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Economic Structure of Idaho: A Provisional Input-output Study

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Moscow, Idaho July, 1968

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The research on which this report is based was financed mainly by a grant from the Research Council University of Idaho

Idaho BBER Research Report No. 12

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Dr. Rodney D. Peterson is Associate Professor of Economics in the College of Business Administration at the University of Idaho. Since coming to the University in 1965 he has been engaged in various researches and investigations involving the local economy or sectors of the economy. In this short time he has become unusually knowledgeable of many local economic conditions. However, his principal contribution has probably been that of applying the modern techniques of the professional economist.

FOREWORD

NORMAN NYBROTEN, *Associate Director and Professor of Economics*
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At some level of competence and understanding nearly everyone worries about inputs, outputs and cash flows. Some worries are personal, some are for industries or corporations, whereas others are for communities or geographic areas. Most of the worries are vague, without factual substantiation and without formalized methods of value in prediction and decision making.

With all the recent developments in data-processing machinery it is getting more feasible to "think big" in regard to active components of an economy. Simultaneous solutions of complicated interactions can be made with unbelievable ease compared with the difficulties in the methods used a few years ago.

This first major effort of a rather formal input-output study for Idaho must remain, as Dr. Peterson has indicated in his title, somewhat provisional. To a degree this must remain true even in the most refined and expensive input-output study of a dynamic economy. Tentative though the results may be, they should furnish some real guide posts to decision makers. They should also serve as a base and model for researchers who want to further quantitative analyses of the Idaho economy through the use of computers and other data-processing facilities available at the University of Idaho and elsewhere. This should be especially important in a relatively undeveloped state such as Idaho.

ACKNOWLEDGEMENTS

This study was financed by the Research Council of the University of Idaho through Special Research projects SR 110 and STAR 9 from funds allocated by the State Legislature. I am grateful for this support; without such concern and foresight much research would not be accomplished. I am especially indebted to the late Professor Charles Mills Tiebout, who first kindled my interest in the input-output technique and who counseled me often on this approach to regional economics. His untimely death is truly a loss to the economics profession. I owe a debt of gratitude to many Idaho state agency personnel and several Idaho business leaders who provided me with information and statistical data. I also acknowledge the assistance of Mr. Jeff Anderson who gathered data and was largely responsible for computer analysis to calculate direct and total requirements. Moreover, Mr. Merle Newell provided some information about the mining sector through extending some of the transformations he had calculated for his Master's thesis. Special thanks are due to Dr. R. A. Wykstra, my good friend and colleague at Colorado State University, who reviewed the manuscript in amazing detail and made many perceptive suggestions about applying the input-output technique to Idaho's economy. Dr. John McKean, Professor Douglas V. Leister, Professor Demetrius Moutsanides, and Col. William N. Case also read the manuscript and offered constructive suggestions. Dr. Norman Nybroten, Associate Director of the Bureau of Business and Economic Research, thoroughly reviewed the final draft, then arranged for its publication and Dr. David D. Kendrick, Dean of the College of Business Administration, offered encouragement and advice from time to time.

R D P

PREFACE

If 10 million automobiles are sold next year, how would sales in Idaho react? Is your firm neglecting some important in-state markets? How would a $20 billion change in national defense spending affect Idaho's economy? Answers to questions such as these can be developed from input-output tables which show the business activity among Idaho's major industries and its relationship to the state's economy. This preface sketches the nature of interindustry economics, then reviews some major findings from a study of Idaho's economic structure.

What Is Input-Output Analysis?

An input-output (or "interindustry") table is essentially a set of double-entry books for an economy—a reliable map of the interconnections among different lines of business in a region. In one respect an interindustry table resembles the baseball standings shown in the won-and-lost record in a sports page—for a win there is a loss and for a sale there is a purchase somewhere. Input-output data are organized to show yearly dollar volume of purchases by each industry from every other industry in the form of grid or "matrix" of equal horizontal rows and vertical columns. Since businesses buy and sell from one another, suppliers can be shown on the left side of the table while purchasers can be listed at the top. In this way, each row shows the distribution of sales (outputs) to various buyers and each column shows purchases (inputs) from different industries. Reading across the table traces sales (ouputs) from each industry to other industries, whereas reading down the columns traces purchases (inputs) from each of the other industries.

How Is The Input-Output Table Used?

The input-output table has become an important technical tool for analyzing economic problems wherever data are available. It has been used to estimate income and employment by areas and industries, to project exports and imports, and to aid in planning economic development. An input-output study is also valuable in gauging market possibilities for businesses selling to other firms rather than those which sell goods only directly to consumers. The technique is useful in determining how certain taxes may affect various industries. Industrial developers often employ interindustry analysis to explore effects of a state's economic structure on new plant location.

Suppose your company manufactures containers with one-fourth of the volume sold to food processors. However, the input-output table may show your industry (which necessarily includes your competitors) selling one-third of their volume to Food and Kindred Products. This comparison suggests that you are missing out on part of an available market and that your product line may need broadening.

How would another $1 billion in federal space spending affect Idaho's economy? First of all, assume that approximately 1 percent of every space dollar is spent for electronic components and that these devices contain nearly 5 percent silver. Secondly, Idaho's mining industry, which supplies about 40 percent of the nation's silver, would thereby experience a $200,000 *increase* in sales ($1 billion x .01 x .05 x .40). Now from their total revenue, mining companies spend approximately 40 percent for labor and 24 percent on *Idaho business inputs* (according to the analysis presented below in Chapter Four). As a result, approximately $128,000 of the $1 billion will filter directly through Idaho's economy ($200,000 x .64). These amounts are significant in supporting and generating additional economic activity throughout the state. Ultimate impacts of this spending can be traced to each industry group included in the input-output tables developed in this study.

What Does The Idaho Study Show?

The analysis is a provisional one, constructed from secondary information and estimates. Idaho's economy was divided into 16 industries based primarily on the two-digit Standard Industrial Classification code and relative industry importance in the state. A gross flows table was constructed to show dollar transactions between industries; from it a table of direct requirements was devised, then re-calculated on a computer to obtain total requirements. Each of these three tables figures conspicuously in outlining the structure of Idaho's economy, especially the Idaho Provisional Gross Flows Table shown inside the back cover of this bulletin.

In 1963 Idaho's total gross output (the volume of *all* business transactions) approximated $5.1 billion, while Gross Idaho Domestic Product (a measure similar to Gross National Product for the nation) was estimated at $1.6 billion. Total value created by *all* Idaho firms was estimated to be $1.37 billion in 1963, and thereby indicated that nearly 84 percent of GIDP was created directly by in-state producers. Value created was greatest in Agriculture, Food Processing, and Miscellaneous Manufacturing. Idaho's "basic industries" (defined as production sold outside the state which brings money into Idaho and thereby supports income and employment) were found to be aligned with agricultural and raw materials processing sources of demand, according to the Provisional Idaho Gross Flows Table constructed in this study. The analysis suggests that Idaho industries are not closely tied to one another. Thus, the state appears to be a favorable place for developing supporting business firms so that Idaho firms will not have to depend on non-Idaho businesses for their supplies.

As the Idaho input-output story unfolds, the reader will be exposed to a newer and different way of viewing business activity in a state. Although the interindustry technique is not claimed to provide ready-made answers to this state's economic problems, understanding the method and related analyses will furnish insight into the structure of Idaho's economy.

Moscow, Idaho, July, 1968 R. D. Peterson

TABLE OF CONTENTS

LIST OF EXHIBITS AND TABLES

Chapter One
INTRODUCTION

Idaho's economy has experienced several structural changes during recent years in population, income, and employment. These structural changes have been most notable among lines of business heavily concentrated in the state. As a part of the national, Pacific Northwest and Mountain States economies, the state's growth performance has been mixed. Recent studies describing economic activity have stressed both Idaho's strengths and weaknesses, but no analysis of economic interdependency has been undertaken.

During 1965, for example, significant increases were reported in employment, and Idaho ranked fourth in the nation at mid-year in rate of gain in personal income.[1] In 1966, Idaho's growth performance approximated the high 1965 level, its most prosperous year since World War II, and prospects for 1967 in the state appeared to be favorable.[2] Whereas average total employment in the Gem State was 251,700 in 1964, it rose to 257,000 by July, 1965. Idaho's unemployment rate was 4.1 percent in June, 1965, and by August, normally the lowest month, it had dropped to a phenomenal 2.9 percent. By mid-1966 the unemployment rate was 3½ percent, slightly above the lower 1965 level.[3] These statistics suggest a growing and dynamic Idaho economy, but other economic data indicate some problems in its economic structure.

Economists view population changes as an important factor of growth, primarily because product and labor markets are directly related to numbers of people. Idaho's population has increased only slightly since 1930. From 1940 to 1950, 6.1 percent of its population left the state as net out-migration was heavy in the 25-44 age group.[4] Between 1950 and 1960 Idaho *lost* 4 percent of this prime-working-age labor force (ages 25-44) compared to a 3 percent *increase* nationally. Finally, it is estimated that net out-migration approximated 26,000 persons for the 1958-64 period. In a state with less than 700,000 persons, this loss represents a serious depletion in the stock of human capital.[5]

Employment and output both have increased *in absolute terms* during the postwar period in Idaho, but it can be shown that *relative to the nation* this growth has been weak. In short, Idaho's economy has been growing over the postwar period at a rate less

[1] Peterson, R. D., "Idaho," *Washington Business Review*, December, 1965, p. 82.
[2] Peterson, R. D., "The Business Outlook for Idaho," *Washington Business Review*, Winter 1967, pp. 45 and 52.
[3] *Idaho Employment*, Department of Employment, Boise, Idaho, 1966.
[4] Bureau of the Census, *Current Population Reports*, Series 25, Nos. 72, 229, and 324.
[5] Wykstra, R. A. and R. D. Peterson, "Economic Growth in Idaho, 1948-1964," *Washington Business Review*, Spring, 1967, p. 40.

than the national average. Whereas overall state growth rates are important measures of the *direction* and *magnitude* of change, analyses of economic activity also should involve normative comparisons (e.g., with other regional or national economies) in addition to identifying the interaction among sectors responsible for change. This study of Idaho's economy disaggregates the state economy into major economic sectors, then attempts to analyze the interacting relationships among them.

Although a state is a part of the national economy, it is not entirely valid to infer that what occurs at the national level will or should happen in a particular state. The economic activity of all states, especially leading ones, has an *influence on* a particular state. Idaho's economy is not completely tied to the national economy because for some goods and services the state is reasonably self-sufficient. It is essential to identify the number of industries in a state that are dependent on the national economy. The greater amount of money an industry brings into a state from markets outside its border, the more that state's economy is "tied to" the national economy.

NATURE OF THE STUDY

This study examined the structure of Idaho's economy by employing the input-output technique of analysis developed by Professor Wassily Leontief of Harvard University. The project was actually the first phase or prototype of more extensive analyses of the Idaho economy contemplated in the future. As an "interindustry" study, this investigation involved constructing provisional input-output tables that depict sales and purchases among Idaho industry sectors as well as relations by in-state firms with the rest of the United States. The results of this research is to provide businessmen, legislators, government officials, and interested citizens with a description of Idaho based on contemporary economic analysis. Greater understanding of Idaho's economy functions may lead to better planning and decision making among all the interdependent economic units in the state.

The underlying rationale guiding the study was to examine Idaho's economy so that the impact, both regionally and nationally, of various types of economic activity on the state could be determined. In this regard, the basic objectives of the study were: (1) to select several broad industry lines as a vehicle for understanding the flow of goods and services in Idaho; (2) to gather relevant secondary data about Idaho's economy to be used for interindustry analysis that will support further study; and (3) to present a quantitative first approximation and description of the economic structure of Idaho via the input-output method of analysis.

