REGIONAL ECONOMIC ACCOUNTING IN THE U.S. OFFICE OF BUSINESS ECONOMICS—AN APPRAISAL*

ROBERT E. GRAHAM, JR.,
Chief, Regional Economics Division
Office of Business Economics
U.S. Department of Commerce

AND

J. THOMAS ROMANS
Regional Economics Division
Office of Business Economics
U.S. Department of Commerce
and
State University of New York at Buffalo

This paper discusses the conceptual framework in which regional economic accounts in the United States are viewed and the functions which those accounts serve. It points out that the major differences between regional and national accounts relate to factor returns to capital. First, returns to capital are extremely difficult, if not impossible, to measure meaningfully on a geographic basis. Secondly, because the capital market in the United States is a reasonably perfect one geographically, the return to capital that originates in a given region has little significance as either a stimulant or a constraint to production in that region.

In terms of the functions of regional accounts, the point is made that whereas national economic accounts can aid economic decision-making in three general areas of policy—allocation, distribution and stabilization—with perhaps greatest emphasis now placed on the last of these, regional accounts are most useful in matters relating to allocation and distribution.

Information needed for the use of regional accounts in decision-making with regard to allocation and distribution problems is examined. Against these needs are placed an inventory of regional accounts which are available in the Regional Economics Division, Office of Business Economics. The available accounts are found to fall considerably short of those needed for allocation decisions. In contrast, regional accounts as presently constituted have much to offer as tools for analyzing the problems of regional economic distribution, although here too, much additional information is needed.

1. INTRODUCTION

The objective of this paper is to set forth the framework in which we view regional economic accounts; to survey briefly efforts underway in the Regional Economics Division (RED), Office of Business Economics (OBE), U.S. Department of Commerce to implement these accounts; and to recite a few of our

*Date received: February 2, 1970.

Paper prepared for the Eleventh Annual Conference of the International Association of Income and Wealth, Nathanya, Israel, August, 1969.

The authors wish to acknowledge the assistance given by members of the Regional Economics Division in the preparation of this paper. Some have contributed by participating in formulating the Division's program. A larger number have contributed through their work in developing the various measures referred to in the text and shown in the exhibits. Both contributions have been essential.

Special acknowledgment is due Lowell D. Ashby, Assistant Chief of the Division, Daniel H. Garnick, Edwin J. Coleman, and Henry DeGraff, Chiefs of the Analysis, Measurement, and Service Branches of the Division and to Sang O. Park and David Hirschberg, regional economists in the Division. The authors, of course, bear full responsibility for the paper. It represents their personal views and not those of the Department of Commerce.

problems. Examples of the regional data series maintained on a regular basis are included.

Functions of Economic Accounts

The national income accounts in most countries were developed initially mainly to provide the data input relevant to decision making on one very important, and especially timely, problem—economic stabilization. The accounts subsequently have proven adaptable or at least relevant to several additional macroeconomic issues such as economic growth and balance of payment problems. But stabilization and other macroeconomic issues do not constitute the whole of government or private economic decision making. Two other major areas in which government policy decisions are made and for which the U.S. national income and product accounts provide little insight are the optimal provision of public goods and income distribution. These issues are receiving increasing priority today, and national economic accounts as they presently exist constitute incomplete and partial analytical tools with which to meet them.

Economic accounts should aid public and private economic decision making. In this regard, it seems appropriate to use as the framework for a review of their use the classification of budgetary functions set forth by Richard Musgrave as principles of budget determination, a classification which promotes conceptual clarity. Musgrave divides governmental budgetary policy into three major functions: allocation, distribution, and stabilization.[1] The allocation function is concerned with the optimal provision of public or social goods. The distribution function seeks to correct via the use of transfers and taxes any undesired features of the distribution of income as determined by market forces. The stabilization function controls the level of aggregate demand by means of proportionate tax rate changes in order to maintain full employment with minimal interference to the allocation and distribution functions. Although decisions in any of the three functional areas affect decisions in the other areas, for many policy making purposes they can be considered independent of one another, i.e., decisions can be made in a partial rather than a general equilibrium framework. For example, stabilization decisions can be made in the light of optimal allocation and distribution functions.

This threefold framework is a useful one, we believe, in which to discuss regional economic accounts. However, as will be noted, when accounts are being utilized in connection with decision making relative to very large projects which can have significant impacts on all three types of functions both within and without the immediate region, the utility of the distinction tends to break down.

The U.S, national income accounts were developed primarily to serve the stabilization function, but stabilization objectives have little relevance to regional economies primarily because of their "openness." As a result, most accounting constructs that have been designed over the years to implement stabilization

[1]Musgrave, Richard A., "Principles of Budget Determination," *Federal Expenditure Policy for Economic Growth and Stability*, 85th Congress, 1st Session, U.S. Government Printing Office, Washington, D.C., November, 1957, pp. 108–115; also *The Theory of Public Finance* (McGraw Hill, 1959), Chapters 1 and 2.

objectives have comparatively little relevance to regional economies.[2] Therefore, regional accounting systems should not follow blindly those national income accounts which were designed to implement a theory and an objective which are non-specific with respect to the subregions of a nation.

Regional accounts are more directly related to allocation and distribution functions than to that of stabilization. Economic accounts are the empirical counterparts of formal theory. They are derived from theory and can only be as useful as the theory which they implement. Thus it is that national income accounts, which are the empirical counterpart of Keynesian income theory, were not developed until the Keynesian income theory was formulated and specified. Without a theory to implement, economic accounts are simply not functional, and, in fact, are not really accounts but rather a bundle or even a jumble of statistics.

If the major purpose of macroeconomic accounts is to implement national stabilization theory and objectives, what is the purpose of regional, or micro-economic, accounts and what theory should they implement?[3] Broadly defined, their major purpose is to aid allocation (efficiency) and distribution decisions and to implement welfare theory with all its concomitant problems of concept and measurement.

A brief examination of the types of information or form of accounts for regional decision making in each of the three areas is in order. We shall then look at the availability of those accounts which have a regional dimension and briefly review RED's inventory of them.

Allocation Function

Allocation decisions in the United States vary from legislative or administrative decisions made without benefit of formal analysis to those made on the basis

[2]Considerable discussion exists in the literature on the inappropriateness or the difficulties involved in applying national accounting concepts to regions. National accounting procedures become blurred and generally inapplicable when used to quantify the small, open economies characteristic of many U.S. towns, cities, counties and states. For example, one item in the national accounts is the business saving originating as the withheld earnings of the corporate sector. This item is especially important in the national income accounts because withheld profits of business corporations are a major source of investment funds and can serve as a constraint or as a spur to the national level of investment. For regions, measurement of business saving is much less important, and perhaps is even unimportant, because in contrast to their national role, business savings originating within a region have little effect on the level of investment in that region. Savings can always be imported from other regions, since there exist reasonably perfect capital markets geographically.

It is also difficult, if indeed feasible, to allocate to regions the profits of national, multi-regional corporations (or their counterpart, the values of intra-firm, interregional shipments of goods which do not enter the market). Any allocation of national corporate profits to regions must ultimately rest on an arbitrary decision as to their geographic origin. Thus, although the measurement of business profits raises problems for regional economic accounting, it is not an especially critical problem because it is not relevant to any realistic concept of regional development or regional investment. Profits to finance regional investment can always be imported from a national pool of capital which is offered to all regions on equal terms. The important information from a regional accounting standpoint is more likely to be the rate of return offered to capital in one region relative to that offered in other regions. Thus, to say that a particular national economic accounting construct is difficult to apply at the regional level is tantamount to saying that the construct employed nationally is not a relevant one regionally.

[3]Micro—is used when referring to regional accounts and macro—when referring to national accounts.

of benefit-cost, cost-effectiveness, or planning-programming-budgeting-systems analyses of varying degrees of sophistication, quantification and reliability. The basic limitation to implementing the more formal optimal decision-making procedure lies in the data input. There is little in the way of a centralized data collection or accounting system in the United States specifically designed to aid decision making with regard to the allocation function. This is true with respect to the relevant national data, and even more so as it relates to regional data.

Decisions concerning the allocation function almost always have a regional dimension even though they may be treated as a national responsibility. In fact, fulfilling the allocation function may be more an issue of regional than of national economic accounting. Insofar as the public good being allocated is a capital good, oftentimes even if it is intangible capital, it must be located somewhere. Insofar as it is a consumer's good, it must be consumed by someone in a specific region. The resources used in providing social goods must come from some region and must be located in some region to participate in the production process. Locational considerations have significant impacts on allocation, or efficiency, decisions. The necessary data inputs for such decisions must include *regional* data on needs, demands, alternative supplies, etc. For some central government projects, it is possible that the allocation decision can be made independently of location considerations. But for the greater portion of government investment, location is an important element in the determination of benefits and costs. In fact, oftentimes the location issue itself is the salient question. That is, the prime concern is where to build rather than whether or on what scale to build.

There is a set of information which forms a common requirement for many public (and private) allocation decisions. To be sure, most economic decisions have an informational requirement that is unique, but nearly all of them also require measures of current and projected income, labor force, employment, population, investment and consumption by region. In addition, many have informational requirements pertaining to regional industrial composition, occupational mix, income distribution, consumption patterns, input requirements, prices and the like. Given this large set of common data requirements, there are efficiencies in having the generation and organization of this information centralized.

Such centralization of data generation for allocation decisions has not come about in the United States for several reasons, all of which relate mainly to a basic lack of acceptance of quantitative economic decision making. Some view decisions made in the discharge of the allocative function as an engineering rather than an economic responsibility. Others consider them economic decisions but judge the economist's tools as too crude to yield meaningful results. Still another factor is a failure on the part of the decision maker to understand the economic rationale that underlies quantitative techniques of current producers and users of the measures. Moreover, a shift in responsibility for generating the methods and measures needed for analyzing the problems of allocation usually implies for those presently responsible for the decisions some loss of power, some dilution of decision-making authority, and a lesser opportunity to use the figures simply to ratify decisions made on noneconomic criteria. For example, some maintain

that in the United States benefit-cost ratios have constituted the target of analyses as frequently as they have formed the criterion for policy decisions.

The belief that economic accounts for allocative purposes require a regional dimension has already been stated. However, the construction of microeconomic welfare accounts presents formidable problems. Ideally, comprehensive, fully articulated accounts showing the total benefits and total costs which stem from both private and public consumption and production activities are needed for all regions. Such a requirement boggles the mind. All output would have to be measured on a benefit basis. External effects would have to be quantified and included, thereby requiring the assignment of many shadow prices. Government output would have to be measured on a benefit basis rather than assumed to equal expenditures. Other non-market transactions would have to be included at specified values. Problems of utility measurement, tax and expenditure incidence, measurement of externalities, and the difficulties of estimating and assigning benefits of public goods which are indivisible and non-appropriable by individuals all of whom suffer revealed preference problems constitute just some of the problems confronting the construction of a general microeconomic accounting system.

