimates in the context of both the SDMS and the SNA. In the former case, we find it essential to distinguish between the output of the government and private nonprofit services and the benefits accruing to the recipients of the services because of the considerations I mentioned earlier.

EDUCATION AND RESEARCH AND DEVELOPMENT

As government and private nonprofit bodies furnish substantial educational and research and development services, it is convenient to comment now on the recommendations in the papers under discussion concerning the classification of the output of these services as intangible capital formation.

Educational services are designed to serve social and economic objectives; they contribute partly to human capital formation and partly to final consumption. Valuation of the flow in terms of income foregone by the recipients bears little, if any, relationship to the output of the services and is even unrealistic from the recipients' point of view. It may be appropriate to value the capital formation involved in higher than compulsory education in the light of the expected stream of greater future earnings but these estimates are difficult to make. Furthermore, still more intractable problems would arise in making the correlated estimates of the obsolescence in the acquired knowledge and skills.

Research and development is treated as capital formation in the SNA only when embodied in tangible capital goods. While the other outputs

from research and development expenditures should be part of capital formation, it is very difficult to identify and value them. In the case of the outputs that are not embodied in capital goods, it would be inappropriate to include the research and development expenditures themselves in capital formation because not infrequently the output is not commensurate with the expenditure. When the results of research and development are patented or licensed, valuation in terms of the expected streams of income becomes possible. We propose to include these results of research and development expenditures in the balance-sheet accounts of the SNA.

HOUSEHOLDS ACCOUNTS

Juster considers that the boundary of production in the national accounts should be extended to include a number of intrafamily activities and that households should therefore have production and capital accounts.

The housekeeping, tutoring, recreational, etc., activities carried on by family members for themselves no doubt make important additions to their welfare. And, with economic development, more of these services are furnished through the market. Nonetheless the intrafamily services are not included in production in the SNA. These activities and the relevant decisions of family members are essentially noneconomic in character; and when the activities become matters of public concern, the questions and policies involved differ greatly from those concerning production for the market. Moreover, the inclusion in national accounting aggregates of the questionable and large imputations for intrafamily activities would significantly alter the meaning and attenuate the analytical uses of these aggregates.

Because intrafamily activities are important for the welfare of the population and are often matters of social concern, data on these activities are included in the SDMS. The data will be primarily included in a subsystem on how much time individuals spend on their various social and economic activities.

The SNA furnishes a capital account for households but the only consumer durables covered are owner-occupied dwellings. In the course of preparing the present SNA, the proposal to classify all consumer durables as capital goods was rejected in view of the serious difficulties of imputing values to the involved flow of services and the resulting alteration in the meaning of the aggregate on gross fixed capital formation.

INTERMEDIATE AND FINAL CONSUMPTION

It is recommended in the papers under discussion that business expenditures which contribute to the population's welfare—for example, health and recreational services that employers render to their employees and television and radio programs—should be treated as final consumption instead of intermediate consumption. On the other hand, Juster argues that the outlays on "regrettable necessities," on items made not for their own sake but for the sake of obtaining others and on "defensive measures"—for example, on commuting to work, on a hospital stay, on a strong door lock, on the police—should be classed as intermediate consumption instead of final consumption.

Intermediate consumption in the SNA includes the employers' outlays on health, recreational, and social services which they furnish collectively to their employees, because in most cases these outlays bring important direct benefits to the employers as well as to the employees. However, as these outlays do contribute to the employees' welfare, they are covered in the concept "total final consumption" that is used in the SDMS. The same approach would be appropriate in the case of television and radio programs.

The main reason that Juster gives for classing outlays on "regrettable necessities" and the like as intermediate consumption is that no benefits are derived directly from these items themselves. In the case of commuting to work, for example, he points out that people do not derive pleasure from this activity and would generally prefer to live within walking distance of their place of work. However, commuters, in residing a considerable distance from their work, have revealed their preferences in the light of the alternatives open to them. And the outlays on commuting are as much a part of the costs of obtaining the benefits of residing where they do as are the rents, or the equivalent, that they pay. The argument that the outlays should be treated as intermediate expenses because commuting is an instrumentality of residing far from work does not hold water. Almost any consumer outlay may be considered to be an instrumentality for satisfying some other, usually more basic, need. In fact, Juster considers outlays on air conditioning or heating to be final expenditures as they are costs of maintaining comfortable temperatures in climates where the temperature would otherwise be uncomfortable.

Juster's reasons for classing the "defensive expenditures" of persons or government as intermediate rather than final are also questionable. Surely, receiving medical attention or police protection or adding a door

lock when needed contributes to people's welfare when they are faced with these situations. I believe that the reasons for treating these and other defensive outlays, for example, on pollution control devices, as final are essentially the same as those in the case of expenditures on air conditioning or heating.