This publication is organized as follows: Chapter One introduces some broad aspects of Idaho's economic structure and gives some indication about the approach used in studying the state. Chapter Two discusses the nature of regional science, the input-

output technique, and the actual step-by-step procedure used to accomplish the project. Chapter Three contains a description of Idaho industry groups selected as representative categories to analyze the state's interindustry structure via the input-output method. Chapter Four traces the building of the provisional Idaho input-output model by showing how the transactions matrix and direct-total requirements tables were devised; in addition, Chapter Four explores some applications of the Idaho input-ouput model to various levels of activity in the state economy. Finally, Chapter Five summarizes the entire study and draws some broad conclusions on the structure of Idaho's economy.

A PROFILE OF INCOME AND EMPLOYMENT IN IDAHO

Idaho's economy can be compared to business activity nationally. Income and employment, two basic measures of society's well-being that are of vital concern to economists, are used in this section to note differences between various lines of business in Idaho and the United States. This type of comparison provides a setting and rationale for a more penetrating analysis via the input-output method discussed in Chapters Three and Four.

Analysis of Income

Table 1-1 presents data on "participation income" in eleven economic groupings for Idaho and the United States during 1963. These data are appropriate indicators of business activity in an area economy because they reflect the contribution by workers to current production. "Participation income" constitutes approximately 75-80 percent of total personal income by including proprietor's income, wages and salaries, and miscellaneous labor income. Property income and transfer payments are excluded from these statistics. Participation income is used partly because it is readily available from United States Department of Commerce publications and partly because it is difficult to disaggregate *total* personal income figures according to industrial origins.

Examination of Table 1-1 indicates that Idaho is predominantly a farming state and less manufacturing oriented than is the nation on the average. Idaho, therefore, relies heavily on farm sources of income and less on income earned in manufacturing. However, Idaho is similar to the rest of the United States in the shares of participation income received by construction, communication and public utilities, services, and trade employees. A greater percentage of total participation income is received by government employees in Idaho than in the national economy, but many small governmental units in a sparsely populated state such as Idaho account for much of this difference as does the preponderance of public-owned lands. Essentially, however, the structure of Idaho's economy appears similar to that of the rest of the United States, except for farming and manufacturing.

An Analysis of Employment

An analysis of employment according to various lines reveals some other differences in Idaho compared with the United

States. Since Idaho is oriented more toward farming relative to other lines of economic activity than the nation as a whole, *non agricultural* employment was analyzed to identify additional structural characteristics of the state. Table 1-2 indicates that annual average employment in mining, wood products manufacturing, food

TABLE 1-1. PARTICIPATION INCOME IN ELEVEN ECONOMIC SECTORS, UNITED STATES AND IDAHO, 1963

(dollars in millions)

	UNITED STATES		IDAHO	
Sector	Current Dollars	Percent	Current Dollars	Percent
Farming	$ 16,005	4.4	$ 172	15.3
Mining	4,267	1.2	22	1.9
Construction	23,149	6.4	72	6.4
Manufacturing	106,263	29.2	178	15.8
Trade	69,308	19.1	210	18.6
Finance	19,024	6.3	42	3.7
Transportation	16,922	4.6	61	5.4
Communication and Public Utilities	10,135	2.7	32	2.8
Services	49,204	13.6	139	12.3
Government	48,135	13.2	199	17.7
Other	1,295	.1	—	—
TOTAL	$363,657	100	$1,127	100

Source: *Survey of Current Business*, August, 1964

processing, and wholesale-retail trade was substantially higher in Idaho than for the national economy. These differences can be accounted for by recognition of the following facts: First, Idaho's natural resources provide a comparative advantage for the mining and lumber industries. Potato, sugar, and meat processing has been a recent growth industry in Idaho. Farm products grown in Idaho that were previously shipped outside the state for processing, now provide raw materials for processing. Apparently farming in Idaho has expanded from being a *basic* raw materials industry to include a secondary role of supporting food processing and thereby provides the wherewithall for expanding employment and financial transactions in the state, rather than exporting raw agricultural products and jobs outside the state.

Idaho employs proportionally one-third more of its people in wholesale-retail trade than nationally. An analysis of employment in wholesaling indicates very little difference between the percent of total employment in Idaho compared to the United States, so

TABLE 1-2. NONAGRICULTURAL EMPLOYMENT IN 15 SECTORS, UNITED STATES AND IDAHO, 1963

	UNITED STATES		IDAHO	
Sector	Number of Employees (in thousands)	Percent of Total	Number of Employees	Percent of Total
Mining	635	1.1	3,224	2.3
Contract Construction	2,983	5.3	8,723	6.3
Food and Kindred Products	1,744	3.1	11,181	8.1
Lumber, Wood and Furniture	976	1.7	11,560	8.3
Printing and Publishing	931	1.6	1,300	.9
Chemicals & Allied Products	865	1.5	1,254	.9
Fabr. Metal Products	1,153	2.0	509	.4
Machinery (exc. Elec.)	1,531	2.7	6,691	.5
Manufacturing (n.e.c.)	9,806	17.3	3,886	2.8
Transportation	2,619	4.6	3,723	2.7
Utilities and Communication	1,295	2.3	4,990	3.6
Wholesale-Retail Trade	11,803	20.8	40,521	29.3
Finance, Ins., & Real Est.	2,873	5.1	6,383	4.6
Services	8,230	14.5	16,558	12.0
Government	9,199	16.2	24,360	17.5
TOTAL	56,543	100	137,863	100

Sources: (1) *Business Statistics*, U.S. Department of Commerce, Office of Business Economics, 1966, pp. 66-72
(2) Department of Employment, Boise, Idaho

the difference is due to retail trade. A comparison of retailing employment in the state and the nation indicates that 23 percent of Idaho's nonagricultural labor force is engaged in retailing but only 15 percent at the national level. Idaho is a sparsely populated state with vast geographical area and has relatively more small retail units than operate in the national economy at more optimum size.

Employment in machinery, fabricated metals, and other manufacturing lines was significantly lower in Idaho compared with the United States, indicating that Idaho's manufacturing activity is more oriented toward nondurable rather than durable goods. Idaho employment in construction, printing-publishing, chemicals, finance-insurance-real estate, services, government, and utilities-communication was quite similar to that of the United States. These relationships will become important reference points as the input-output model is constructed.

Chapter Two
METHODOLOGY

The purpose of this chapter is to explain the method of analysis used in this study. The subjects of economics and regional science are reviewed, the nature of input-output is explored, and major sources of information are noted. Although the steps followed in building the input-output tables are explained only briefly, enough information will be presented to understand the nature of the Idaho interindustry study.

ECONOMICS AND REGIONAL SCIENCE

Before describing the actual procedures followed in accomplishing the research for this study, some fundamentals of regional economics are reviewed to develop the rationale underlying the formulation of the Idaho project.

Basically, to economize should be understood as using limited resources to satisfy as many urgent wants as possible. As a social science, economics is the study of how scarce resources are allocated to satisfy alternative desires. It is *social* because interrelated and mass human behavior are involved whenever production, distribution, and consumption occur. Economics is considered a *science* because orderly, objective procedures are used to analyze economic behavior. Economic theory involves identifying basic relationships that explain economic phenomena and is both neutral and objective in explaining reality rather than judging its performance. Economic policy, on the other hand, is subjective and involves suggesting procedures to be employed in reaching certain objectives.

This study in economic analysis is based on general equilibrium theory and one of its operational techniques called input-output economics. As such, it does not conclude what Idaho "ought to be" but attempts to describe the pattern of economic activity that actually exists in this state. Hopefully citizens, legislators, and businessmen of Idaho who influence social and economic policy in the state can use this report as a reflection of the state's economic conditions and base their decisions on it.

Regional science is an inter-disciplinary field which borrows from economics, geography, sociology, and political science. Regional *economics* is the study of a region from an economist's viewpoint "of the differentiation and interrelationships of areas in a universe of unevenly distributed and imperfectly mobile resources, with particular emphasis in application on the planning of social overhead capital investments to mitigate the social problems created by these circumstances."[1] Thus the regional economist seeks to examine an area's resources, how they are used to produce goods and services, and what problems are associated with distributing the output of that area. Among the many phenomena studied in regional science are location of industry, regional product flows, the resource base and its utilization, and patterns of population migration. Although regional analysis is not a new discipline, it is currently a maturing one as state and local governments become increasingly interested in economic growth of areas and communities. Regional analysis is the study of an entire economy according to economic, social, or political areas. Although the method used to accomplish this study was input-output analysis, it is useful to describe briefly other techniques employed by regional scientists, especially product flow analysis, economic base analysis, and interregional analysis.

A poduct flow analysis describes the relation between an area's imports and exports of goods and services by expressing such exchange in terms of either volume (physical output) or value (purchases and sales dollars). The analysis of product flows is an application of location theory based on the premise that firms will locate where costs of production are minimized. This type of study can be an inexpensive way of delineating the types and quantities of goods which are consumed and sold within a market.

An economic base analysis seeks to identify the primary and secondary sources of income and employment by distinguishing among economic activities within an area. By dividing a local economy, for example, into *export* industries (firms that serve markets outside the area) and *local* industries (firms that serve markets within an area), the economic "base" of that community can be identified. A basic industry is considered to be a prime mover in an economy because it brings money into an area from the outside in exchange for the sale of goods that were produced in that region. Regions often develop basic industries and those which facilitate them so that both income and employment in that area will grow over time.

In an interregional analysis a large economy is divided into regions, then product flows are traced among them. As a comparative study, this method seeks to explain how each region contributes to economic activity in other regions. The product flows between regions are presented in a table (matrix) from which equations are derived. By projecting the model, insights can be gained into how changes in one region are transmitted to other regions and thereby affect the flow of trade between them. In this way, the impact of changes can be studied and traced from one region to another.

FUNDAMENTALS OF INPUT-OUTPUT ANALYSIS

In this section pertinent aspects of input-output economics are summarized for the layman.[2] As a nontechnical summary, this

[1]Dubey, Vinod, "The Definition of Regional Economics," *Journal of Regional Science*, Vol. 5, No. 2, 1964, p. 28.

[2]This section does not present the theoretical foundations of interindustry economics. In reality, this method of economic analysis is quite heavily steeped in matrix algebra, econometrics, and other techniques for mathematical transformation. An introduction to the mathematics of input-output can be found in Miernyk, William H., *The Elements of Input-Output Analysis*, (New York: Random House, 1965), pp. 128-151. For a more extended treatment, see Chenery, H. B. and P. G. Clark, *Interindustry Economics*, (New York: John Wiley and Sons, Inc., 1959), pp. 13-53.

introduction describes a method of analysis which can provide direction for future development of an economy by applying knowledge gained from analysis of three basic tables (matrices) which depict purchases and sales among industries.

Origin of Input-Output

As a method of examining economic activity, input-output has become an important analytical tool in studying national and regional problems, not only in the United States, but in Europe and other countries. Input-output is a type of double-entry bookkeeping which shows for each industry in an economy, during a given period, *purchases from* (by reading down a series of columns) and *sales to* (by reading across various rows) other industries, thereby showing interdependencies among all groups within as well as outside a region. All transactions that involve sale of products or services are arranged in a square table indicating simultaneously the industries making and the industries receiving delivery. After this table is constructed, ratios are calculated for each purchase and sale by using simple mathematical transformations.

Conceptually, the input-output technique is not new. Two developments have occurred in the history of economic thought from which the method emerged. In order to understand the rudiments of this technique more thoroughly, it will be useful to trace their kinship to input-output analysis.