As a more practical alternative to the ideal accounting system, we are presented with benefit-cost analysis. As usually conceived, benefit-cost analysis is an attempt at a decision rule of what a government should do (1) under conditions of perfect knowledge and (2) with the goal of maximizing society's economic welfare function. It is an attempt to place project evaluation in the public sector on a par with project evaluation in the private. In the public sector, if the benefits from a project exceed its cost, or as it is usually stated, if the benefit-cost ratio exceeds unity, the project is deemed worthwhile. In the private sector, if the internal rate of return exceeds the opportunity cost of capital, the project is profitable and therefore worthwhile. The basic difference between the two approaches lies in the estimation of externalities which the public sector includes and private firms generally exclude. In fact, the existence of externalities is often the reason an activity occurs in the public rather than the private sector all together. However, the extent to which benefit-cost analysis evades the problems encountered in an ideal and more general set of welfare accounts is quite limited. In fact, the greater practicality of the benefit-cost approach lies only in its ability to use partial rather than general equilibrium analysis. This avoids certain problems involving the incidence of secondary or induced effects, but only by assuming them away. As the conceptual and empirical problems of measurement still remain, accounts for the implementation of benefit-cost analysis are difficult to construct. In fact, the difficulties are so substantial that the claims of critics that the resulting ratios are empirically empty cannot be dismissed cavalierly. But improvements in the benefit-cost techniques are justifiable simply because broadly defined benefit-cost analysis, assuming no specific recognition is given to distribution objectives, is synonomous with economic rationality or economic efficiency.

One should be careful not to overdraw the distinction between income and product accounts and benefit-cost or other accounts for microeconomic decisions. There are only three significant differences: (1) Income and product is generally measured at a higher level of aggregation than are benefits and costs;

(2) benefits and costs are usually stated in terms of future flows discounted to present values, whereas income and product values are stated in terms of current flows; and (3) income and product accounts measure the value of the spending stream rather than the value of output inclusive of externalities.[4] If, for example, there were no externalities and all benefits and costs were completely and perfectly reflected in prices, the (existing or projected) value added statement of an economic unit would also form the basis of a benefit-cost calculation. This is the reason that benefit-cost analysis can be used to arrive at a position logically analogous to profit maximization. It is also the reason that an optimum allocation of resources occurs in the private sector only if benefits and costs are perfectly reflected in prices. The basic problem with respect to public sector accounts is that only the income side has been measured and all benefits of public production in excess of its costs have been excluded. An independently measured side of the value added account has yet to be prepared. The estimation of benefits in benefit-cost analysis is an attempt to complete the product side of the government account independently of the income side.

The discussion thus far has been cast in terms of decision making in the public sector only. But economic accounts are useful to the private sector as well. Because of their specific orientation to stabilization, national income accounts may not be the most useful form of accounts to the private sector for micro-analysis. They are very relevant and widely used in private decisions related to the national aggregates, e.g., in studies of demand in national markets. With respect to microeconomic accounts, however, the similarity between benefit-cost analysis in the public sector and profit maximization in the private has already been noted. Both are used in allocative (or efficiency) decisions, and, in general, the required set of informational inputs is the same for both. Projecting the demand for public goods in specific regions is not different in substance from forecasting the demand for private goods, and micoeconomic accounts should be of great value to both sectors.

Distribution Function

There are two major types of economic accounts with regional dimensions which are relevant to distribution decisions. First, there are those to account for the distribution of income *among* regions. Second, there are those to account for the distribution of income among persons *within* regions. The former are relevant primarily to regional allocation decisions with respect to the measurement of secondary income effects and to the projection of regional incomes, but they obviously have a substantial relevance for measuring the redistributive effect of a program. The latter are relevant directly to size or vertical income distribution decisions, particularly insofar as policies to alleviate vertical income inequality are implemented through the spending side of public budgets. Such accounts are equally relevant to all levels of government: Federal, state and local. The basic policy tools with which to implement these redistributive functions are the tax and transfer powers of government.

[4]Insofar as externalities are reflected in prices, they will be reflected in the value added statement of some other economic unit and, thus, in an aggregated value added statement, e.g., GNP.

Accordingly, three types of accounts are needed to carry out the distribution functions on a regional basis. First, in order to measure the distribution of income among areas, the regional counterpart of a national income and product account is required. Given the problems discussed elsewhere of geographically delineating certain types of income flows, this, at present, has come down to a measure of regional personal income or of labor earnings.

Second, regional measures of the vertical distribution of income among persons within regions are needed in order to determine whether and to what extent the distribution function must be invoked. Hopefully, these measures can aid in the evaluation of programs designed to alter the vertical distribution of income within a region. Such an account has no conceptual difficulties but is very demanding of direct data and, hence, very expensive to construct.

Third, a government account is needed in order to measure governmental revenues and expenses within a region so that transfers and taxes can be traced, and the geographic and income-distributional effects of government expenditures recorded. Here, regional accounting encounters difficulties similar to those noted in the discussion of the allocation function. That is, a completely satisfactory government account requires that the incidence of taxes be determined geographically, by income groups, and by industries. Similarly, the ideal government account would value the output originating within government in terms of at least a simulated market value and government expenditures would be allocated on both benefit and incidence bases. Moreover, if the account is to be of maximum usefulness, the value of its output should be allocable to specific regions and income groups.

The "state of the art" of regional income accounting currently falls far short of these desiderata. With respect to distribution considerations, even the national accounts fall short of the criteria listed as the minimum needed for regional accounting. For example, the national income and product accounts of the United States currently show no distribution of the population by income size.[5] A closely related series is maintained annually by the Bureau of the Census, but this is not integrated into the national income and product accounts.

The two major types of income distributions with a regional dimension—distribution among regions and distribution among persons—are both affected by interregional migration of persons. In fact, migration is probably the most powerful force underlying relative changes in the geographic distribution of income among regions.

Some data on net regional migration are available but the gross migration flows that prevail throughout the Nation are many times the magnitude of their net value. Because the flows into and out of any region are usually quite different in their demographic and economic characteristics, it is essential that each flow can be measured and characterized through what might be called a regional migration account. Such an account would permit the measurement of the

[5]During the 1950's and early 1960's, the distribution of personal income among families was maintained as part of the U.S. income and product accounts. This series was discontinued in 1965 due to inadequate funding. It is now being revised and will be included once again in the national income and product accounts.

effects of migration upon the regions from which and to which the migration occurred as well as upon the migrants themselves.

Stabilization Function

Stabilization decisions are most relevant to the national economy and are of less concern to us in a regional context. Income and product accounts aggregated at the regional level are of interest, not primarily for stabilization, but for allocation and distribution purposes. Still, there are regional dimensions to the stabilization function which are manifested by regional variations from the national norm in business cycles, structural unemployment created by immobile resources, and economic growth. Consequently, a full set of income and product accounts on a regional basis would be useful in regional analysis leading to economic stabilization decisions.

Regional Accounts for Decision Making

There are no comprehensive regional economic accounts in the United States with which to analyze the problems of regional allocation, distribution, or stabilization and which can aid policy-makers directly in making their decisions. There are no accounts, for example, which can serve to identify regional differentials in productivity and from which regional differences in costs or output can be determined directly. Similarly, there are no entirely satisfactory series measuring the distribution of income among individuals of a region.

Over the past two decades there has been an increasing interest in regional accounting in the United States, but surprisingly little has been accomplished either in the conceptual design of a set of regional accounts or in implementing the regional constructs that have been proposed.

There has been no lack of discussion and conferences on regional accounts but generally these efforts have neither resolved nor created a concensus on the knotty conceptual problems that invariably arise when any design for regional accounting is proposed. Some of the most difficult of these problems have been covered earlier in this paper. In order that regional economic measurement and analysis not be immobilized until the major conceptual problems have been resolved, the RED has been developing a regional economics information system that can serve analysts and decision makers. This system is more than a data bank but significantly less than a comprehensive, integrated set of regional accounts. Its major elements will be reviewed under the budgetary functional classification noted earlier.

Accounts for Allocation Decisions

There are several accounting constructs designed to aid allocation decisions by providing general data input into benefit-cost analyses.

Regional Output

The national economic accounts are structured to measure interinstitutional and intersectoral economic transactions. A basic problem with regard to measuring economic activity in open regions, small or large, arises because the

geographic jurisdictions of economic institutions and sectors do not coincide with regional boundaries to the extent they do with national frontiers.[6] The major problems in this respect arise in allocating multi-regional corporate and multi-regional government income geographically.

Because of inadequate data, most analysts who have attempted to measure the product or output of a region have made the heroic assumption that the rate of return to capital and the quantity of capital used in each industry combine so that the income share accruing to capital in any particular establishment or any particular region is a constant function of the share received by labor, the latter being the only portion of the total which is directly and satisfactorily measurable. This means, then, that apart from differences due to industry mix, the ratio of capital income to labor income is uniform among regions. The assumption that the national capital income/labor income ratio for an industry is constant across regions is tantamount to an assumption that a Cobb–Douglas production function characterizes each industry without regard to its geographic location, or at least that its historical antecedent, a labor theory of value, obtains. The effect of this assumption and the estimating procedures based on it are to make regional differences in income shares and productivity a function of industry mix alone. But, may this not be the case? Given the difficulties and costs involved in measuring regional gross product, should an attempt to do so be made?

To answer these questions, we undertook a pilot study in which gross product originating by detailed manufacturing industries in each State was estimated for one year, 1958.[7] The purpose of the project was to ascertain, at least for manufacturing and inferentially for other industries, the validity of several commonly used proxies for gross area product. Considering the proxy of labor income, for example, we found very high correlation coefficients between labor income and gross product originating by States. No r^2 was less than 0.93. However, when put on a per worker basis, correlation coefficients were lower in all industries, and in eleven out of eighteen, they were not significantly different from zero at the 0.01 level. Equally poor correlations occurred when actual capital income was correlated with capital income calculated on the assumption that within each industry capital income bears a constant relation to labor income. Thus, our general conclusion is that regional labor income by industry may be a reasonable proxy for regional product if one is primarily concerned only with the aggregates. But in per worker terms or as an indirect estimate of the capital income component, regional labor income is not a very accurate proxy for regional product, nor were the other proxies which we tested.