I might note in passing that the SDMS is designed to furnish data on the aspects of welfare mentioned above, namely, commuting, the state of health and of public safety, housing, conditions of the physical environment, and on measures adopted in order to improve these conditions and their costs and benefits.

MICRODATA SETS

The Ruggles' paper stresses the values of microdata sets in economic and social accounting. I am in complete agreement with them concerning the usefulness of microdata sets as a source of basic data for these purposes. Microdata sets furnish an efficient and flexible means of assembling a wide range of disaggregated series of data that are nonetheless coordinated and linked; they are also an effective and practicable way of compiling longitudinal data.

The availability of detailed, consistent, and linked data greatly facilitates the compilation of interrelated economic and social accounts at various levels of aggregation and the carrying out of correlation and factor analyses. In fact, disaggregated, linked basic data on the various aspects of a population's welfare and the relevant social services are essential to building an integrated system of social accounts. And it is generally not feasible to gather all these series of data on the population at the same time or through the same agency. It is necessary to divide up the series over a number of phases or agencies that are tied together either through the use of an identical sample of households or individuals or preferably through the use of samples drawn from the same strata. The strata of households or individuals should be defined in terms of the characteristics which are strategic in the variance of the various aspects of the population's welfare.

Detailed longitudinal data are wanted in economic and social accounting for purposes of studying the sequences of experience and behavior of people, enterprises, and institutions over time. Synthetic microdata sets offer a means of gathering longitudinal data which avoids the difficulties of gathering data on identical respondents over a long period of time and the serious response errors that are involved in retrospective queries.

However, building and maintaining microdata sets is probably more costly and raises more complex statistical and administrative problems than the traditional methods of compiling data for broader groups of a population. This is so because, for example, a larger number of respondents is needed in the microdata approach, and they must be matched from phase to phase. The choice between the two approaches should depend on evaluating their relative benefits and costs in the light of the circumstances of a country. For example, I believe that many developing countries would find it advantageous to use microdata sets in order to gather and compile economic and social data on households.

EDWARD F. DENISON, The Brookings Institution

I share with Nancy and Richard Ruggles the expectation that synthetic microdata sets will contribute importantly to future economic analysis and wish only to express one comment on their presentation and one dissent.

It will be more difficult than they imply to integrate microdata sets with macroeconomic accounts because totals from the former are necessarily on a combined basis whereas the latter are and should be on a consolidated basis. The difference is fundamental and poses difficult problems for integration.

I disagree with the recommendation to transfer nonprofit institutions from the personal to the business sector. This recommendation doubtless stems from the authors' observation that if one wishes to analyze individual behavior the inclusion of nonprofit organizations is inconvenient. My objection stems from the observation that inclusion of nonprofit institutions in business is inconvenient if one wishes to analyze business, and that I do this much more often. We could both be satisfied by transferring nonprofit institutions to government (which the treatment of institutions in the national accounts most closely parallels) but this would inconvenience another group of users.

One possible expedient is to make nonprofit organizations a separate sector. This is feasible if low standards of statistical accuracy are acceptable; the necessary annual estimates would be weak and hardly any information would be available on a more frequent basis. This solution requires (1) data on all transactions between nonprofit institutions and other "persons" (mostly families and individuals) and (2) the segregation of purchases of goods and services by these institutions

from purchases by other persons. I once made annual estimates for most of the required series of the first type for the 1929–41 period.[1] The most important single statistical source, the decennial *Census of Religious Bodies,* unfortunately last appeared for 1936, but no doubt rough annual estimates could still be made. Most of the required information of the second type is provided in the present annual personal consumption expenditures tables or the worksheets from which they are derived.

To make nonprofit organizations a separate sector is not a good idea even though it may be feasible if one accepts wide margins of error. It would greatly complicate the presentation of the annual and quarterly national income and product data without providing the aggregate combined income and outlays of families and single individuals to which one would expect microdata to aggregate. To obtain such series, far more adjustments than elimination of nonprofit institutions must be made to personal income and to personal consumption expenditures, consumer interest, and personal taxes. A more constructive request would be to ask OBE to try to provide such series on an annual basis without disturbing the accounts. I presume that something close to the income series so defined will necessarily emerge as a byproduct of the resumed publication by the OBE of size distributions of family and individual income.

[1] Edward F. Denison, "Consumer Expenditures for Selected Groups of Services, 1929–41," *Survey of Current Business,* October 1942, pp. 23–30.