A crude forerunner to input-output relations was developed by the French economist Francois Quesnay in 1758. His famous Tableau Economique (Economic Table) was an attempt to diagram the flow of money and goods in a nation and is considered an original contribution to economic thought. Quesnay, a physician, was employed by King Louis XIV; his economic diagram was probably inspired by the discovery of the human circulatory system by Harvey in 1616 and subsequent development by Malpighi and Hales involving capillary action and measurement of blood pressure. Although Quesnay's analysis is couched in terms of agriculture (which dominated economies of that time), it was an innovative approximation of how economic sectors in a nation are tied together.

Closely associated with input-output is the concept of "general equilibrium" in economic analysis. Basically, equilibrium means "at rest," i.e., economic forces are in balance. Economists study the interaction among firms and markets in order to determine why economic decisions are made over time and how their decisions affect equilibrium. If continual adjustments occur because buyers and sellers alter their behavior, it is held that equilibrium does not exist. Only when no forces influence buyers and sellers to increase or decrease purchases and output is an equilibrium, or "rest," position attained. In studying this phenomenon, a distinction is usually made between "partial" and "general" equilibrium: If price and output of a particular *industry* or a *segment* of an aggregate economy is the subject of study, then an analysis is said

to be partial equilibrium oriented. On the other hand, general equilibrium analyzes the aggregate of firms and markets in an economy in terms of the interrelationship among *all* prices or outputs and how the entire economy would be affected if there were a change in one of them. When a set of input-output tables is constructed for an economy, it is generally held to depict general equilibrium relations among economic units. In fact, the technical aspects of both systems are mathematical counterparts of each other.

In 1936, Professor Wassily W. Leontief, a Harvard University economist, published the results of the first empirical input-output study.[3] This pioneering project, which described the structure of the United States economy for 1919, has been followed by others for the years 1947, 1958, and 1963. Since World War II, state and city governments have increasingly devoted much time and money for research on the input-output relations of regional and local economies. There is little doubt in the minds of many economists that the input-output approach has become the most acceptable method of regional economic research.

Basic Input-Output Relations

Business activity in any area is composed of many separate transactions accomplished by many distinct producing and distributing enterprises. Since market similarities exist among some firms, it is possible to classify them into several basic groups according to lines of business. For example, the sales of all grocery stores can be summed to represent all firms that fall into that grouping. This procedure is important in input-output studies because it helps simplify the number of relationships that have to be made in such an analysis. Moreover, based on the observation that part of the output of one business necessarily becomes an input to other businesses (or to households and government), the relationships showing firms buying and selling from one another can be described by an interindustry matrix.

Although the kinds of detailed analyses that can be accomplished with input-output are numerous, the heart of the system lies in the basic "transactions" or "gross flows" matrix and associated tables derived from it. A transactions, or gross flows, table shows the purchases from and sales to firms included in those industry groups selected for study in a region. Simply stated, this basic table consists of the actual dollar transactions that occur in an area economy[4] and is constructed by arranging amounts sold from each industry group to the various buyers of firms' outputs. After the transactions matrix is completed, a table of "direct" and another of "indirect" requirements are derived from it. These

[3] Leontief, W. W., "Quantitative Input and Output Relations in the Economic System of the United States," *Review of Economic Statistics*, August, 1936. p.p. 105-126.

[4] Technically, the transactions table can present any one of several types of economic aggregates such as employment, physical output, or value added. However, since the Idaho study concentrated on dollar volume of sales, this explanation was framed in terms of sales dollars.

three tables can be used for different types of analysis and prediction.

The first step in creating an input-output table is to divide an area economy into two major segments—a "processing sector" and an "autonomous sector." The processing sector consists of all firms classified according to various industry lines. To illustrate, the annual sales of all transportation firms (airlines, trucking firms, bus companies, taxicabs, railroads, etc.) operating in Idaho during a given year can be combined and their total sales labelled as the output of the Idaho transportation industry within the processing sector. The number of sectors that can be created in this manner depends on data available and the degree of detail necessary (or desirable) to analyze the economy under study. (In the study of Idaho's economy, 16 such processing industry groups were selected.)

In addition to the processing group, input-output tables usually include an autonomous or "final demand" sector wherein ultimate consumption or use is measured. The processing sector differs from the final demand sector in that the former includes business firms that buy goods from each other for resale or use in their operations whereas the latter does not. In this regard, it is important to remember that goods produced by one firm may become a part of the output of another firm. To illustrate, the farming sector supplies food-processing firms with raw materials, markets some of its products directly to wholesalers (such as grain elevators) and to retailers (such as supermarkets), sells some goods directly to the consumer, and may even make sales to different levels of government. However, businesses do not purchase agricultural products for their own use, but to use in their operations. It is this final demand, or "autonomous," sector (i.e., consumers, government, and buyers outside the processing sector of the economy being studied) that buys products for their ultimate use.

A Simplified Example

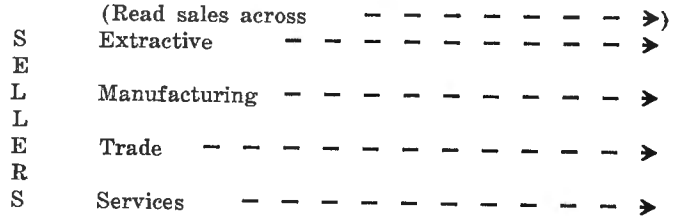
The following illustration, presented in the next several paragraphs, constitutes an integrated, consistent approach toward developing a fundamental set of input-output relations for a hypothetical economy. If the analysis contained in the example posited in this section is understood, the reader should have little problem following the analysis of the Idaho economy presented in Chapter Four of this publication.

Consider a state in which all economic activity has been very simply classified into four broad industry groups: (1) extractive (to include all farming, fishing, forestry, and mining firms); (2) manufacturing (all processing firms and producers of durable and nondurable goods); (3) trade (wholesale and retail establishments) and (4) services (personal, professional, and business enterprises such as physicians, theatres, hotels, public utilities, and barbershops). Each of these four industry groups can be

treated as a producer (1) that sells to other firms for purposes of processing or resale (i.e., to other firms in the processing sector), or (2) that sells to ultimate users such as consumers, governments, to buyers outside the state (i.e., the state's "export" market), or for investment purposes.

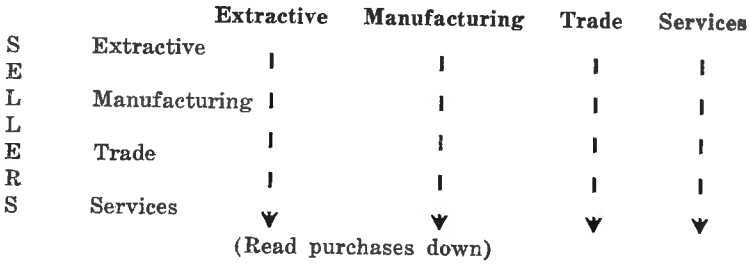
It is important to note that in an input-output table the same industry groups in the processing sector are treated both as "sellers" and as "buyers." To illustrate, the transactions table is organized so that whenever an industry group is treated as a seller, it is listed on the left-hand side of the table in a row. The sales of sellers are read *across* the table, as depicted in Illustration A, below. The following list treats as sellers the exemplary industry groups noted in the example developed above:

ILLUSTRATION A



Every sale is a purchase, and therefore each figure in a horizontal row also forms a vertical column. Thus, the output (sale) of one industry is an input (purchase) to another industry which is indicated by a column. Therefore, reading the figures by column denotes the purchases of a "column" industry or the inputs to that column industry from all the other industries. In treating these same industries as buyers, they are arranged at the top of the table and the input-output matrix begins to take form:

ILLUSTRATION B



A hypothetical transactions table can be developed partly by completing Illustration B with figures depicting the dollar sales of each industry to its sources of demand.

Suppose that in a particular year, say 1965, the total value of extractive output was 60 million dollars, and their output was distributed as follows:

ILLUSTRATION C

Distribution of Output	Millions of Dollars
Sales among extractive firms:	14
Sales to manufacturing firms:	10
Sales to wholesale and retail trade:	10
Sales to service enterprises:	6
Sales directly to ultimate users ("final demand"):	20
TOTAL SALES OF EXTRACTIVE GROUP:	60

Next, let the following list portray the sales of the manufacturing sector:

ILLUSTRATION D

Distribution of Output	Millions of Dollars
Sales to extractive firms:	8
Sales among manufacturing firms:	6
Sales to wholesale and retail trade:	6
Sales to service enterprises:	2
Sales directly to ultimate users ("final demand"):	18
TOTAL SALES OF MANUFACTURING GROUP:	40

Moreover, assume that the sales of the wholesaling-retailing (trade) sector were:

ILLUSTRATION E

Distribution of Output	Millions of Dollars
Sales to extractive firms:	8
Sales to manufacturing:	2
Sales among wholesale and retail trade:	4
Sales to service enterprises:	2
Sales directly to ultimate users ("final demand"):	14
TOTAL SALES OF THE TRADE GROUP:	30

Finally suppose the sales of the services sector were:

ILLUSTRATION F

Distribution of Output	Millions of Dollars
Sales to extractive firms:	6
Sales to manufacturing firms:	4
Sales among service enterprises:	2
Sales to wholesale and retail trade:	6
Sales to ultimate users ("final demand"):	12
TOTAL SALES OF THE SERVICES GROUP:	30

Now the hypothetical output or sales data in millions of dollars shown in Illustrations C, D, E, and F can be arranged as follows (shown in G, below):

ILLUSTRATION G

	BUYERS (dollars in millions)			
SELLERS	Extractive	Manufacturing	Trade	Service
Extractive	14	10	8	6
Manufacturing	8	6	6	2
Trade	8	2	4	2
Services	6	4	6	2

By reading *across* the table according to *rows* the output of each industry group (such as manufacturing) can be arranged according to where it is sold. On the other hand, by reading *down* the table according to *columns*, the inputs of each industry group are traced. For example, the manufacturing column shows the amounts sold to manufacturers by other industry groups thereby tracing the purchases by, or inputs of, manufacturing.

However, goods or services purchased from other business firms by the manufacturing group are not the only inputs used because manufacturers also use manpower and capital and equipment, i.e., factors of production, in their operations. Thus, a factory not only buys raw materials (from "agriculture"), semi-fabricated pieces (from "other manufacturers"), operating supplies (from "wholesalers"), and electricity (from "services"), but it also hires labor and uses up its own machinery. Moreover, a business firm even makes "payments" in the form of profits to enterprise owners. In this example, wages, interest, depreciation, rent, and profits have been aggregated into one large group called a "payments sector" which provides these inputs to other industries. For example, suppose that all of the above noted factors of production combined "sold" their services to various industry groups in the same way that a given industry sells its outputs to other firms, as follows:

ILLUSTRATION H

Distribution of factor contribution	Millions of Dollars
Sales of factors to the extractive group:	24 million dollars
Sales of factors to manufacturing firms:	18 million dollars
Sales of factors to wholesale and retail trade:	6 million dollars
Sales of factors to service enterprises:	18 million dollars

These sales from the payments sector are then recorded as a row entry in Table 2-1.

An industry's output is sold not only to other business firms (i.e., in the processing sector) but also for ultimate consumption or use to consumers, governments, etc. In an input-output study some record must be made of these transactions. To account for these sales a "final demand" sector (discussed above) is used. Once the final demand sector is added as a column "buyer," a more complete input-output table can be created as noted in Table 2-1.