[6]For an elaboration of this point, see J. Thomas Romans, "Measurement Problems and Needs for Capital and Income Flows in Interregional Analysis," *Conference on Capital Income and Regional Development*, North Carolina State University, Agricultural Policy Institute Series No. 21, October 1966, pp. 33–47. The argument of Footnote 2 above can also be phrased in the context of inter-versus intra-institutional (or sectoral) translations.

[7]J. Thomas Romans and Jeanne Goodman, "The estimation of gross State product originating in Manufacturing, 1958," unpublished manuscript. The year 1958 was chosen despite the fact that it is now a decade away because the available data are more plentiful for that year than for any other.

Had the assumption regarding the constancy of the capital income/labor income ratio across regions proved valid, it would have been comparatively simple and economical to construct a fully articulated set of income and product accounts for any region. The invalidity of this assumption precludes our taking the easy way out, however. We are still experimenting with this phase of regional economic measurement, as are others, and perhaps a technique will be developed for making the necessary calculations. Until this is accomplished, we shall concentrate on personal income and outlay as the one major account which is feasible on a geographic basis given the present state of the art and data availability.

Regional Personal Income and Outlay

In recent years, demands for data inputs into benefit-cost calculations have risen exponentially. Traditional series on personal income by States were too aggregative geographically for use in most benefit-cost problems, and in 1964, we began to prepare personal income estimates in local areas across the Nation.

Personal income has now been measured for all local areas in the United States for eight selected years from 1929 to 1967. Generally, the geographic unit used is the county. This unit was chosen because it is the smallest one for which a large amount of basic data can be assembled in a time series on any reasonably consistent basis. Estimates of personal income are now available for 2,572 counties or county equivalents of the 2,630 such units that lie outside of standard metropolitan statistical areas (SMSA's). In addition, estimates have been prepared for the 223 SMSA's of the Nation which together account for another 443 counties. Because much of the basic data required for measuring personal income is available only for SMSA's as a whole, and not for their component counties, no attempt has been made to measure income in the individual counties within an SMSA. This more detailed measurement will be done when additional resources becomes available. The use of approximately 2,800 counties and SMSA's as basic building blocks imparts substantial flexibility to regional classification. Because of the automated data storage and retrieval system now in operational use in the RED, the 2,800 geographic units can be grouped into any regional system, with or without geographic contiguity, and the personal income measure computed immediately in maximum industrial and type of income detail. This flexibility and ease of manipulation is proving to be a major strength of the system.

To measure personal income on a local-area basis, criteria for allocating income to areas had to be established. In the case of labor and entrepreneurial income the relevant criterion seemed to be either place-of-work or place-of-residence of the income earner, with the difference between the two being the net flow of commuter earnings (or the net export of labor servies).[8]

The distinction between place-of-work and place-of-residence cannot be applied so readily, if at all, to the other components of the income flow—

[8]Area earnings on a place-of-work basis minus the earnings of persons who work in the given area, but reside in another area plus the earnings of persons who reside in the given area, but work in another area equal area earnings on a residence basis.

property incomes and transfer payments.[9] It would not appear meaningful to combine the labor component of personal income, measured on a where-earned basis, with property income and transfers which are necessarily measured on a where-received basis.

Accordingly, where an earnings measure by place of work is called for, we use the sum of the three components of labor income: wages and salaries, other labor income, and entrepreneurial income. This measure, termed total earnings, is especially useful for analyzing the income structure of a given area by industrial origin and by type of income. Moreover, given the nebulous assumption of constant factor shares, it serves as a proxy, though not an entirely satisfactory one, for production or output. It provides a basis for evaluating the effect of remedial programs, for identifying the factors underlying an area's economic progress or deterioration, and for measuring the impact of government expenditures on an area's economy. Total earnings by type of income and by industrial source are shown in the upper section of Exhibit 1.

The "residence adjustment", shown in the Exhibit, serves to convert total earnings from a place-of-work to a place-of-residence basis. The addition of property income and transfer payments to total earnings and the deduction of personal contributions for social insurance yield a measure of total personal income on a where-received basis. This is shown in the lower portion of Exhibit 1, a construct useful in the analysis of consumer markets and purchasing power. When expressed in real terms and on a per capita basis, this aggregate constitutes a measure of relative differences in living standards and levels of welfare among regions. Because of a lack of sufficiently detailed data on commuting, it has not been possible to construct an industrial breakdown of labor income *on a where-received basis.* However, such a breakdown, even if it were feasible, would have only limited interest. It would add to the predictability of area changes in personal income under the impact of national industrial developments, but this would seem to be of limited usefulness in contrast to the importance of the industrial breakdown of labor income in a where-earned framework.

It would be desirable to have further breakdowns of the where-received income total by size of income, by social and demographic characteristics, and by type of income and these are all under investigation or development as will be seen in the discussion of accounts for distribution decisions.

Although Exhibit 1 contains data for 1929, 1950, and 1967 only, comparable figures are available for 1940, 1959, 1962, and 1965–1966 also. Moreover, the series will be maintained annually in the future.

The area estimates of personal income are constructed from a wide variety of statistical sources. These are mainly compilations of data by government

[9]In the case of property incomes—rents, dividends, and interest—an alternative concept, resembling the place-of-work criterion, appears theoretically possible. That is, these incomes could be allocated to the areas in which the businesses that generated the property income were located. However, conceptual and statistical difficulties that have not been satisfactorily resolved stand in the way of the application of this criterion. And even if these difficulties did not exist, it may not be advisable to apply the criterion to the property income component of personal income, since it cannot be transformed into a satisfactory measure of the contribution of capital to production, mainly because it excludes all components of profits other than dividends. In the case of transfer payments, place of residence of the recipient appears to be the only meaningful criterion.

EXHIBIT 1

PERSONAL INCOME BY MAJOR SOURCES AND EARNINGS BY BROAD INDUSTRY GROUPS

(Thousands of dollars)

COLUMBUS, OHIO SMSA

	1929	1950	1967[1]
TOTAL EARNINGS (where earned)	295,996	785,082	2,386,996
By type of payment:			
Wages and salaries	242,576	654,470	2,074,196
Other labor income	3,342	16,493	114,924
Proprietors' income	50,078	114,119	197,876
By industry:			
Farm	13,956	22,478	15,401
Nonfarm	282,040	762,604	2,371,595
Government	27,977	97,764	429,624
Federal	3,967	42,234	167,977
Civilian	3,279	32,649	110,761
Military	688	9,585	57,216
State and local	24,010	55,530	261,647
Private nonfarm	254,063	664,840	1,941,971
Manufacturing	71,057	210,631	686,312
Mining	2,127	5,756	5,598
Construction	16,247	50,771	167,616
Transportation, communication and public utilities	41,189	82,425	162,125
Trade	53,449	160,894	421,028
Finance, insurance and real estate	27,577	64,983	159,965
Services	42,166	87,894	333,866
Other	251	1,486	5,461
Residence adjustment	—	−11,010	−68,134
TOTAL EARNINGS (where received)	295,996	774,072	2,318,862
Property income	55,186	123,086	312,588
Transfer payments	6,442	52,743	206,882
Less: Personal contributions for social insurance	536	14,164	97,068
TOTAL PERSONAL INCOME (where received)	357,088	935,737	2,741,264
POPULATION (thousands)	413.0	565.4	859.6
PER CAPITA INCOME (dollars)	865	1,655	3,189
Per capita relative (percent of U.S. *per capita* income)	123	111	101

[1]Comparable figures are available also for 1940, 1959, 1962 and 1965–1966.

agencies, usually as a by-product of their administrative or regulatory functions. In addition, a significant amount of basic information is derived from private sources. A major example of data from government sources is the tabulations of wages and salaries by industry prepared by the various State unemployment insurance (UI) commissions from employer reports. Another example is the compilation by the Internal Revenue Service (IRS) of the total amounts of entrepreneurial income, dividends, interest, and rents reported by individuals in various geographic areas on Federal income tax returns. In neither instance, however, is coverage complete. Instead, a job of substantial magnitude remains to fill gaps in the areas covered by UI and IRS as well as to obtain data from other sources for components not covered by these two programs.

Data on economic activities in local areas are not collected in the framework of a coordinated statistical program designed for income measurement. For the most part, reported statistical information is not directly or wholly suitable for this purpose and must be processed to adjust for differences in definition and to fill gaps in coverage. Geographic income measurement thus becomes a twofold task: Assembling data from a multiplicity of sources and then adapting them, through estimation, in a step-by-step buildup of aggregate income from component flows.

All income estimates made in the RED are developed within the framework of the OBE's national income and product accounts by an allocation procedure. That is, area totals for each income component—beginning with those for the Nation—are allocated to the next smaller areas in accordance with those areas' proportionate shares of a related economic series. For many components, the allocating series is the one from which the larger area total was derived. For other components, the allocating series may be related directly or indirectly to the item being allocated. This approach permits the utilization of all available sources of information. Moreover, the use of an allocation method yields a large amount of analytically useful information on industrial sources of income at the local-area level.

In summary, personal income presents a detailed picture of the economic structure of an area and may be the most comprehensive economic aggregate presently practicable to construct. Through it, economic progress or deterioration can be traced and the factors directly responsible identified. Moreover, historical data, which can be constructed, provide a background for regional economic projections and the estimation of future demands and capacity requirements for benefit-cost calculations.

Work is now underway in the RED to develop methodology for measuring at the State level personal tax and nontax payments and personal outlays, with personal savings derived as a residual. Measurement of the first of these three components has been completed and substantial progress made on the second. Upon completion of this effort the methodology will be adapted from the State to the local-area level—generally a much easier task than that of developing new methodology—and the personal income and outlay account will have been established in its entirety.

Employment

There are no comprehensive, long-term employment time series covering the Nation on a local-area basis other than those from the decennial censuses of population, which reflect place-of-residence of employees. A preferable series would be one measured on a place-of-work concept and which was statistically comparable to the earnings component of personal income. Such a series, now under construction in the RED, will make possible a more rigorous analysis of regional economies than is now feasible.