TABLE 2-1. HYPOTHETICAL

TRANSACTIONS TABLE

Read Sales Across	Read Purchases Down	BUYERS					
		Extract.	Manuf.	Trade	Service	Fin. Dem.	TOTAL
SELLERS	Extract.	14	10	8	6	22	60
	Manuf.	8	6	6	2	18	40
	Trade	8	2	4	2	14	30
	Services	6	4	6	2	12	30
	Payments Sector	24	18	6	18	66	132
	TOTAL	60	40	30	30	132	292

Suppose that, according to the example already underway, the following amounts were sold to consumers and government, for investment purposes, or exported outside the area being studied (i.e., sold to final demand):

ILLUSTRATION J

Type of Sale	Millions of Dollars
Sales by extractive group to final demand:	22
Sales by manufacturers to final demand:	18
Sales by wholesalers and retailers to final demand:	14
Sales by service enterprises to final demand:	12

By putting all the sales figures together in appropriate form, a simple input-output table of transactions (Table 2-1) is developed inclusive of two general categories—the payments sector and final demand.

The Hypothetical Transactions Table

The final demand and payments sectors are added in their proper places to complete the basic arrangement of the simplified input-output diagram. Although the matrix shown in Table 2-1 is small, it can be and usually is larger and more complete. Instead of just four industry groups, 25, 50, or even more than 100 of them can be created. Moreover, instead of aggregating all factors of production into a single "payments sector," each factor can be treated separately. Finally, instead of aggregating all final use or consumption into a single "final demand" sector, each of these could be shown separately (such as government, households, investments, and exports).

It is instructive to note that in an input-output table the inputs are equal to output for each industry group; hence, the totals at the bottom of each column will necessarily be equal to the totals at the right-hand side for those same industry groups. This fact is so because a sector's total sales (output) can be accounted for by the amounts it pays for raw materials and other processed goods (denoted in the processing sector); the funds expended for labor, rent, utilities, interest, and depreciation; and the amount left over to the owners in the form of profit, including inventory adjustments, which are included in the payments sector.

Hypothetical Table of Direct Requirements

Table 2-1, a hypothetical transactions table arranged in appropriate input-output form, shows some important relationships. The figures shown inside the heavy-ruled lines in the upper left-hand part of the transactions table represent the "processing sector" discussed in a previous paragraph, and presented in Illustration G above thereby recording "interindustry" transactions in the area being studied. Note that the processing sector shows only the sales among industry groups and leaves out the payments and final demand sectors mentioned above. Regional economists analyze a processing sector in order to trace the impact of additional sales on business firms in the economy being studied. This analysis involves determining "direct requirements" from the transactions table by calculating simple numerical ratios. For example, if consumers (in the final demand sector) want more of a certain industry's output (such as services), what effect will this change in demand have on all other suppliers of output if that industry is to increase its production? It is obvious that if Services is to increase its output it will have to have additional inputs. The important question is "How many cents worth of inputs are necessary in the first three to produce one additional dollars worth of output in services?" The original sales data shown in the transactions table can be used to make some calculations to determine this ratio of input to output. It should be noted that in these ratios lies the essence of "input-output" economics because these interindustry relationships between inputs and outputs are the basis of the technique.[5]

To illustrate further, suppose that consumers demand another dollar's worth of output from the manufacturing industry group. According to the hypothetical table, manufacturing output was $40 million. Reading down the manufacturing column it can be noted that to produce this $40 million worth of output, the following amounts of inputs were required from suppliers: (1) $10 million from extractive; (2) $6 million from other manufacturing firms; (3) $2 million from trade; and (4) $4 million from service

[5]To note the mathematics underlying input-output analysis see: Dorfman, Robert, "The Nature and Significance of Input-Output," *Review of Economics and Statistics*, May, 1954, pp. 121-133; and Fisher, Walter D., "Criteria for Aggregation in Input-Output Analysis," *Review of Economics and Statistics*, August, 1958, pp. 250-260.

firms. Now these relationships can be expanded in ratio or percentage form for all supplying groups as follows:

(j)	Extractive:	10/40 = .25
	Manufacturing:	6/40 = .15
	Trade:	2/40 = .05
	Services:	4/40 = .10

These percentages state that if manufacturing is to increase its output by $1, the following purchases will have to be made: (1) 25¢ worth from agriculture; (2) 15¢ worth from other manufacturing firms; (3) 5¢ worth from trade establishments; and (4) 10¢ worth from service enterprises. Once a set of such relationships has been calculated, they are called "direct requirements" or "technical coefficients" because they indicate the *immediate* effects that an increase in production in one industry group will have on other industry groups in the processing sector. These relationships have been calculated for each of the four processing industries and are presented in Table 2-2. Assuming that these relationships are linear, one can readily determine the additional direct output required of all sectors for an increase in final demand in manufacturing of $6 millions for example.

Hypothetical Table of Total Requirements

Calculating technical coefficients provides some basis of assessing the direct impact of demand upon the interindustry transactions. In reality, however, succeeding "rounds" of spending and re-spending occur in an economy. For example, when a tourist buys a meal for $5.00 in a local restaurant, part of that $5.00 is spent for food supplied and part becomes income to cooks, waitresses, and the owner of the establishment. These income receivers in turn spend some of that money in other businesses so that a part becomes income to other retailers and clerks employed in stores who in turn spend part of that income on other goods and services in the local community and this again becomes income to other people. One could conceptually compute the income-generating effects of the original $5.00 expenditure by following its multiple exchange each time part of it was spent. Over a period of multiple transactions the original $5.00 flows through the economy numerous times causing business to buy more inputs than would occur with the initial, immediate change of $5.00 in demand depicted by a table of direct requirements.

TABLE 2-2. HYPOTHETICAL TABLE OF DIRECT REQUIREMENTS

		BUYERS					
		Extract.	Manuf.	Trade	Service	Fin. Dem.	TOTAL
SELLERS	Extractive	.23	.25	.27	.20		
	Manufacturing	.13	.15	.20	.07		
	Trade	.13	.05	.13	.07		
	Service	.10	.10	.20	.07		
	Payments Sector						
	TOTAL						

Analysis of Table 2-2 suggests that if manufacturing output is increased by $1.00, five cents worth of immediate or direct inputs will have to be purchased from trade (e.g., from an industrial distributor who sells operating supplies). But when trade supplies this incremental input of five cents to manufacturing, it increases its output by five cents and thereby requires more inputs from other sectors to supply that nickel's worth of incremental output. Moreover, since other firms will have to supply trade, their output and therefore their demand for inputs will increase, and so on with other firms and industries.

Some distinction must be made, then, between the immediate effects (i.e., direct requirements) of an increase in demand on suppliers and the long-term (total) effects after succeeding rounds of buying, selling, and income-creating have transpired. Determining these total effects can be accomplished by repeated calculations that trace through all transactions stemming from the initial increase in final demand. By means of mathematical techniques and modern computers the procedure can be accomplished efficiently. A table of total requirements can be computed by "matrix" inversion," the mathematics of which are too cumbersome to present here.[a] The table of total requirements in the example (Table 2-2) was "inverted" by the appropriate mathematical process and is presented in Table 2-3. This table (total requirements) shows both *direct and indirect* impact, resulting from the delivery of $1.00 worth of the products of each industry in the processing sector to the final demand sector. It, therefore, shows the total dollars production directly and indirectly required from the industry at the top for one dollar of additional sales to final demand by each industry at the left. One can obtain the indirect effects by subtraction of matrix elements in Table 2-2 from like elements in Table 2-3.

Calculating The Multiplier

Regional economists are interested in the total impact of economic activity and they calculate a "multiplier" from the table of total requirements. The multiplier is simply the sum of all the technical coefficients in a particular sector or column in the table of total requirements. Thus, for example, the multiplier for manufacturing is 2.32607 which is the sum of all of the figures presented in the manufacturing row of Table 2-3. The multiplier is interpreted to mean that if manufacturing output should increase by $1.00 (due to additional demand in the autonomous final demand sector), the *total impact* of the $1.00 change in demand will

[a]For example, total sales of Idaho's transportation industry was not available but total employment figures had been published by the Idaho Department of Employment. Idaho Transportation dollar output for 1963 was estimated by applying the ratio between transportation employment and output in the United States to Idaho transportation employment. The problem was set up to read

$$\frac{\text{US TRANSPORTATION SALES}}{\text{US TRANSPORTATION EMPLOYMENT}} = \frac{X}{\text{IDAHO TRANSPORTATION EMPLOYMENT}}$$

and then solved for X.

be to increase output by $2.33. Needless to say, the multiplier is an important concept to use in order to understand the importance of economic activity in particular lines of business.

TABLE 2-3. HYPOTHETICAL TABLE OF TOTAL REQUIREMENTS

		Extract.	Manuf.	Trade	Services	Fin. Dem.	TOTAL
S E L L E R S	Extractive	1.56722	.56170	.71621	.71621	.43368	
	Manufacturing	.32814	1.34056	1.34056	.45805	.20610	
	Trade	.26834	.18048	.18048	1.31539	.17143	
	Services	.26149	.24333	.24333	.40916	1.18091	
	Payments Sector						
	TOTAL						

STEPS FOLLOWED IN THIS STUDY

The study of Idaho's economic structure was not based on original data from primary sources collected expressly for this project. Rather, the input-output analysis presented in this report is based on an estimated, provisional transactions table. Many separate items of information obtained from several sources, as well as reasonable calculations based on informed knowledge and judgment of the state economy, were integrated to estimate the flow of economic activity in Idaho for 1963. The steps described below constitute the procedure followed to complete this study:

Select Idaho Industry Groups

To depict business transactions inside the state's borders, a processing sector for Idaho's economy was divided into 16 industries based on primarily the two-digit Standard Industrial Classification (SIC) code and relative industry importance in Idaho. This particular breakdown facilitated the use of available employment and earnings data to compare Idaho with the nation and other states whenever estimating various magnitudes was required. Exhibit A contains the names of each of the 16 industry groups in the processing sector along with their corresponding standard industrial classification code and 1958 national input-output numbers. Although the extent of disaggregation in the processing sector was limited by available funds, the 16 industry groups chosen appear to be reasonable in depicting the major flows of economic activity among Idaho business firms. The final demand sector consisted of four components, namely (1) consumption, (2) investment, (3) government, and (4) exports. Net inventory changes were not considered. A payments sector included a row entry for imports and another called "value created," which is the common proxy for payments to the factors of production.

Collect Secondary Data

The gross flows table was to be measured in terms of dollar sales at producers' prices. Because of this, it was necessary to assemble as many sales or value of production data as possible

about Idaho firms. Although some data on Idaho business activity have been published, most information is not in a form that can be readily used for an interindustry study. Secondary data were secured on several industry groups for "gross output," "value added," and "investment" from the *1963 Census of Business*. Some figures on agriculture were available from United States Department of Agriculture publications; information on utilities and communications, taxes, government expenditures, and lumbering were also obtained from published sources. A recent Master's thesis written at The University of Idaho supplied additional data on mining and chemicals.[7] Finally, annual reports and trade association publications provided general information about several industry groups.

Determine Industry Gross Outputs

Total 1963 dollar-sales figures for each of the 16 Idaho industry groups were determined by estimates as well as from secondary data. Those few output figures not available from secondary information for several industries were derived by comparing employment or value-added in Idaho to those same relationships with output in other states.[8] In this regard, input-output studies of Oregon, Mississippi, New Mexico, and Washington, as well as the 1958 United States interindustry study, were useful as bases for comparison. Estimates were cross-checked by comparing the industrial structure of an area with that of Idaho. Gross output figures were recorded as totals for both row and column entries of each of the 16 Idaho industry groups; reconciliations were made thus insuring equality of inputs and outputs.

Recast 1958 United States Transactions Table

One feature of the provisional Idaho input-output study was to use national technical coefficients as guidelines for estimating interindustry transactions. To facilitate this procedure, the 1958 United States transactions table was restructured into a 16 x 16 table by aggregating its 87 row and column entries into 16 lines of business activity comparable to Idaho industry groups. Once this aggregation was completed, technical coefficients were calculated to create a table of direct requirements with 16 industry groups for the United States based on the processing sector entries in the Idaho interindustry study. This "collapsed" national input-output table was assumed to depict an average input mix for Idaho industry groups and was used to estimate several Idaho deliveries to intermediate demand.