Pending the development of employment estimates tailored to our needs, a temporary measure has been assembled. Employment by counties in 1940, 1950 and 1960 was taken from the corresponding decennial censuses of population. Some estimating and rearranging of data were necessary in order to obtain a

EXHIBIT 2

EMPLOYMENT AND COMPONENTS OF EMPLOYMENT CHANGE, YUBA COUNTY, CALIFORNIA[a]

INDUSTRY	EMPLOYMENT IN			COMPONENTS OF EMPLOYMENT CHANGE							
				1940–1950				1950–1960			
				Changes Related to				Changes Related to			
	1940	1950	1960	Nat'l growth	Industrial mix	Regional share	Total change	Nat'l. growth	Industrial mix	Regional share	Total change
Agriculture	1,126	1,264	1,275	300	−502	340	138	196	−682	497	11
Forestry and fisheries	8	29	62	2	−1	20	21	4	−12	40	32
Mining	563	213	124	150	−143	−358	−351	33	−96	−26	−89
Contract construction	489	678	1,241	130	198	−139	189	105	−35	493	563
Food and kindred products manufacturing	64	113	227	17	1	31	49	17	15	81	113
Textile mill products manufacturing	1	2	0	0	0	1	1	0	−1	−2	−3
Apparel manufacturing	2	2	4	1	0	−1	0	0	0	2	2
Lumber, wood prod., furn.	54	543	519	14	0	475	489	84	−140	32	−24
Printing and publising mfg.	44	53	89	12	4	−7	9	8	10	18	36
Chemicals and allied prod. mfg.	1	2	5	0	0	1	1	0	0	2	2
Electrical and other mach. mfg.	10	29	83	3	7	10	20	4	9	40	53
Motor vehicles and equip. mfg.	8	0	0	2	2	−12	−8	0	0	0	0
Other transp. equipment mfg.	2	5	68	1	1	2	4	1	4	58	63
Other and miscellaneous mfg.	17	91	129	5	1	68	74	14	3	21	38
Railroads and railway express	72	136	62	19	−3	48	64	21	−65	−30	−74
Trucking and warehousing	42	89	99	11	5	31	47	14	13	−16	11
Other transportation	25	52	62	7	8	12	27	8	−7	9	10
Communications	50	120	151	13	27	30	70	19	0	12	31
Utilities and sanitary service	208	236	182	55	37	−64	28	37	−2	−88	−53
Wholesale trade	112	222	288	30	42	38	110	34	−8	40	66
Food and dairy products stores	212	254	276	57	−24	9	42	39	−44	27	22

Eating and drinking places	301	393	434	80	73	−62	91	61	−36	16	41
Other retail trade	537	1,016	1,117	143	65	271	479	157	19	−76	100
Finance, ins. and real estate	101	160	287	27	4	28	59	25	40	63	128
Hotels and other pers. serv.	305	372	333	81	−50	36	67	58	−42	−55	−39
Private households	122	120	338	33	−69	34	−2	19	2	198	219
Business and repair services	138	236	199	37	34	27	93	37	17	−90	−36
Entertainment, rec. services	79	121	68	21	−2	23	42	19	−17	−55	−53
Medical, other prof. services	379	650	924	101	66	104	271	101	276	−103	274
Public administration	200	259	614	53	85	−80	58	40	31	284	355
Armed forces	0	24	2,414	0	0	24	24	4	13	2,373	2,390
Industry not reported	144	105	435	38	−7	−71	−40	16	204	110	330
TOTAL	5,416	7,589	12,109	1,443	−141	869	2,171	1,175	−531	3,875	4,519

[a]The change in employment in an area in any period consists of three parts for any single industry or for the summation across all the industries. The first of these is the change that would have occurred at the national rate, termed the national growth effect; the second is change related to industrial mix; and the third is change related to any alteration in the regional share. The three parts sum to the actual change.

The national growth effect is calculated by applying to employment in each industry in the base year the percent change in total employment in the Nation between the base and terminal years. This is the growth that would have occurred had the area been like the Nation in all respects.

The industrial-mix effect is calculated by applying to employment in a given industry in the base year the difference between the all-industry national rate of growth and the national rate of growth in the specified industry. If a specific industry has grown nationally at a rate less than that for all industries combined, nationally, the industry-mix effect will be negative in every area, with the size of the effect a function of the size of the industry (number of employees) in the area in the base year.

The regional-share effect is calculated by applying to employment in a given industry in the base year the difference between the national rate of growth in the industry and the regional rate of growth in the same industry.

Change elements (growth, mix and share) afford ready comparisons of performance among regions. Such an orientation is a valuable prologue to model building which attempts to explain root causes of change or to afford plausible techniques of projection.

Special care has been taken by Ashby to indicate that the technique is not in itself a behavioral growth model. In its totality, for example, it is more analogous to a system of indexes or an account which places both industries and regional areas on a common footing for a review of change during an elapsed period.

For discussion of the above and other issues, see the following: Lowell D. Ashby, *Growth Patterns in Employment by County, 1940–1950 and 1950–1960*, U.S. Department of Commerce, Office of Business Economics (Washington, D.C., Government Printing Office, 1965), 8 regional volumes.

David B. Houston, "The Shift and Share Analysis of Regional Growth: A Critique," *The Southern Economic Journal*, April 1967, pp. 577–581.

Lowell D. Ashby, "The Shift and Share Analysis: A Reply," *The Southern Economic Journal*, January 1968, pp. 423–425.

H. James Brown, "Shift and Share Projections of Regional Economic Growth: An Empirical Test," *Journal of Regional Science*, April 1969, pp. 1–17.

Lowell D. Ashby, "Shift and Share Projections . . .: Comment," forthcoming *Journal of Regional Science*.

uniform industrial classification. The Census-based series, which ended at 1960, was extended to 1962 and 1965–1967 on the basis of an employment series taken from reports of the Old-Age and Survivors' Insurance (OASI) Program for 1959, 1962, and 1965–67. Because the Census series reflects residence of the employees and the OASI series is reported by place of work, the extension was not made at the county level, but for groups of counties (economic areas) in which place-of-work and place-of-residence generally coincided. These multi-county areas are discussed in the following section.

In order to utilize the employment series most effectively, a technique termed "shift-share" analysis has been applied to the entire series at the county level by Lowell D. Ashby of the RED, one of the principal developers of "shift-share." An example of this technique for one U.S. county is shown in Exhibit 2.[10] As noted, comparable tables have been prepared for all counties and can be calculated by the RED for any specified group of counties in the Nation.

"Shift-share" analysis provides a rational and orderly method for sorting out the factors which relate to differences in the rates of employment growth among areas. It distinguishes the industrial-mix effect (the effect on a region's growth of its industrial mix in terms of industries which on a national basis are classified as fast-or slow-growing) from the competitive or regional-share effect (the effect on a region's growth of its industries growing faster or slower than the same industries elsewhere).

Since both the industrial-mix and the regional-share factors are at work simultaneously, they may be either reenforcing or offsetting. In some areas, both factors will be positive; in others, both will be negative. In still other areas, one factor will be positive and one negative. The data do not pretend to show what an area's industrial mix or regional share should be. Investigators will realize, for example, that many areas have had low growth rates in total employment because of their heavy commitment to agriculture. But the decline in agricultural employment is the product of a wide-ranging inter-industrial, technological revolution which has benefited the Nation's economy significantly. Likewise, in certain other industries, technological advances have held down the rate of employment growth. There is no implication that high rates of employment growth can be considered as desirable developmental objectives without regard to other considerations.

As shown in Exhibit 2, two types of information are presented: First, actual employment in 1940, 1950, and 1960, and second, components of employment change in each of the two periods 1940–1950 and 1950–1960.

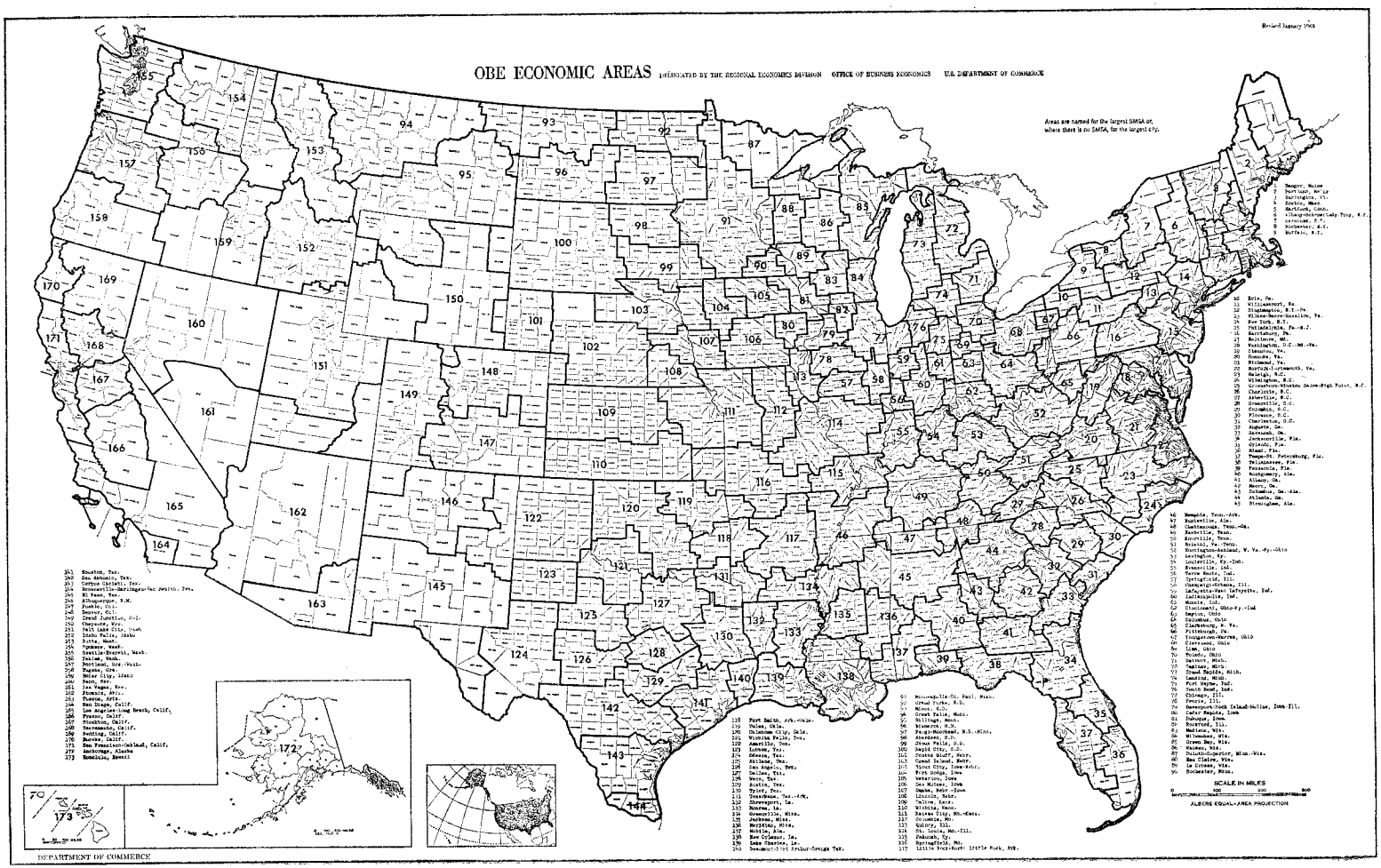
Separation of employment in an area into its component parts permits ready identification of the factors and industries responsible for an area's progress or decline. Although the "shift-share" approach of itself does not reveal the causes of employment change in an area, it lays the problem out in preparation for analysis.