Determine Demand Sources for Idaho Industries

Although some cell entries in the Idaho Provisional Gross Flows Table were available from secondary and other sources, many interindustry transactions were estimated through several

[7] Newell, Merle E., "Idaho's Minerals Industry: A Flow of Product Analysis," (Unpublished M. S. Thesis, University of Idaho, 1967).

[8] At this point in the analysis neither import substitution nor changes in the interindustry relationships which likely occur with changes in economic activities are taken into consideration.

procedures. Informed judgment and basic knowledge about the Idaho economy were the basis for eliminating those deliveries of industry output to demand sources for which little or no output data could be supplied. For example, national technical coefficients from the aggregated United States table described above indicated that Food and Kindred Products (Industry Group 4) requires three cents worth of Fabricated Metal Products (Industry Group 8) for each dollars worth of final demand. However, nearly all of the output of Idaho's Fabricated Metal Products industry is produced by structural metal fabricators, a specific group which delivers *no* traceable output to Food and Kindred Products according to the 87-sector 1958 United States transactions table. This inspection process was repeated for each row and column in the Provisional Gross Flows Table, and as a result, several cells were left blank. For purposes of further analysis it was assumed that inputs in blank cells that were not a part of a production coefficient were supplied by imports. In addition, several other cells were left blank in the gross flows table due to certain assumptions and procedures characterizing the study: First, most of the output of the construction industry was assigned to the final demand sector; second, deliveries of output by a few industries were considered too small to assign to certain other industries and therefore, disregarded; third, wherever blank cells in the aggregated United States table were noted, it was assumed that those outputs were not delivered among Idaho firms.

Estimate Interindustry Transfers in Idaho

Estimates of deliveries by each Idaho industry group to its demand sources were based on expert opinion, informed judgment, and comparisons with other states. These procedures are briefly described through examples in this section. For example, Idaho agriculture sells a share of its output directly for household consumption, but no data were available on the exact physical amount or dollar value. However, agricultural economists, familiar with Idaho farm production and marketing, provided a reasonable estimate of this transfer. In other cases, minor but noteworthy deliveries by one industry group to another in Idaho were known to occur, but since data were again unavailable, an equal percentage allocation was made. To illustrate, after estimating the deliveries of the Finance-Insurance-Real Estate group via well documented patterns of economic behavior, the remaining output was equally distributed to each of the smaller purchasers. In some instances, the percentage of output sold by an Idaho industry group to another sector was based on a similar relationship with other states. Transactions tables from the Oregon, Mississippi, New Mexico, and Washington input-output studies contain corresponding data and were used to validate transactions wherever industry structure was similar. In this case, to estimate the intraindustry transaction in agriculture, ten percent of Idaho's agricultural gross output was delivered to itself because that percentage figure was an average for New Mexico and Washington. In the final demand sector similar estimates were made. More than three-fourths of the Pro-

visional Gross Flows Table was constructed according to similar procedures.

Verify Estimates

When an estimated-provisional gross flows table had been constructed, copies were distributed to several persons who were familiar with specific industry groups in the state economy. Copies of the table were sent to selected academic economists located at various institutions of higher education including Idaho, to certain Idaho business executives in the mining, lumbering, and manufacturing industries, and to others in state and federal governmental positions. Each addressee was requested to study the table carefully, then to express his opinion on the validity of the estimates. Many comments were received and a few errors, omissions, and poor estimations were noted. The gross flows table was then revised into its final form.

Compute Direct and Total Requirements

Once the Provisional Gross Flows Table had been completed, direct requirements were calculated by the usual method of dividing each column cell in the processing sector by its respective column total. In this regard, only direct requirements per dollar of final demand were computed. Moreover, only the 16 x 16 matrix was inverted (the processing sector) rather than calculating coefficients in final demand and payments sectors. The study thereby concentrated on Idaho interindustry transactions rather than on Idaho's economic relations with the outside world. Direct and total requirements are shown in tables 4-4 and 4-5 in Chapter Four.

SOURCES OF DATA

Although regional analysis generally requires gathering statistical data from primary sources, already-published information was used to construct the Idaho input-output table. As such, this study can be considered a preliminary report on the structure of Idaho's economy. Information for this study was obtained from U.S. Government documents, annual reports, data from Idaho State offices, and other pieces of information from Master's theses, academic studies, and even newspaper clippings. Whereas this research procedure is hazardous, because data from various agencies are recorded and reported for different reasons, it is felt that they are adequate to develop reasonable approximations of the relationships existing among economic units in Idaho. The following list includes most of published statistical sources of data used in this study.

"Annual Report of the Idaho Department of Highways," Idaho Board of Highway Directors

"Annual Report of the Mining Industry of Idaho for 1965," O. T. Hansen, Inspector of Mines

"Annual Report of the State Tax Commission of the State of Idaho," 1966

"Annual Report State of Idaho, Department of Insurance," June 30, 1964

"The Balance Sheet of Agriculture 1966," United States Department of Agriculture

"Biennial Report of the Idaho State Board of Education and the State Superintendent of Public Instruction for the Biennium 1964-1966," Boise, Idaho

"Biennial Report of the State Land Department," State of Idaho, 1964-66
"Biennial Report of the State Treasurer to the Government of Idaho," 1962-64.
"BSDA U. S. Industrial Outlook, 1966," U. S. Department of Commerce, Business and Defense Services Administration
Census of Manufacturing, 1965, U. S. Department of Commerce, Washington, D.C., 1965.
"The Consumer of Cut-up Lumber," University of Idaho, College of Forestry—Wildlife and Range Science
"Economic Facts: Idaho Agriculture," Agricultural Extension Service, Boise, Idaho
Farm Income Situation, Economic Research Service, U. S. Department of Agriculture, July, 1965
"Fiduciary, Gift, and Estate Tax Returns," U. S. Treasury Department—Internal Revenue Service, 1962
"Fifteenth Annual Report of the Idaho Department of Highways," Idaho Board of Highway Directors, 1963
"Fifty-First Annual Report of the Idaho Public Utilities Commission," July 1, 1963 to June 30, 1964
"Financial Summaries, Idaho School Districts," State of Idaho, Department of Education
"Fingertip Facts and Figures," National Forest Products Association, Wash., D.C.
"First Security News Letter," First Security Corporation, Salt Lake City, Utah
"Highway Information," Department of Highways, Boise, Idaho
"Idaho Basic Economic Data," Employment Security Corporation
"Idaho Construction Report," First Security Corporation, Salt Lake City, Utah
"Idaho Economic Indicators," Department of Employment, Boise, Idaho
"Idaho Economic Report," Idaho Department of Commerce and Development
"Idaho Employment," Department of Employment, Boise, Idaho
"Idaho Fifteenth Annual Report," Office of Tax Collector
"Idaho Image," Department of Commerce and Development, Boise, Idaho
"Idaho Minerals Industry: A Flow of Product Analysis," (unpublished M. S. Thesis, M. C. Newell, University of Idaho, 1967)
"The Idaho Potato Story," Idaho Potato & Onion Commission, Boise, Idaho, 1962
"Idaho Statistical Abstract," University of Idaho, 1966
"Idaho Will Grow," University of Idaho, 1966
"Import Substitution as Investment Potential in Idaho," Wm. G. Bedford, Bureau of Business and Economic Research, University of Idaho, 1964
"Individual Income Tax Returns," U. S. Treasury Department, Internal Revenue Service
"The Interindustry Structure of the United States, A Report on the 1958 Input-Output Study," Morris R. Goldman, Martin L. Marimont, and Beatrice N. Vaccara, Survey of Current Business
"Maintenance Report—1963," State of Idaho Department of Highways
"Mineral Industry Surveys," U. S. Department of Interior Bureau of Mines, Albany, Oregon
"Mountain States Business," Mountain States Telephone, Boise, Idaho
"Municipal Finance in Idaho," Bureau of Public Affairs Research, University of Idaho
"Personal Income by States since 1929," United States Department of Commerce, Office of Business Economics
"Population Trends in Idaho 1950-1960," University of Idaho, 1964
"Report of Idaho Department of Commerce and Development," Louise Shadduck

"Report to the Governor of Idaho and the Thirty-Ninth Legislature from the Idaho Potato and Onion Commission," 1966
"The Sawmilling Industry in Northern Idaho," E. L. Williams, Idaho Agricultural Experiment Station, October, 1964
"Small Non-Industrial Forest Owners in Northern Idaho," Department of Agricultural Economics
"Speaking of Taxes," Associated Taxpayers of Idaho, Boise, Idaho
"State of Idaho Department of Finance Forty-Seventh Annual Report," 1965
Survey of Buying Power, Sales Management, Inc., Philadelphia, Pa.
Survey of Current Business, U. S. Department of Commerce, Washington, D.C.
"A Survey of the Idaho Lumber Industry," Employment Security Agency, 1962
"United States Census of Agriculture 1964," U. S. Department of Commerce, Bureau of the Census

Chapter Three

DESCRIPTION OF INPUT-OUTPUT SECTORS AND IDAHO INDUSTRY GROUPS

The input-output approach to interindustry economics, described in Chapter Two is based upon a very unique identification and arrangement of different parts and sectors of the economy being studied. This chapter examines the nature of the basic sectors that were developed for the Idaho study and describes in detail the various breakdowns for industry groups established for analyzing their input-output relationships.

DEVELOPMENT OF BASIC SECTORS

As indicated in Chapter Two, there are three essential parts to an input-output transactions (or gross flows) table: the processing, final demand, and payments sectors. The relationship between and among each of these sectors is a very technical one that involves social accounting concepts and Keynesian economic theory; however, explaining these ideas in detail is not within the scope of this publication.[1] Simply stated, the sum of the entries in a payments sector is equal to the sum of the components of final demand thereby depicting the four Keynesian aggregates, Consumption, Investment, Government, and Net Exports. Although all input-output studies contain the processing, final demand, and payments sectors, individual studies may differ because of the elements contained within each can be reported at different levels of aggregation. For example, the number of entries in a final demand sector could vary from one to more than a dozen separate items because Government could be disaggregated according to federal, state, and local units. To illustrate further, the payments sector could be divided into as many different factors of production (or resources) as the analyst deemed necessary to reflect adequately the economic relationships in the economy under study. Each of the three sectors (processing, final demand, payments) is discussed in detail below.

THE PROCESSING SECTOR

The processing sector is primarily the focal point of an input-output analysis; it contains several groupings devised to depict all of the business firms in the economy being studied which are aggregated and arranged according to their respective industry lines. If an economy, such as the state of Idaho, is the subject of

[1]These concepts, regularly taught in college undergraduate economics courses, are within the so-called field of "macroeconomics" (or, the relationships which describe the economy in general). An elementary treatment of Keynesian economics and related social accounting techniques can be found in Peterson, Wallace C., *Income, Employment, and Economic Growth* (New York: W. W. Norton McGraw-Hill Book Company, Inc., 1966).

an investigation then those business units *inside* its borders must be separated from economic entities outside the state. In the Idaho input-output study, an attempt was made to determine the manner by which different broad lines of business in the economy were tied together. This identification consisted of entering business establishments organized for profit and their corresponding dollar transaction in the processing sector (as depicted by the hard-ruled rectangle in the upper left-hand corner of Table 2-1 in Chapter Two). The processing sector shows transactions between two industry groups in which one industry group is represented as purchasing from another for the purpose of either using those goods in its business, or processing them for further sale either to another firm, to one in the processing sector, or to a component of final demand.