Projections of Personal Income and Employment

The RED has made several types of regional economic projections. We shall discuss only the one which is being used most generally. The geographic

[10]A more detailed statement on "shift-share" is given in the footnote to Exhibit 2.

EXHIBIT 3


OBE ECONOMIC AREAS
DELINEATED BY THE REGIONAL ECONOMICS DIVISION OFFICE OF BUSINESS ECONOMICS U.S. DEPARTMENT OF COMMERCE
Revised January 1969
Areas are named for the largest SMSA or, where there is no SMSA, for the largest city.
SCALE IN MILES
ALBERS EQUAL-AREA PROJECTION
DEPARTMENT OF COMMERCE

units for which the projections are made consist of 173 nodal or functional economic areas that cover the Nation. These are shown in Exhibit 3. The economic areas which have been delineated are based on the nodal-functional area concept. To each urban center are attached the surrounding county units in which economic activity is focused directly or indirectly on the center. Each economic area combines the place of residence and place of work of its residents as nearly as possible, which results in regions with minimal commuting across area boundaries. Each economic area specializes in the production of certain goods and services presumably in order to take advantage of lower costs of production resulting from the availability of natural resources and from benefits to be derived from internal and external economies. These are its export or basic industries. In addition, each area approaches self-sufficiency in its residentiary or local-service industries. That is, most of the services and some of the goods required by the household sector and by local business as intermediate products are produced within the area.

The economic areas used here correspond to the closed trade areas of central place theory in which the number and type of establishments and their size and trade areas are bounded by the relative transportation costs from hinterland to competing centers. Each area approaches closure with respect to residentiary industries which include general and convenience retail and wholesale trade activities and those other services which are difficult or impossible to transport and are most efficiently consumed in the vicinity of their production. The economic areas remain open, for the most part, to the movement of transportable commodities and nontransportable special services such as education at Cambridge and recreation at Miami. Hopefully, based on such delineations, interindustry coefficients, income and employment multipliers, and other economic relationships within each area will have maximum constancy over time and space and, hence, facilitate the task of analysis and projection.

Exhibit 4 shows the detail that is being projected. Forthcoming projections will include greater detail in the earnings component of income than that shown in Exhibit 4. Certain aggregates or components are projected for use as a measure of the demand for specific types of goods. For example, employment or earnings of persons engaged in the chemical and allied products industry can serve as the starting point to measure future water requirements in that industry.[11] Of

[11]In our work thus far, all of it involving water resource development, we have avoided the problem of evaluating or pricing the benefits through the convenience of an assumption, namely, that the demand for water was perfectly inelastic. This left the task of estimating benefits to be simply one of projecting regional income and output and derived capacity requirements without any water constraint. For no matter what requirements or what the costs, given the assumption of perfect inelasticity, there is always a price consumers would be willing to pay which would make benefits exceed costs, and justify completely filling all capacity requirements (defined, in effect, as demand at zero price).

For the bulk of the United States, an assumption of a perfectly inelastic demand for water may be plausible. It meets the traditional criteria for products to be in inelastic demand—necessary, no good substitutes, low price and as an intermediate input it is usually a small percentage of total cost, etc. For the more arid areas of the U.S., and the world, where water developments may be more costly, the assumption may well not be valid as demand may be significantly less inelastic in higher price ranges.

The condition of perfectly inelastic demand avoids another problem, namely, in any other circumstance if public investment takes place to the point where marginal cost equals marginal

[*footnote continued on next page*

EXHIBIT 4

OBE ECONOMIC AREA 02026

POPULATION, PERSONAL INCOME, AND EARNINGS BY INDUSTRY SOURCE, SELECTED HISTORICAL YEARS, 1929–1962

	1929	1940	1950	1959	1962
POPULATION, July 1	923,566	1,059,075	1,207,352	1,319,808	1,407,714
EMPLOYMENT	—	387,916	469,545	521,431	—
			(In thousands of 1958 $)		
Total personal income	555,163	845,208	1,634,265	2,115,814	2,487,970
Per capital income	601	798	1,354	1,603	1,767
Per capita relative (US = 1.00)	0.47	0.62	0.75	0.75	0.78
INCOME BY TYPE OF PAYMENT					
Wages and salaries	346,156	582,591	1,087,691	1,491,701	1,747,625
Other labor income	2,178	5,592	30,849	72,688	91,582
Proprietors' income	135,605	159,329	262,096	231,777	253,489
Property income	62,847	81,899	161,601	227,309	286,531
Transfer payments	9,149	21,885	112,791	137,552	169,675
Less: contribs. to soc. insurance	772	6,088	20,763	45,213	60,932
TOTAL EARNINGS	483,939	747,512	1,380,636	1,796,166	2,092,695
Per worker earnings	—	1,927	2,940	3,445	—
Per worker relative (US = 1.00)	—	0.63	0.75	0.74	—
Agriculture, forestry and fisheries	94,579	88,856	126,122	69,508	84,408
Farms	93,539	87,670	124,403	66,163	81,217
Agr. services, forestry and fish.	1,040	1,186	1,719	3,345	3,191
Mining	1,030	1,319	3,151	3,957	4,506
Contract construction	17,484	36,583	88,194	107,930	109,582
Manufacturing	156,242	286,073	595,809	740,416	879,560
Transp., commun. and pub. utilities	30,142	45,269	79,711	138,328	155,879
Wholesale and retail trade	80,343	130,148	226,484	319,042	354,553
Finance, insurance and real estate	15,220	16,213	31,086	66,374	80,095
Services	60,429	76,764	135,753	202,276	232,516
Federal civilian government	6,027	31,845	18,128	29,677	29,615
State and local government	22,069	33,855	60,602	103,039	145,375
Federal military	374	587	15,596	15,619	16,607

Footnote continued from previous page

benefit, but the output is sold at a zero price (or any price below marginal cost) which is generally the case, excess demand appears. This is a rather clear case where allocation and distribution considerations cannot be separated. See John V. Krutilla, "Is Public Intervention in Water Resources Development Conducive to Efficiency,"*Natural Resources Journal*, Vol. 6 (Jan., 1966) and J. W. Milliman, "Beneficiary Charges and Efficient Public Expenditure Decisions," (Mimeo prepared for Joint Economic Committee, U.S. Congress, *Compendium*: *Economic Analysis of Public Expenditure Decisions*: *The PPB*.

This assumption is used only to derive a set of "base-line" projections. Subsequent analyses will employ more realistic assumptions regarding the elasticity of demand for water and alternative projections will be made under varying assumptions.

EXHIBIT 4—continued

OBE Economic Area 02026

Population, Personal Income, and Earnings by Industry Source, Projected Years, 1970–2020

	1970	1980	1990	2000	2010	2020
Population	1,624,900	1,882,800	2,184,100	2,539,400	2,980,400	3,508,000
Employment	642,800	763,000	875,200	1,033,900	1,216,900	1,425,400
			(In thousands of 1958 $)			
Total Personal Income	3,864,400	6,366,400	9,808,300	15,818,000	24,952,000	39,002,900
Per capita income	2,378	3,381	4,491	6,229	8,372	11,118
Per capita relative (US = 1.00)	0.78	0.82	0.84	0.87	0.88	0.90
Total Earnings	3,167,700	5,082,200	7,680,000	12,277,800	19,201,600	29,815,700
Per worker earnings	4,928	6,661	8,775	11,876	15,779	20,917
Per worker relative (US = 1.00)	0.78	0.82	0.84	0.87	0.88	0.90
Agriculture, forestry and fisheries	100,300	116,000	125,200	152,100	178,400	213,900
Farms	96,000	110,400	115,900	—	—	—
Agr. services, forestry and fish.	4,300	5,500	9,300	—	—	—
Mining	5,100	6,600	8,200	10,800	13,600	17,100
Contract construction	195,500	304,709	459,700	718,400	1,117,200	1,724,900
Manufacturing	1,294,000	2,099,700	3,076,700	4,765,600	7,086,000	10,479,300
Transp., commun. and pub. utilities	224,900	310,600	416,000	595,400	864,000	1,264,400
Wholesale and retail trade	545,100	838,100	1,242,500	1,929,100	2,985,600	4,612,600
Finance, insurance and real estate	127,800	210,600	325,200	525,600	843,100	1,333,500
Services	369,600	708,200	1,263,300	2,232,000	3,845,800	6,419,400
Civilian government	294,700	474,400	746,200	1,326,300	2,238,400	3,711,700
Federal military	10,600	13,100	17,000	22,400	29,500	38,800

EXHIBIT 4—continued

OBE Economic Area 02026

Population, Employment by Industry, Selected Historical Years, 1940–1960

	1940	1950	1960
Population, April 1	1,058,274	1,206,260	1,347,352
Participation rate (Empl./Pop.)	0.37	0.39	0.39
Total Employment	387,916	469,545	521,431
Agriculture, Forestry and Fisheries	97,283	71,032	30,788
Agriculture	97,176	70,882	30,541
Forestry and fisheries	107	150	247
Mining	791	662	760
Contract Construction	14,501	26,328	31,258
Manufacturing	146,146	186,823	221,340
Food and kindred products	5,002	6,771	10,799
Textile mill products	113,777	134,650	131,386
Apparel and other textiles	1,287	4,439	11,884
Printing and publishing	1,780	3,014	5,200
Chemicals and allied products	1,828	3,401	5,055
Lumber and furniture	14,817	22,606	28,249
Machinery	1,548	3,353	10,522
Machinery, excluding electrical	—	2,631	7,066
Electrical equipment and supplies	—	722	3,456
Transportation equipment	523	576	2,064
Motor vehicles and equipment	424	527	407
Trans. eqp., exc. motor vehicles	99	49	1,657
Other manufacturing	5,584	8,013	16,181
Paper and allied products	—	918	2,435
Petroleum refining	—	186	737
Primary metals	—	2,064	2,225
Fabricated metals and ordnance	—	993	3,264
Miscellaneous manufacturing	—	3,852	7,520
Transp., Comm. and Pub. Utilities	14,860	24,536	29,038
Transportation	10,184	16,452	17,816
Railroad transportation	5,621	6,954	4,712
Trucking and warehousing	3,179	6,087	10,095
Other transportation services	1,384	3,411	3,009
Communications	1,714	3,588	4,559
Utilities (elec., gas, sanitary)	2,962	4,496	6,663
Wholesale and Rental Trade	41,019	67,765	83,233
Wholesale trade	5,905	11,414	15,656
Retail trade	35,114	56,351	67,577
Eating and drinking places	4,346	7,241	8,419
Other retail trade	30,768	49,110	59,158
Finance, Insurance and Real Estate	4,835	8,010	14,788
Services	63,114	73,865	98,901
Lodging places and personal ser.	10,049	13,059	13,978
Business and repair services	4,073	7,568	9,555
Amusement and recreation services	1,946	2,955	2,874
Private households	28,915	22,111	27,058
Educ., med. and professional ser.	18,131	28,172	45,436
Government	5,367	10,524	11,325
Public administration	5,367	8,458	10,894
Federal military	—	2,066	431