Selection of Idaho Industry Groups

The number of industry groups selected in an input-output study varies from a few to many. In fact, the number of industry groups depicted in the 1947 U. S. Input-Output study was nearly 500, but in the Idaho study only 16 were shown. As will be recalled from the previous chapter the number of industry groups in the processing sector is multiplied by itself in order to determine how many separate cell entries there are in the processing sector. Thus, with the 1947 U.S. table, there were 250,000 cells (500 x 500) for which data had to be gathered and calculated; however, in the Idaho project only 256 (16 x 16) cells were involved.

The 16 industry groups selected to depict the Idaho business economy are shown below in Exhibit A. The small number chosen does not suggest the relative size of Idaho to the national economy, but rather, only that 16 industry groups were considered an appropriate number to accomplish this study.

EXHIBIT A

SIC Industry Content and 1958 U.S. Input-Output Entry Numbers for Corresponding Idaho Industry Groups

Idaho Industry Number and Name	Related SIC Two-Digit Industries	1958 U.S. Input-Output Table Entry Numbers
1. AGRICULTURE	01,02,07,08,09	1,2,3,4,
2. MINING	10,11,12,13,14	5,6,7,8,9,10
3. CONSTRUCTION	15,16,17	11,12
4. FOOD & KINDRED PRODUCTS	20	14
5. LUMBER, WOOD, & FURNITURE	24,25	20,21,22,23
6. PRINTING & PUBLISHING	27	26
7. CHEMICALS & ALLIED PRODUCTS	28	27,28,29
8. FABRICATED METAL PRODUCTS	34	39,40,41,42
9. MACHINERY (except electrical)	35	43 through 52
10. MANUFACTURE (n.e.c.)	19,21,23,26,29,30, 31,32,33,36,37,38,39	13,15,16,17,18,19,24,25,31, 32,33,34,35,36,37,38,52,53, 54,55,56,57,58,59,61,62,63,64
11. TRANSPORTATION	40,41,42,44,45,46,47	65
12. UTILITIES & COMMUNICATIONS	48,49	66,67,68
13. WHOLESALE & RETAIL TRADE	50,52,53,54,55,56,57,58,59	69
14. FINANCE, INSURANCE, & REAL EST.	60,61,62,63,64,65,66,67	70,71
15. PERSONAL SERVICES	70,72,76	72
16. OTHER SERVICES	73,75,78,79,80,81,82,84,86,88,87	73,74,75,76,77

Courtesy of Graduate School of Business Administration, University of Washington

Agriculture (Industry Group No. 1)[2]

This industry group represents farming—the production of livestock, raw livestock products, as well as field and garden crops and fruit. Idaho has been largely a farm state for some time (although manufacturing-related sources of income are rapidly increasing as a share of total Idaho output). In 1963, the major sources of Idaho farm incomes were potatoes ($859 million), wheat ($583 million), sugar beets ($337 million) and cattle ($98 million). Significant incomes were also earned from dairy products, sheep, hay, and barley producing. Data for this industry group were obtained primarily from United States Department of Agriculture publications and from the Department of Agricultural Economics at the University of Idaho. In estimating agricultural *inputs* for the Idaho Provisional Gross Flows Table, many data were secured from the Farmer Cooperative Service of USDA. To determine the distribution of output by Agriculture, 10 percent of gross sales were allocated as an intraindustry transfer (agriculture to itself), while 30 percent were delivered to food processors (Industry Group No. 4), both reasonable estimates of interindustry relations in states such as Idaho. Although a small amount was considered as being sold directly to the trade sector (Industry Group No. 13), the remaining agricultural output was assigned to components of final demand in that sector.

Some basic data on Idaho agriculture highlights economic activity in this area and includes many items used to contribute to the input-output tables.

TABLE 3-1. IDAHO CASH RECEIPTS FROM FARM MARKETINGS, SELECTED YEARS

(dollars in thousands)

Year	Total Cash Receipts	Crops	Livestock and Livestock Products	Government Payments
1955	$353,716	$206,014	$142,898	$ 4,804
1957	381,952	198,201	169,632	14,119
1959	443,897	225,652	204,307	13,938
1961	426,354	221,846	190,417	14,091
1963	474,923	256,597	197,285	21,041

Source: United States Department of Agriculture Agricultural Marketing Service, *The Farm Income Situation* (Washington, D.C.: Government Printing Office, 1949-64.)

Table 3-1, showing farm cash receipts, points out that income from livestock, crops, and government subsidies increased over the eight-year period 1955 to 1963. It should be noted that in the estimation of gross output from the agricultural sector, government payments were not included.

[2] The term "agriculture" was chosen as an indicator for farming and feeding activities and does not include so-called "agri-business" processing units such as meat packing plants, grain elevators, and feed mills.

Table 3-2, which shows farm operating expenses, indicates that expenditures have risen considerably between 1955 and 1963, but that much of the increase can be accounted for by trends affecting the livestock industry. Farm operating expenses are reported in greater detail in USDA publications, and some *input* data

TABLE 3-2. CURRENT FARM OPERATING EXPENSES, IDAHO, SELECTED YEARS, 1955 to 1963

(dollars in millions)

Year	Feed	Livestock	Seed	Fertilizer	Repairs	Labor	Misc.	Total
1955	$27.8	$ 6.9	$ 8.0	$ 9.2	$49.9	$36.1	$34.8	$172.6
1957	30.5	13.7	6.3	7.4	54.7	39.1	37.6	189.2
1959	40.9	20.4	7.4	11.4	58.7	41.4	44.3	224.4
1961	42.2	18.5	10.4	16.5	55.9	41.8	49.1	234.4
1963	57.3	25.8	9.3	15.2	58.0	44.3	53.1	263.0

Source: *Farm Income State Estimates, 1949-1964,* (U.S. Department of Agriculture E.R.S.), FIS 199, August 1965.

for the Provisional Gross Flows Table were obtained from them as well as from estimates based on activity in other states in which the structure of agriculture is similar to that in Idaho.

Mining (Industry Group No. 2)

Idaho's mining industry has been important to the state's economy for more than a century. Leading metallics are silver, lead, zinc (in that order) followed by copper production. Idaho contributes nearly 50 percent of all silver produced in the United States each year. Whereas less than 2 percent of the Idaho labor force is currently employed in the mining industry, total sales of metallics and nonmetallics are nearly $100 million annually. Employment has been decreasing here since the early 1950's and so has the money income earned by those employed in mining. Although there is some scattered mining throughout the state, the principal metal mining area is in northern Idaho in the Coeur d'Alene district. Except for sand and gravel pits located all over Idaho, the main nonmetallic mining is phosphate production[3] in southeastern Idaho.

TABLE 3-3. MEASURES OF ECONOMIC ACTIVITY MINING*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Sales	Value Added	Capital Creation
1954	4,781	$22,405	$52,083	$38,692	$5,433
1958	3,932	20,886	52,084	36,815	2,911
1963	3,224	19,253	82,800		

*SIC Nos. 10, 11, 12, 13, 14; Idaho Industry Group No. 2

Sources: (1) *Census of Mineral Industries (1958)*
(2) *Mineral Industry Surveys (1963)*
(3) *Minerals Yearbook (1948)*

[3]It is apparently not well established whether phosphate production is a part of the mining industry or a part of chemicals and allied products, at least in terms of assigning the sales value of total phosphate output to one of the categories. It is significant, however, that the U. S. Census of Business and the Idaho Department of Employment reports phosphate employment and output under SIC 28, a group which is described as "Chemicals and Allied Products."

Table 3-3 shows several measures of economic activity in mining in Idaho between 1954 and 1963 and indicates that it has been varied recently. The total sales figure of 1963 ($82,800,000) was used as the value of output in the Idaho Provisional Gross Flows Table. In determining sources of demand for the mining industry, approximately 92 percent[4] of the output was assigned to the exports column in the final demand sector. Deliveries to other groups in the processing sector were based on the Newell thesis as were inputs in the Mining column.

Construction (Industry Group No. 3)

"Construction" reflects the activities of many large and small firms in the Idaho economy; this grouping includes primarily the creation of commercial and residential building, roads, dams, new plant building, and other public and private structures. In Idaho, the value of non-governmental construction has risen modestly alongside public projects since 1949 when more than $300 million were spent over several years on the Atomic Testing Station at Idaho Falls. During the 1960's many government-financed projects for the building of highways, dams, defense installations, and public buildings stimulated construction activity in the state.

TABLE 3-4. VALUE OF CONSTRUCTION ACTIVITY, 28 MAJOR CITIES, IDAHO, 1960-1963

(dollars in thousands)

Type of Construction	1960	1961	1962	1963
Residential	$23,489	$21,206	$25,168	$27,199
Business	15,309	15,385	21,742	23,224
Alterations	7,822	10,241	8,954	10,113
TOTALS	$46,620	$46,841	$55,865	$60,536

Source: First Security Bank of Idaho, *Idaho Construction Report,* (selected issues)

Table 3-4, which shows the value of private construction activity in Idaho, indicates that more than $60 million were spent in 1963. The value selected for the gross output figure for Construction ($139 million) was based on reports of construction activity issued by the First Security Bank of Idaho, then modified by several items of information about government building programs and selected data on construction by specific firms and industry groups. Construction is one of the most difficult industry groups to treat in an input-output study because the theoretical nature of investment and capital creation does not always coincide with the practical aspects of the amounts actually spent by different levels of government, by consumers, and by business firms for new construction and for alterations and repairs. Hence, the gross output figure is a rough estimate.

For purposes of the Idaho Provisional Gross Flows Table, the output of the construction industry group was assigned almost

[4]Newell, Merle L., *Idaho's Minerals Industry: A Product Flow Analysis* (Unpublished Master of Science Thesis, University of Idaho Graduate School, April, 1966).

entirely to the final demand sector. This procedure reflects the fact that most construction is capital creation and, as such, it should be treated as investment in the autonomous final demand sector rather than as a purchase for resale in the processing sector. Thus, aside from a small intraindustry transfer, (which recognizes that some construction firms sell to other construction firms), no cell entries were made in the processing sector. Reading down the Construction column traces the inputs used by construction firms in that industry group to create the output which was allocated in the Construction row. In order to estimate these input figures, data were patterned according to experience noted in the United States 1958 interindustry study and other states (notably Oregon, Washington, New Mexico, Utah, and Mississippi).

Food and Kindred Products (Industry Group No. 4)

This major group includes establishments manufacturing foods and beverages for human consumption, and certain other products such as vegetable and animal fats, and prepared feeds for nonhuman use. Table 3-5 bears out that not only has Food and Kindred Products increased output (as noted by the 260 percent increase in value added between 1948 and 1963), but employment and payrolls have also increased markedly. Food and Kindred Products output currently accounts for about 36 percent of all manufacturing employment in Idaho. Total value created in this category increased by $33,000,000 between 1958 and 1963; over one-third of this gain ($11,300,000) stemmed from frozen fruits and vegetable manufacturers, notably potato processing plants. The rest of the increase (nearly $22,000,000) can be traced to increased output for poultry dressing, animal feeds, and canned fruits and vegetables. Most other specific food processing lines also increased output during this period.