EXHIBIT 4—continued

OBE Economic Area 02026

Population, Employment by Industry, Projected 1970–2020

	1970	1980	1990	200	2010	2020
Population	1,624,900	1,882,800	2,184,100	2,539,400	2,980,400	3,508,000
Total Employment	642,800	763,000	875,200	1,033,900	1,216,900	1,425,400
Participation rate (empl./pop.)	0.40	0.41	0.40	0.41	0.41	0.41
Agriculture, Forestry and Fisheries	22,400	18,100	14,500	12,100	9,900	8,000
Agriculture	22,100	17,700	14,100	—	—	—
Forestry and fisheries	300	400	400	—	—	—
Mining	700	700	700	700	700	700
Contract Construction	39,900	47,300	54,300	63,600	74,400	86,700
Manufacturing	272,100	311,700	343,800	382,900	427,100	475,900
Food and kindred products	12,500	13,300	14,100	14,700	15,300	15,800
Textile mill products	148,100	157,700	161,500	164,500	167,300	169,800
Apparel and other textiles	19,500	28,200	38,600	—	—	—
Printing and publishing	6,800	8,700	10,500	—	—	—
Chemicals and allied products	6,700	8,600	10,400	13,100	15,700	18,500
Lumber and furniture	33,000	34,600	35,800	—	—	—
Machinery	18,200	25,000	30,600	—	—	—
Machinery, excluding electrical	12,300	16,300	19,300	—	—	—
Electrical equipment and supplies	5,900	8,700	11,300	—	—	—
Transportation equipment	2,600	3,100	3,400	—	—	—
Motor vehicles and equipment	500	500	500	—	—	—
Trans. eqp., exc. motor vehicles	2,200	2,600	3,000	—	—	—
Other manufacturing	24,800	32,500	39,000	—	—	—
Paper and allied products	3,300	4,100	5,000	6,000	7,200	8,400
Petroleum refining	700	700	700	600	600	500
Primary metals	3,400	3,900	4,400	4,900	5,400	5,800
Fabricated metals and ordnance	6,000	8,600	10,500	—	—	—
Miscellaneous manufacturing	11,400	15,200	18,500	—	—	—

TRANSP., COMM. AND PUB. UTILITIES	32,900	36,200	38,900	40,000	42,000	44,500
Transportation	19,300	20,000	20,300	—	—	—
Railroad transportation	3,800	3,000	2,300	—	—	—
Trucking and warehousing	11,900	12,800	13,300	—	—	—
Other transportation services	3,700	4,300	4,800	—	—	—
Communications	5,400	6,100	6,700	—	—	—
Utilities (elec., gas, sanitary)	8,200	10,100	11,800	—	—	—
WHOLESALE AND RETAIL TRADE	101,000	119,700	137,200	158,800	184,400	214,100
Wholesale trade	19,400	23,200	27,100	—	—	—
Retail trade	81,600	96,400	110,100	—	—	—
Eating and drinking places	10,800	13,400	15,800	—	—	—
Other retail trade	70,800	83,100	94,400	—	—	—
FINANCE, INSURANCE AND REAL ESTATE	20,300	26,300	32,000	40,400	50,100	61,100
SERVICES	138,100	182,900	228,600	301,200	383,500	477,000
Lodging places and personal services	17,400	20,300	23,000	—	—	—
Business and repair services	17,700	27,900	38,400	—	—	—
Amusement and recreation services	3,700	4,400	5,200	—	—	—
Private households	24,200	22,000	19,700	—	—	—
Educ., med. and professional services	75,100	108,200	142,400	—	—	—
GOVERNMENT	15,300	20,100	25,200	34,300	44,800	57,400
Public administration	14,900	19,700	24,800	33,900	44,400	57,000
Federal military	400	400	400	400	400	400

course, projected earnings must be accompanied by projected water use technological coefficients developed by engineer-economist teams.

Total personal income and total earnings can serve to derive household and municipal demands for water. Projected personal income with its industrial sources and type of income detail can serve as a framework for evaluating the economic impact of alternative proposals and for measuring at least in part the benefit side of the benefit-cost calculation.

Consideration was given to the use of an econometric model with which to make the projections, and, indeed, such a model is presently under development. However, the model contemplated presupposes a more detailed and rigorous set of input data than is now available. Accordingly, until the more refined series are on hand—and considerable progress has been made in developing them—we are using a comparatively simple projection method that relies to a significant degree on correlative data and judgment.

The earnings component of personal income (See Exhibit 1) is projected by first identifying those industries in each area that produce for national or international markets—the basic or export industries. Earnings in each of these industries in each area are converted to percentages of the national total of the industry in 1929, 1940, 1950, 1959, 1962, and 1965–1967. Each series is studied in the light of all correlative data relating to industry location that can be assembled. On the basis of this analysis, a trend line is fitted to the 1929–1967 data and extended into the future.

Substantial judgment is used in extending the historical trend. Such judgment reflects analysis of erratic observations in the historical time series; the timing of past or anticipated significant developments in the geographic location of the industry; the status of the supply of the natural resource on which a particular industry depends; and the shape of the curve fitted to the measured observations. This approach permits the full utilization of all information that can be assembled on any given industry in any region, which is a desirable attribute in any case but especially so when information is very limited.

Projected area shares of each basic, or export, industry are forced to total to 100 percent and the projected share of each industry is then applied to independently projected national values of earnings in the corresponding industry. Employment in basic or export industries is projected in the same manner as are earnings.

The interactions of the basic and the local-service industries in an area produce in the latter type industry a multiplier effect similar to a Keynesian consumption multiplier. Since the function of local-service or residentiary activities is to supply the local businesses and households with commodities and services which do not enter into interregional trade in substantial amounts, the magnitude of these residentiary activities is determined by the size of earnings and employment in basic industries of the region. Because of these functional regional relationships, earnings and employment in residentiary industries can be projected on the basis of changes in the export industries.

Specifically, location quotients for the individual residentiary industries of each area are projected on the basis of historical trends. The relationship of projected location quotients for the industries of an area and the projected

national industrial composition of earnings and employment provide the basis for calculating the projected industrial composition of the area. This relationship together with projected earnings and employment in the basic industries permit the derivation of total earnings and employment and of residentiary earnings and employment in each area—see footnote 16.

The income and employment projections for each industry—basic and residentiary—in each economic area are then compared and adjustments made as necessary. In some instances this reconciliation points clearly to the necessity for a change in either the earnings or the employment component. Occasionally, compromise is necessary and both components are adjusted judgmentally.

The remaining components of income—transfer payments and property income—are projected by evaluating past trends and by their relationship to per worker earnings. Population is projected by extending the relationship of population and employment with special adjustments made for areas with large groups of retired persons.

Conceptually, the relationship between the basic and the local-service industries is most stable in a nodal regional delineation scheme and least stable in an arbitrary or administratively determined regional delineation. Thus, the relatively closed trade area incorporated in the functional economic area concept would hypothetically permit less variance between basic and residentiary sectors than would regions composed of counties or other groupings of counties based on other criteria. Empirical studies performed by the RED with respect to indexes of industrial centralization and of relative regional specialization support the hypothesis that less variation in the basic-service relationships occurs in such nodal regions as OBE economic areas than in non-nodal regions comprised of single counties or of homogeneous or arbitrary groupings of counties. Hence, the validity for projecting such cross-section relationships as basic-service interactions forward in time decreases as regional delineations depart from the nodal region concept.

Project Evaluation

Projections of income, employment and population are basic ingredients used in benefit-cost analysis in order to derive future demands for the goods or services which the project under evaluation is intended to produce. However, these by no means meet all data requirements of benefit-cost analysis. Other supporting series such as interindustry linkages, trade flows, prices, etc., are required. The RED is developing some data series on the first two of these. We have compiled no information on price differentials among regions, however, although we have experimented with price *indexes* to deflate personal income to real terms.

Benefit-cost analysis becomes most troublesome when applied to public projects which are large relative to the affected area. Here, indirect effects can be numerous and substantial and relative prices so affected that the *ceteris paribus* assumptions usually associated with benefit-cost analysis become inappropriate. These problems become paramount when the *raison d'etre* of a project is to affect relative prices in such a way as to promote regional economic development.

The literature on the estimation of gross benefits is characterized by a confusion of terminology. This reflects the fact that it constitutes the language of a heterogeneous group of persons such as politicians, planners, program managers, engineers, economists, and others. The consequent confusion of language constitutes *prima facie* evidence that communication is not taking place.[12] Therefore, as an aid to understanding the next few pages, rather than as a resolution of semantic conflicts, we offer the following definitions and distinctions.

There are three effects of public investment which are associated with gross benefits and which can be distinguished.

(1) Direct effects: Output effects flowing directly from the project including those that enter the income stream as well as those intangible ones which are not caught in presently-defined income measures.

(2) Indirect effects: Output effects that are caused by the project but which are external to it, i.e., which result from shifts of utility or production functions of other economic units.

The direct and indirect effects are synonomous with gross benefits as usually defined by benefit-cost theorists and they may be positive or negative. It is here that our models are weakest, particularly with respect to the estimation of indirect (or external or agglomeration) effects which can be substantial in large projects and which in fact are most often the objective of development projects.

(3) Secondary effects: Induced income effects, or Keynesian-type multiplier effects, resulting from changes in exogenous spending in a region as a direct or indirect result of the project.

These types of income multiplier effects are often excluded from benefit-cost calculations where economic efficiency is the only goal on the grounds that they do not represent changes in total income or output but rather represent the zero sum effects of a reallocation of resources among regions and industries. The desirability, and perhaps necessity, of considering them in benefit-cost calculations, is discussed below.