TABLE 3-5. MEASURES OF ECONOMIC ACTIVITY, FOOD AND KINDRED PRODUCTS,* IDAHO, SELECTED YEARS, 1948-63

(dollars in thousands)

Year	Average Employment	Payroll	Number of Establishments	Value Added	Capital Creation
1948	6,020	$14,951	244	$43,653	$7,473
1954	6,752	21,274	232	49,627	5,020
1958	7,885	28,786	238	78,073	7,207
1963	9,881	44,559	224	111,086	7,930

*SIC No. 20; Idaho Input-Output Sector No. 3

Sources: (1) U.S. Census of Manufactures (1958)
(2) U.S. Census of Manufactures (1963)

According to the 1963 *Census of Business,* 11 of the 16 frozen food packers had more than 20 employees, an indication that these plants are not small, one-man operations. It is estimated that this category within Industry Group No. 4 is responsible for one-third of all value added which is created in Idaho.[5] In 1960

[5]*Idaho Economic Almanac,* (Boise: Department of Commerce and Development, 1963) pp. 446-448.

alone plant investment in potato processing amounted to approximately $28 million, according to a recent publication.[6] In 1963 Idaho produced 58 percent of all processed potatoes manufactured in the United States. Moreover, the 20 potato plants in Idaho processed 21 million hundred weight of potatoes into food products and 647 thousand hundred weight into starch, flour, and alcohol in 1964. Although meat, sugar, and dairy products processing firms operate in Idaho, the 43 meat products plants alone accounted for total value of shipments worth close to $70 million.

Aside from a small intraindustry transfer, output of Food and Kindred Products was distributed to only two other groups in the processing sector, namely Agriculture (Industry Group No. 1) and Trade (Industry Group No. 13). The value of prepared animal feeds was assigned to Agriculture, while the amount allocated to Trade was based on an average from similar transactions in other state input-output studies.

Lumber Wood Products, and Furniture
(Industry Group No. 5)

This category consists of (1) logging camps and contractors, (2) sawmills and planing mills, (3) millwork plants, (4) firms manufacturing household, office, public building, and related furniture, and (5) companies producing partitions, shelving, lockers, office and store fixtures, and miscellaneous furniture and fixtures. According to the 1963 *Census of Manufactures,* over half of the 505 establishments in this category were logging camps while one-third of them were planing and sawmills.

Idaho has 22 million acres of forests containing 115 billion board feet of saw timber. Yearly production averages 1.6 billion board feet at the present time.[8] Timber and related industries are important in Idaho, not only because three-fourths of the state is covered with timber, but because over one-third of all full-time manufacturing workers are employed in this industry grouping. It has been estimated that forest and related industries rank second

TABLE 3-6. MEASURES OF ECONOMIC ACTIVITY, LUMBER, WOOD PRODUCTS, AND FURNITURE*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Number of Establishments	Value Added	Capital Creation
1948	7,653	$21,477#	242	$44,956#	$ 2,912#
1954	11,590	46,752	505	83,049	6,726
1958	10,434	47,834	493	67,640	6,009
1963	10,391	54,036	505	89,424	11,759

*SIC Nos. 24, 25; Idaho Input-Output Sector No. 4
#Approximations based on partial census data.
Sources: (1) U.S. *Census of Manufactures* (1958)
(2) U.S. *Census of Manufactures* (1963)

[6]"Potato Processing in Idaho," (Burley, Idaho: Potato Processors Association, 1964).
[7]*Ibid.*
[8]Nybroten, A. N., *Idaho Statistical Abstract* (Moscow: University of Idaho 1966), p. 158.

only to agriculture in economic importance in Idaho,[9] although value added in food processing has been significant in recent years.

Table 3-6, which contains census data on this sector for recent years, indicates that over the 15-year period 1948 to 1963 economic activity has increased markedly. Here three figures deserve mention: (1) while employment has been fairly constant since 1954, payrolls have increased slightly; (2) value added has doubled since 1948 but has not moved significantly since 1954; and (3) total capital creation in census years has increased notably since 1948. Data for the input-output table were obtained from several sources in addition to Census of Business figures. First, it has been estimated by competent researchers that approximately 89 percent of all lumber products in Idaho are exported;[10] second, the gross output figures for 1963 ($206,000,000 as it appears in the Idaho Provisional Gross Flows Table) were unavailable from census data. Therefore, it was estimated from value of shipments and value added figures. Since the majority (89 percent) of the output of this group was treated as an export, outputs were allocated to construction and trade as well as a 20 percent intraindustry transfer which appeared in accordance with national trends of demand and use. *Inputs* to Industry Group No. 5 were structured on the basis of known patterns of business purchases in this line.

Printing and Publishing (Industry Group No. 6)

This major group includes establishments engaged in printing through one or more of the common processes, such as letterpress, lithography, gravure, or screen; and those firms which perform services for the printing trade, such as bookbinding, typesetting, engraving, photoengraving, and electrotyping. Also included are establishments engaged in publishing newspapers, books, and periodicals.

TABLE 3-7. MEASURES OF ECONOMIC ACTIVITY, PRINTING AND PUBLISHING*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Number of Establishments	Value Added	Capital Creation
1948	961	$2,566	88	$ 4,968	$201
1954	966	3,796	94	6,777	328
1958	1,321	5,860	104	10,456	378
1963	1,360	6,716	106	16,119	607

*SIC Nos. 27; Idaho Input-Output Sector No. 5

Sources: (1) U.S. *Census of Manufactures* (1958)
(2) U.S. *Census of Manufactures* (1963)

The Printing and Publishing industry in Idaho consists of 66 newspapers, 18 printing companies, and several lithographers and engravers, in addition to other small print shops. Table 3-7 indicates that although the absolute amount of capital creation in

[9] *op. cit., Idaho Economic Almanac*, p. 404.
[10] Williams, E. L., "Distribution of Lumber Produced in Idaho," (University of Idaho: College of Forestry, Wildlife, and Range Sciences; Station Note #8), February, 1967.

this industry group has not been too significant since 1948, large percentage increases can be noted because initial amounts in the base year (1948) were small. The number of firms increased by 20 percent between 1948 and 1963, and value added more than tripled during that period.

In order to enter appropriate data into the Idaho Provisional Gross Flows Table, the total sales figure for 1963 for Printing and Publishing was obtained by increasing the Idaho value added figure in this industry group by a percentage on the basis of experience in other states. In addition to a 10-percent intraindustry transfer, output was distributed to sources of demand in Food and Kindred Products (1 percent), Trade (25 percent), Finance-Insurance-Real Estate (10 percent), Personal Services (5 percent), and Other Services (5 percent). Approximately two-thirds of the output of Printing and Publishing was allocated to the final demand sector (to Consumption, Exports, and Investment, in that order). Several of the percentage estimates for inputs were the result of allocating the outputs of other industry groups to Printing and Publishing; many of these figures were based on similar patterns noted in other input-output studies. Once again, the reasoning here was that the structure of inputs for an industry group is primarily an expression of the technical coefficients of production characterizing a particular line. On this basis, it was assumed that certain resources (or inputs) are uniquely necessary to produce a certain kind of output regardless of whether that production takes place in Idaho or other places in the United States.

Chemicals and Allied Products (Industry Group No. 7)

This category consists of firms producing basic chemicals and of establishments manufacturing products by predominately chemical processes. In Idaho, this industry is composed mainly of agricultural chemicals companies, notably phosphate production. A few firms in this group produce inorganic chemicals, such as mercury and silver. Chemical and Allied Products has been a rapid growth industry in Idaho during recent years. Examination of Table 3-8 indicates that value added tripled between 1954 and 1958, then doubled during the 1958-1963 period. A significant increase in employment has also been recorded in this category. For example, according to *Census of Manufactures* data, total employment rose from a mere 149 persons in 1948 to 2,425 persons in 1958, then increased to 3,232 persons in 1963, or by nearly 30 percent in five years.

TABLE 3-8. MEASURES OF ECONOMIC ACTIVITY, CHEMICALS AND ALLIED PRODUCTS*, IDAHO, SELECTED YEARS, 1948-63

Year	Average Employment	Payroll	Number of Establishments	Value Added	Capital Creation
1948	149	$ 436	7	$ 1,609	$ 260
1954	859	3,886	12	12,783	4,218
1958	2,425	15,419	12	41,345	527
1963	3,232	24,349	17	75,193	2,258

*SIC No. 28; Idaho Input-Output Sector No. 7

Sources: (1) U.S. *Census of Manufactures* (1958)
(2) U.S. *Census of Manufactures* (1963)

Total output for this industry (in 1963) was estimated at $190 million. This figure was derived by applying the ratio of value added to output in the United States to the Idaho value added figure; thus Idaho value added was "marked up" by the same percentage existing nationally in this same industry group. Value added was only $1.6 million in 1948, but by 1963 it had increased to over $75 million. Table 3-8 also indicates that employment and payrolls have increased markedly in each census year. Some of the data used to allocate deliveries of output to demand, as well as input figures, were taken from the recent Master's thesis cited above.[11] In essence, approximately 8½ percent of the gross output of Chemicals and Allied Products were allocated to the processing sector (Agriculture, Trade, and an intraindustry transfer). The remaining gross output was shown as a delivery to exports in the final demand sector, primarily because most of the production of this industry group is sold outside Idaho. As with many of the other industry groups, inputs were both structured on the basis of national and state technical coefficients in other input-output studies, as well as being based on output allocations by other Idaho industry groups having the capacity of delivering part of their production to the Idaho processing sector.

Fabricated Metal Products (Industry Group No. 8)

This industry group consists of firms that produce fabricated ferrous and nonferrous metal items. In Idaho, six establishments in this industry fabricate steel and other metals for structural purposes; many other firms are small sheet-metal shops. Companies making hand tools, metal stampings, and metal and wire products are also included in this group.

Economic activity in Fabricated Metal Products has increased considerably since 1948; not only has capital creation risen, but value added doubled between 1954 and 1958, then rose 80 percent more by 1963. These data are shown in Table 3-9 where it can also be noted that only 444 workers were employed in this line in 1963, a notable decrease since 1958. However, the total number of establishments has increased during the process of the replacement of capital for labor. In other words, Fabricated Metal Products firms appear more mechanized today than formerly.

TABLE 3-9. MEASURES OF ECONOMIC ACTIVITY, FABRICATED METAL PRODUCTS*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Number of Establishments	Value Added	Capital Creation
1948	106	$ 278	10	$ 404	$ 36
1954	409	1,340	21	1,637	100
1958	547	2,864	19	3,496	182
1963	444	2,528	31	6,218	285

*SIC No. 34; Idaho Input-Output Sector No. 8

Sources: (1) U.S. *Census of Manufactures* (1958)
(2) U.S. *Census of Manufactures* (1963)

[11]Newell, *op. cit.*

Machinery-Except-Electrical (Industry Group No. 9)

This group includes establishments engaged in manufacturing machines powered by built-in or detachable motors (except household appliances), as well as portable tools, excluding hand tools. Some of the major items produced by firms in this industry group are (1) engines and turbines, (2) farm machinery, (3) construction, mining, and materials handling equipment, (4) metal working machines, (5) business machines, (6) service industry machines, and (7) general industrial equipment. In Idaho, major firms in this industry are farm machinery manufacturers. In fact, approximately one-half of value added is derived from such companies. Another 20 percent of value added arises from the output of miscellaneous machined parts manufacturers.

TABLE 3-10. MEASURES OF ECONOMIC ACTIVITY, MACHINERY-EXCEPT-ELECTRICAL*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Number of Establishments	Value Added	Capital Creation
1948	312	$ 886	11	$1,194	$122
1954	222	775	24	1,408	54
1958	845	6,000	59	8,399	523
1963	556	3,112	67	5,050	218

*SIC No. 35; Idaho Input-Output Sector No. 9

Sources: (1) U.S. *Census of Manufactures* (1958)
(2) U.S. *Census of Manufactures* (1963)

Economic activity in the Machinery-except-electrical industry has risen markedly in recent years. For example, from Table 3-10, the number of firms increased from 11 to 67 over the period 1948-1963. Moreover, during that same time, value added increased fourfold (from approximately $1.2 million to $5.1 million) and employment nearly doubled. It is interesting to note that between 1948 and 1958, value added increased from $1 million to $8 million, then dropped to $5 million in 1963. This movement reflects the fact that there was a change in classification between the 1958 and 1963 business census. The fact remains, however, that economic activity in this industry group has been increasing during the past two decades.