One approach to benefit-cost analysis which has the deceptive appearance of simplicity is that of calculating gross benefits as the difference in an affected region's projected income with and without the contemplated investment.[13]

[12]For one attempt to untangle the morass, see Julius Margolis "Secondary Benefits, External Economics, and the Justification of Public Investment," *Review of Economics and Statistics*, August 1957.

[13]A computational formula would be:

$$\frac{B_g}{C_g} = \frac{\sum_{t=0}^{n} (Y_t^P - Y_t^0 - C_t^i)(1 + r)^-}{\sum_{t=0}^{n} C_t^d (1 + r)^{-t}}$$

Where:

B_g = Present value of gross benefits

C_g = Present value of gross costs

Y_t^P = Gross annual income of the region with the existence of the project (i.e., including all technologically induced and income multiplier effects) in year t

[*footnote continued on next page*

There are serious statistical, or measurement, difficulties which make the use of the suggested formulation difficult. Yet, there are clear advantages in using such an approach as a starting point for conceptualizing the problem in that (1) it does bring into the calculation of benefits price effects which are internal to the region but which may be external to the project itself and (2) with respect to specific projects, adjustments can be made to account for non-price effects and price effects external to the region where they are expected to be significant. Although there are several problems that preclude the ready use of this approach at this time, we are moving to implement it.

The first major problem is that national or regional income, as presently defined, is an inadequate proxy for welfare in the allocation process. The arguments here are familiar. In national income accounting, with few exceptions, a market criterion is used to determine the inclusion or exclusion of an activity in the accounts, and, therefore, leisure is excluded; no product or income is generated within the household sector unless a monetary transaction is involved and no benefits in excess of production costs can be counted in the public sector.

With respect to this last point, it has already been noted that the problem of measuring direct benefits is in effect the problem of imputing prices and measuring value added by government. The problem is not simply that most government output is not sold in the market for insofar as government output consists of producers' goods or intermediate products, both the direct benefits as well as any indirect ones resulting from shifting private sector production functions will be picked up in the procedure of comparing real income streams with and without a project. However, insofar as government production consists of consumer goods which are not sold or if it generates indirect effects by shifting private sector utility functions, such benefits will not show in a comparison of income streams. In sum, benefits will not be completely reflected in national income prices and, consequently, national income is an inappropriate measure of them.

Second, all benefits and costs, direct and indirect, may not occur in one region; instead, they may be transmitted to other regions via price changes. For example, if a government investment project lowers the prices of a region's exports, many recipients of the project's benefits would be outside the region and the above procedure would underestimate benefits. Or, if the direct benefits of the project are sold at a price below marginal cost, and thus are at least partially tax financed, a regional subsidy and interregional redistribution of income would be taking place.[14]

Footnote continued from previous page

Y_t^0 = Gross annual income of the region in the absence of the project in year t
C_t^i = Indirect costs, i.e., any increases in capital and labor employment in the region times their opportunity costs (measured as the national average rate of return to these resources) excepting those resources which are directly employed in the project itself (i.e., the costs of the project) in year t
C_t^d = The annual direct construction and operation costs of the project in year t
r = The social rate of discount
n = Life of the project.

[14]Even if marginal cost pricing exists, where there are economies of scale, partial tax finance and interregional redistribution of income still take place. If there are diseconomies of scale, a negative subsidy exists for the region in which the government investment is located. See J. W. Milliman, "Beneficiary Charges and Efficient Public Expenditure Decisions." *Op. cit.*

The possibility of indirect benefits being transmitted to other regions via changes in the prices of regional exports is probably not a major defect in the procedure. Such price effects would only be significant if the affected export products bulked sufficiently large in their national markets to affect national prices significantly.

The regional redistribution effects resulting from the secondary income impacts may be quite sizeable. Given the proportion of local consumption of locally-produced goods and services to total local production for most regional delineations at least as large as an SMSA, the secondary redistributive effects may well dominate the direct and indirect effects of the project on regional income. It one used changes in national income rather than regional income as a measure of benefits, most or all of such secondary effects will tend to wash out nationally.

However, there are several good reasons to consider such secondary income effects on regional income when assessing benefits: (1) No bias is introduced if the benefits of such income effects are cancelled by foregone output elsewhere (in the equation in footnote 13, they are included in the C^i and are appropriately deducted); (2) insofar as these income effects accrue to immobile or otherwise unemployed resources, they constitute a legitimate benefit and should be included; (3) there is a certain utility in stating the effects of a project in gross income streams rather than in terms of exogenous changes; (4) it provides the informational input for any desired tradeoffs between efficiency and distribution objectives as advocated by many economists;[15] and (5) the resulting distribution effects can react back on efficiency and allocation decisions. Ideally, allocation and distribution decisions should be considered simultaneously, particularly with respect to large projects where both effects can be significant. Should such interregional distribution effects be completely ignored, excess demand in some regions and excess supplies in others could appear because of the multiplier effects of the project on regional incomes, demand and migration.

Analytical models are required for implementation which, given the present state of the art, are either not very good at best or nonexistent at worst. This is the basic problem confronting the Regional Economics Division. With a mandate for data input for economic decisions, we still lack the conceptual or accounting constructs to organize efficiently such data input. Ideally, an income projection model is required with regional income appropriately defined and with such specification that detailed public projects can appear as policy parameters; this we do not have.

As discussed above, the projection model now used is one that projects past trends and changes in trends, albeit with endogenous elements, so that the relations are not completely specified. A feasible, but difficult, approach to benefit-cost, one on which we are presently working, will use this projection model to estimate future incomes in the absence of the project under consideration,

[15]Arthur Maass, "Benefit-Cost Analysis: Its Relevance to Public Investment Decisions," *Quaterly Journal of Economics*, May 1966, pp. 208–226, and Stephen A. Marglin, *Public Investment Criteria* (Cambridge: M.I.T. Press), 1968; Burton A. Weisbrod, "Income Redistribution Effects and Benefit-Cost Analysis," Problems in Public Expenditure Analysis, 1968, reprinted in The University of Wisconsin, Social Systems Research Institute Reprint Series No. 179.

and will employ impact models and other analyses to ascertain the effects of the project on equilibrium income with appropriate judgmental adjustment for intangibles and the other problems noted. Specifically, an impact model (discussed in the following section) will gauge the secondary benefits of the investment project. Direct benefits will be calculated from information furnished by the planners who originate the proposed investment. The problem of measuring indirect benefits has not yet been solved, but work is underway to identify and quantify the forward linkages of a given investment project.

Accounts for Distribution Decisions

The distribution function contains the two related objectives of securing both an optimal distribution of income *among* regions as well as an optimal distribution *within* regions (or the Nation) among persons.

Distribution of Income Among Regions

Income redistribution among regions of the United States is occurring. In part this is associated with population redistribution. Differential changes in per capita income associated with changing composition of the population and industry-mix of regions also contribute to regional income redistribution. This is suggested by relative changes in per capita income among the States of the United States over the past four decades; the coefficient of variation in State per capita incomes has declined from 38.0 in 1929 to 17.4 in 1968.

Despite the convergence of per capita incomes toward the national mean, wide variations remain. Average income in the top-ranking State is double that in the lowest-ranking. Among counties the disparity is larger. In 1966, personal income ranged from a mean of $656 in the five counties with lowest incomes to $5,375 in the five with highest incomes. The former areas generally represent counties in which the resources on which the basic industry depends have been exhausted or they reflect temporary aberrations such as a poor agricultural year in a county heavily dependent upon farming as an income source. Conversely, those counties with per capita incomes around $5,000 represent mainly counties with very large and unique construction projects which are manned in many cases by workers without families accompanying them.

The total impact of a public investment will tend to include secondary effects which redistribute population and income among the regions of a Nation. It has already been argued, however, that in the process of regional redistribution, some elements in the national efficiency scheme will be changed through the secondary, and largely, redistributive effects. The implications for national efficiency are unspecified in the usual partial regional impact model, just as the redistributive effects are unspecified in the usual benefit-cost model. Also, a multi-regional model exhausting and consistent with the Nation may disclose differential secondary impacts which do not necessarily wash out the national level and hence, change the industry-mix and total output at the national level. A particular uni-regional model cannot do this; it must be multi-regional

Current operational regional partial impact models are usually drawn from export base theory which was outlined briefly above. Export base theory views

the Nation as composed of specialized regions which engage in trade with each other based on competitive advantages in those commodities which enter interregional trade (basic or exportable outputs) but which remain self-sufficient in most of their services (local-service or residentiary outputs) in a manner analogous to the international trading community of nations. This view of the Nation translates into either a regional input–output model or basic-service income multiplier model both of which are divided into component parts with fixed interdependencies.

Via the input–output approach, the export-base industries drive a regional input–output matrix. Via the basic-service or income multiplier approach, export industries induce local service industries through an income multiplier, which in its simplest form is equal to total regional income/regional income from exports. In the first case, the necessary assumption is the constancy of the interindustry sales coefficients; in the latter, the constancy of the basic service coefficients—the regional income multipliers—is assumed. Either approach can be made at any level of industrial detail desired or permitted by the data.

Economists have generally indicated a preference for an input–output empirical implementation of regional export-base models even when it has required the use of national (as a proxy for regional) input–output coefficients. Input–output constructs are more detailed and elegant than simple regional income multipliers. They are also much more expensive. However, the major argument in their favor has been that the basic-service multipliers appear more unstable over time than the interindustry coefficients and thus are less suitable for projection purposes. In a recent article, our colleague Daniel Garnick has demonstrated that there are regularities which exist over time if one takes into account cyclical and secular adjustments in national industry-mix and output. When appropriately adjusted, regional income multipliers appear to be converging toward a national proportion.[16] Thus, secondary impact multipliers

[16]Garnick decomposes the usual term for the propensity of local persons and enterprises to consume locally-produced goods and services into the shift-share categories of a proportional national industry-mix term and a differential regional term, and by so doing identifies and adjusts for a major source of the often noted instability of the basic-service multiplier. That is, a cross-sectionally estimated local propensity to consume is transformed to reflect the temporally changing national patterns and the regional adjustments thus providing an updating mechanism wherein temporal effects can be included in a projection model of secondary effects.

This can be illustrated as follows:

In any time period t, total regional income Y consists of income generated in local-service industries ($i = 1, 2 \ldots c$) and basic-export industries ($i = c + 1, c + 2 \ldots n$), i.e.:

$$(1)\quad Y_{or(t)} = \sum_{i=1}^{n} Y_{ir(t)} = \sum_{i=1}^{c} Y_{ir(t)} + \sum_{i=c+1}^{n} Y_{ir(t)}$$

where subscripts i refers to the industry and r refers to the region and $\sum_i Y_{ir} = Y_{or}$; $\sum_i Y_{ir} = Y_{io}$; and $\sum_i \sum_r Y_{ir} = Y_{oo}$ where the o subscript refers to summations, when over r equal to the United States and when over i equal to all-industry income.

Each local service industry is considered a function of total regional income:

(2) $Y_{ir(t)} = A_{ir(t)} Y_{or(t)}$; $i \leq c$ (So A_{ir} is the marginal and average propensity to consume good i in region r. Here, Garnick notes the very high significant relationship (ignoring time-scripts):

$$(3)\quad A_{ir} = \frac{Y_{ir}}{Y_{or}} \frac{Y_{io}}{Y_{oo}} \cdot \frac{Y_{ir}/Y_{or}}{Y_{io}/Y_{oo}} = \frac{Y_{io}}{Y_{oo}} \cdot L_{ir};\ i \leq c$$

[*footnote continued on next page*

differ among regions so that the secondary effects of changes in exogenous spending will differ at each point in time. On the other hand, such differences are converging over time which is most convenient for regional projection purposes. This together with the simplicity of the basic-service income model justifies continued research and generation of the data input needed to better implement this model on a regional basis. It can be useful as part of an overall regional projection model, or as a means of estimating secondary income effects of public projects.

There is no comparable convergence with respect to the input–output coefficients, of course. Attempts to update the coefficients for purposes of projecting over time have relied on assessments of "best firm practices" and similar, necessarily crude, adjustments. Neither basic-service multipliers nor input–output coefficients can handle the output effects resulting from the shifting of production or utility functions of economic units external to the project. Such effects are exogenous to both models; yet as indicated above, these development effects may be the very *raison d'etre* of a project.

Distribution of Income Within Regions

The end result of the distribution function of government is to secure an equitable distribution of income among persons. Since we are concerned with the regional aspect, we are interested in the distribution of income among persons within each region. Such a distribution may be of equal interest to the public and private sectors. But there is comparatively little direct information on this.

Footnote continued from previous page

where

$$\frac{Y_{io}}{Y_{oo}} = \text{the share of the } i\text{th industry in national income}$$

and

L_{ir} = the location quotient, i.e., the ratio of the share of industry i in region r to the ratio of the share of the industry in the Nation.

Thus, by substitution, local-service income is:

$$\sum_{i=1}^{c} Y_{ir(t)} = \sum_{i=1}^{c} \left[\frac{Y_{io}}{Y_{oo(t)}} \cdot L_{ir(t)} \right] Y_{or(t)}$$

and total income is:

$$Y_{or(t)} = \sum_{i=1}^{c} \left[1 - \frac{Y_{io}}{Y_{oo}}(t) \cdot L_{ir(t)} \right]^{-1} \sum E_{or(t)}$$

where

$$E_{or(t)} = \sum_{i=c+1}^{e} Y_{ir(t)}$$

are the exogenous export-base industries in time period t and the bracketed term is the regional multiplier which generates the secondary income effects.

Note that the only regionally specific element in the bracketed term is the location quotient which Garnick shows to be converging toward unity over all nodal regions over time. Thus, while regional patterns of consumption of local-service outputs tend to be convering toward the national ratio Y_{io}/Y_{oo}, the difference between the location quotient and unity for any local-service industry in any region at a point in time implies differential secondary impacts among regions for similar exogenous impulses and hence, different national industry-mix and output totals.

See D. Garnick, "Disaggregated Basic-Service Models and Input–Output Models in Multiregional Projections," *Journal of Regional Science*, April, 1969, pp. 87–100.

The U.S. decennial censuses of population for 1950 and 1960 contain distributions of families, of unrelated individuals, and of families and unrelated individuals combined by size of money income received in 1949 and 1959. In addition, those censuses show distributions of individuals by size of money earnings for 1949 and 1959. The 1940 Decennial Census contains distributions of wage and salary workers by size of money wages and salaries. Some of these income distributions are available by counties. Others are shown at the SMSA or State level only. Apart from these series, no comprehensive local-area income series on the size distribution of income are available.

In order to obtain some measure of the distribution of income within local areas, the Regional Economics Division has obtained from the Social Security Administration a one-percent sample of the social-security covered labor force for each year beginning with 1957. From this file a distribution of wage earners and/or self-employed persons by size of wages and/or proprietors' income can be constructed on a county or multi-county basis. There are two major weaknesses in the series. There is no way of grouping individuals into family units, nor can other types of income (transfers, for example) be added to the distribution. Experimental work is now underway in which the earnings distributions from the social security data are being related to the distributions of total money income from the Census. From this, we hope to develop relationships that will make it possible to use the social security distributions as proxies for the distributions of families and unrelated individuals by size of total income. As an example, a comparison of the relative distributions of income based on three data sources is shown for the Wilmington, Delaware SMSA in Exhibit 5.

The Social-Security-based distribution of earnings shown in Exhibit 5 can be subclassified according to: age, race, sex, industry of employment, and county of employment. These characteristics add significantly to the usefulness of the series in analyzing the income distribution.

Work Force Migration

Perhaps the most important determinant of changes in the distribution of income both among regions and within regions is inter-regional migration. Incomplete evidence indicates that a significant part of the Social Security covered labor force migrates each year. This factor obviously can have a heavy impact on the distribution of income.

From the Social Security data, we have assembled a record of the migration experience of the Nation's work force. Through this, we can trace a migrant's moves on a quarterly or annual basis from 1957 forward.[17] The migrant (and nonmigrant) can be classified according to age, race, sex, and level of earnings. In addition, for migrants, the county and industry of origin and of destination can be tabulated. From these data it is possible to assess the economic effect of

[17]Persons who are included in the Social Security Administration's one-percent sample remain in the sample until death, retirement, or employment in a non-Social-Security-covered industry. Thus, a continous work history record can be established. It should be noted that before making the data available, all identifying marks such as name, address, and social security number are removed thereby making impossible the identification of individuals in the sample.

EXHIBIT 5

INCOME DISTRIBUTIONS IN THE WILMINGTON, DELAWARE SMSA, 1959

Income Category	BUREAU OF THE CENSUS DATA			Income Reported on Federal Income Tax Returns	Wages Earned in Social-Security-Covered Employment
	Money income of				
	Families and Unrelated Individuals	Persons	Earnings of Persons		
			NUMBER		
$					
1– 999	11,311	39,200	16,381	14,525	31,900
1,000–1,999	8,328	22,094	12,865	12,113	19,100
2,000–2,999	7,562	18,515	14,525	12,842	17,100
3,000–3,999	9,000	20,129	18,020	14,886	21,000
4,000–4,999	11,216	20,234	18,648	15,135	20,500
5,000–5,999	12,388	17,965	16,845	13,274	13,400
6,000–6,999	11,788	13,323	12,578	13,364	11,700
7,000–9,999	23,715	18,344	16,768	18,312	14,600
10,000 and over	21,257	12,658	10,944	15,586	9,300
TOTAL	116,565	182,462	137,574	130,037	158,600
			PERCENT DISTRIBUTION		
$					
1– 999	9.7	21.5	11.9	11.2	20.1
1,000–1,999	7.1	12.1	9.4	9.3	12.0
2,000–2,999	6.5	10.2	10.6	9.9	10.8
3,000–3,999	7.7	11.0	13.1	11.4	13.3
4,000–4,999	9.6	11.1	13.5	11.6	12.9
5,000–5,999	10.6	9.8	12.2	10.2	8.4
6,000–6,999	10.1	7.3	9.1	10.3	7.4
7,000–9,999	20.4	10.1	12.2	14.1	9.2
10,000 and over	18.3	6.9	8.0	12.0	5.9

migration both upon the migrant and upon the income distribution of the area from which and to which the migration occurred.

Regional Differences in Cost of Living

Perhaps the greatest deficiency in the accounts from a distributional point of view is the lack of a cost-of-living index with which to adjust the money income of each region to eliminate differences in prices. Undoubtedly, a portion of the wide regional disparities that exist in per capita income would vanish were a correction made to eliminate regional differences in cost-of-living but information in this area is exceedingly scarce. The Bureau of Labor Statistics has prepared a number of cost-of-living studies for selected types of families in selected areas, but there are no comprehensive measures covering all residents of a given set of regions. This is an area in which research is needed urgently.

Accounts for Stabilization Decisions

As indicated in the opening sections of this paper, the stabilization function is of minimum interest to regional decision makers because their ability to

EXHIBIT 6

SOCIAL SECURITY COVERED EMPLOYEES
SOUTH CAROLINA, 1960–1965[1]

	White	Negro
NONIMIGRANTS, NUMBER	360,000	128,100
Average wages, 1960	$3,209	$1,623
Average wages, 1965	$4,479	$2,379
OUTMIGRANTS		
To contiguous States, number	27,200	4,600
Average wages, 1960	$2,838	$1,336
Average wages, 1965	$4,173	$2,687
To noncontiguous States, number	34,100	20,500
Average wages, 1960	$2,182	$918
Average wages, 1965	$4,175	$3,000
INMIGRANTS		
From contiguous States, number	33,000	6,200
Average wages, 1960	$2,765	$1,279
Average wages, 1965	$4,682	$2,155
From noncontiguous States, number	46,500	10,700
Average wages, 1960	$3,149	$1,659
Average wages, 1965	$5,070	$2,268

[1]Any group of persons can be further subclassified according to age, sex, industry of employment, and level of earnings. Geographic areas can be a single county or any combination of counties.

affect the stability of a regional economy is limited. In general, national stabilization policies tend to take care of regional stabilization automatically, with the exception of that type of structural unemployment which arises from a geographic immobility of labor.

Substantial evidence exists that regions respond differently to short-run national economic changes in income and employment. The Regional Economics Division has constructed personal income at the State level on a quarterly, seasonally-adjusted basis. The series has been operation (and published) for about two years. We are now completing its extension back to 1948. In view of the several recessions between 1948 and 1960, this series will provide a basis for research into the effects of cyclical changes in business activity on State economies.

Assuming, however, that in general stabilization is a function of a national government rather than of a regional one, measures of aggregate economic activity on a regional basis can be conceptualized in either allocative or distributive terms. That is, the geographic distribution of income originating is a function of the geographic *allocation* of resources, and the geographic distribution of income received is a function of the geographic *distribution* of resource owners and transfer recipients. In other words, the regional allocation of the national product and income can be conceptualized geographically as allocative (product) or distributive (income) and these two constructs are all-inclusive.