In addition to an intraindustry transfer, a small portion of the gross output of the Machinery-except-electrical grouping was distributed to Trade (in the processing sector), while the majority of output was shown as delivered to investment (in the final demand sector). This allocation was made because these items were not intermediate goods bought for further processing, but rather final goods used in the process of production by agriculture. Inputs for this industry group were distributed according to the pattern of distribution characterizing the national interindustry study. After allowing for inputs unable to be supplied by Idaho firms, the import column was treated as a residual.

Manufacturing-Not-Elsewhere-Classified
(Industry Group No. 10)

Manufacturing, n.e.c., is a miscellaneous industry group in the Idaho interindustry study which includes 12 different SIC categories (identified in the footnote on Table 3-11). Some specific output represented by this group are (1) paper and allied products, (2) nonferrous metals smelting, (3) clay, stone, and glass products, (4) electrical machinery, (5) transportation equipment, (6) scientific instruments, and (7) other items such as jewelry and sporting goods. Industry Group No. 10 is dominated by paper mills, trailer manufacturers, concrete and plaster products firms, and copper, lead, and zinc smelters in Idaho.

TABLE 3-11. MEASURES OF ECONOMIC ACTIVITY, MANUFACTURING-NOT-ELSEWHERE-CLASSIFIED*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Number of Establishments	Value Added	Capital Creation
1948	922	$ 2,362	87	$ 4,886	$ 456
1958	3,784	19,252	134	46,366	3,583
1963	4,623	27,260	153	63,321	5,314

*SIC Nos. 19,21,23,26,29,30,31,32,33,36,37,38,39; Idaho Input-Output Sector No. 10.
Sources: (1) U.S. *Census of Manufactures* (1958)
(2) U.S. *Census of Manufactures* (1963)

Table 3-11 suggests that Idaho has experienced considerable economic activity among lines comprising Industry Group No. 10. For example, value added rose several hundred times between 1948 and 1963, and also increased by 26 percent during the five-year period 1958 to 1963. Even more significant for the Idaho economy are the tremendous gains in employment and capital creation during that same time in this industry group.

In addition to a small intraindustry transfer, only two deliveries were shown for Industry Group No. 10 to its sources of demand in the processing sector: to Construction (the value of gross output of "concrete and plaster products") and to Trade (because some paper products, trailers, and electrical machinery are sold through the wholesaling-retailing sector). Small amounts were allocated to Investment and Consumption in the final demand sector, but the main portion of gross output (over 70 percent) for Manufacturing, n.e.c., was shown as a delivery to the Exports column.

Because of the nature of output and the production process for this industry group, the majority of physical inputs (total inputs less value added by Idaho firms in this group) was estimated as imports. Nominal amounts were shown as purchases from other Idaho industry groups wherever it could be reasonably concluded that instate producers could supply such inputs, but these items were primarily in service lines. The net effect of these allocations, in both column and row entries, was to show Industry Group No. 10 as being very loosely tied to the Idaho economy.

Transportation (Industry Group No. 11)

Industry Group No. 11 reflects the air, rail, water and motor vehicle transportation services performed by Idaho firms in these lines during 1963. In a state of vast geographical area and one which is relatively isolated from national production and distribution centers, transportation is both an important input and output to Idaho businesses.

During 1960, the following transport facilities operated in Idaho: (1) 9 railroad companies, (2) 328 trucking firms, (3) 7 bus lines, (4) 2 major airlines and several private chartered-aircraft enterprises, and (5) 196 airports. Although the value of privately owned noncommercial vehicles and the transportation services provided by them are not reflected in an input-output study, the number of such vehicles has been increasing significantly in recent years. For example, the number of automobile registrations has risen by approximately 2 percent annually since 1950. Whereas in 1940 there were only 436 busses and 36,537 trucks registered in Idaho, by 1964 there were 1,390 busses and 130,398 trucks, a 300 percent increase in each class.

Total sales data for Idaho's transportation industry were not available from secondary sources, but total employment figures are regularly published by the Idaho Department of Employment. By comparing transportation output per employee for states where such sales data are available, it was found that this output relationship was quite stable. A weighted-average multiplier based on several states was derived and applied to Idaho employment. The resulting figure ($161 million) was then entered into the Idaho Provisional Gross Flows Table as the 1963 gross output of the Transportation industry. Additional estimates were made to allocate the gross output of transportation to sources of demand and to determine the pattern of inputs for this industry group.

An entry for transportation service was distributed in the processing sector to each industry group that sold a physical output. No allocations were made to service enterprises (other than the usual intraindustry transfer) because transportation is not normally purchased by a firm for purposes of further processing. Each component of final demand received a delivery from Transportation except Investment (the sale of transportation service *does not* represent capital accumulation) by paralleling gross output deliveries in other state input-output studies. No physical inputs for the Transportation group were shown from firms in the processing sector; purchases were shown, however, from service-rendering firms and from imports, but the majority of inputs was shown as being accommodated through the value created entry in the gross flows table. Finally, the percentage structure of inputs was predicted upon average purchases by this industry group as noted in other interindustry studies.

Utilities and Communications (Industry Group No. 12)

This group consists of the following types of firms: (1) companies engaged in the generation, transmission, or distribution

of electricity, gas, or steam, (2) those providing water supply, sanitary and irrigation systems, (3) several radio and television stations, and (4) some agricultural irrigation companies. In the state there are primarily 8 electric, 17 water, and 20 telephone utilities. Table 3-12 presents some basic data on economic activity among major public utlities in Idaho during 1963.

TABLE 3-12. FINANCIAL STATISTICS ON IDAHO PUBLIC UTILITIES, 1963

(dollars in thousands)

Type of Utility	Operating Revenue	Operating Expense	Depreciation	Taxes
17 Water Utilities	$ 1,571	$ 659	$ 210	$ 423
20 Telephone Utilities	36,139	15,200	5,339	9,232
8 Electric Utilities	64,573	17,682	7,992	16,584
TOTAL	$102,283	$33,541	$13,541	$26,239

Source: *Annual Report of the Idaho Public Utilities Commission* (1963), Boise, Idaho.

Data to distribute the gross output of Industry Group No. 12 were obtained from the records of the Idaho Public Utilities Commission in Boise. Here much information was available on sales to households, commercial firms, and industrial units. Although it was possible to accumulate data to allocate gross output in both the processing and final demand sectors, a few estimates were made by comparing the structure of this group to similar experience in other state input-output studies. Output was shown as being delivered to every industry group in Idaho, primarily because of the vast amounts of electricity, water, and communications services used by firms today. In the final demand sector, significant amounts were shown as purchases by consumers and government. To depict purchases for Industry Group No. 12, inputs were shown as stemming primarily from value created by Idaho utility and communications producers; some purchases were indicated in the form of an intraindustry transfer as well as from Trade and Other Services.

Trade (Industry Group No. 13)

This grouping combines both wholesale and retail outlets. Wholesale trade includes establishments primarily engaged in selling merchandise to retailers, to industrial, commercial, institutional, or professional users, or to other wholesalers, or those acting as agents in buying and selling merchandise for others. Retail trade includes establishments engaged in selling merchandise for personal, household, or farm consumption and in rendering services incidental to the sales of such goods.

Since 1929, the number of wholesalers in Idaho has doubled but the volume of wholesale sales increased seven times. Table 3-13, which shows *Census of Wholesaling* data, indicates that total sales have grown steadily since 1948. After 1958, according to Census data, most of the increase in wholesale sales came from drugs and chemicals, groceries, and raw farm products while certain lines

(e.g., electrical goods, petroleum bulk stations, and tobacco products) have experienced decreases in sales since 1958.[12] Although the number of wholesale establishments has not increased very rapidly, employment and payroll have also risen significantly during past decades.

TABLE 3-13. MEASURES OF ECONOMIC ACTIVITY WHOLESALE TRADE*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Sales	Number of Establishments
1948	8,108	$19,957	$415,882	1,152
1954	9,272	27,220	483,269	1,273
1958	11,131	33,927	668,587	1,468
1963	11,405	46,545	779,053	1,473

*SIC No. 50; Idaho Input-Output Sector No. 13

Sources: (1) U.S. *Census of Wholesale Trade* (1958)
(2) U.S. *Census of Wholesale Trade* (1963)

Retail trade has been growing in Idaho in recent years. On the basis of data in Table 3-14, not only did payroll double between 1948 and 1963 but sales increased by more than 60 percent. Retail sales in major Idaho urban areas, according to another source, rose approximately 2 percent each year during the early 1960's.[13] Moreover, Table 3-14 shows that the number of retail establishments has fluctuated between 1948 and 1963 but yet remain quite constant from the beginning to the end of the period. Finally, employment in retail establishments did not grow significantly, with merely 3,000 additional persons employed during those same years.

TABLE 3-14. MEASURES OF ECONOMIC ACTIVITY RETAIL TRADE*, IDAHO, SELECTED YEARS, 1948-63

(dollars in thousands)

Year	Average Employment	Payroll	Sales	Number of Establishments
1948	33,569	$ 55,559	$581,844	7,332
1954	31,945	65,780	670,057	7,096
1958	36,545	80,286	817,611	7,546
1963	36,797	102,232	947,044	

*SIC Nos. 52 - 59; Idaho Input-Output Sector No. 13

Sources: (1) U.S. *Census of Retail Trade* (1958)
(2) U.S. *Census of Retail Trade* (1963)

Because an item may be sold through wholesalers and retailers several times before reaching ultimate buyers, total sales data generally overestimate the value of gross output for Trade. In most interindustry studies, "trade margins," are used to depict economic activity in lines similar to Industry Group No. 13. Accordingly, based on established precedent, one-sixth of the value of

[12] U. S. Bureau of the Census, Census of Business, *1963 Wholesale Trade: Idaho*, U. S. Government Printing Office, Washington, D.C., 1964.
[13] Selected issues of *Survey of Buying Power* (Philadelphia: Sales Management, Inc.), 1963-1966.

total wholesale and retail sales were used as the gross output figure for the Trade industry group.[14]

Except for the Utilities and Communications industry group, gross output of Industry Group No. 13 was distributed to every cell in the processing and final demand sectors. Although some of the figures were available from purchase data pertaining to buying industry groups, most of the deliveries to sources of demand were estimated on the basis of the average pattern of distribution noted in other state input-output studies. In depicting the structure of inputs for Trade, purchases were shown as emanating from all Idaho industry groups except Construction (because such purchases are not normally processed for further sale) and Fabricated Metal Products (because this output is considered to be construction-oriented). Whereas some of the input figures were a result of allocations by other selling industries, some of the entries were also estimated by applying criteria from studies of industrial groups operating in similar environmental conditions.

Finance-Insurance-Real Estate (Industry Group No. 14)

The Finance-Insurance-Real Estate (FIRE) industry consists of the following types of firms: (1) those engaged in deposit banking, (2) establishments involved with credit extensions, (3) security and commodity institutions, (4) insurance companies, (5) insurance agents, (6) real estate operators, and (7) holding (investment) companies. Industry Group No. 14 is dominated by commercial banks, insurance agents, loan companies, and real estate firms in Idaho. Insurance and real estate establishments in Idaho are characterized by small units, but the number of employees in the FIRE grouping has increased significantly in recent years. For example, in 1948 only 3,247 workers were employed here but by 1963 employment had risen by more than 90 percent to 6,383 workers.[15] Furthermore, activity in commercial banking has risen—total deposits have been growing by nearly 10 percent annually since 1960.[16]

Although information on economic activity for each line in this industry group is both difficult to obtain and hazardous to aggregate, employment data are available for these services. As in the case of Transportation (Industry Group No. 11), gross output for FIRE was estimated on the basis of average output per employee; this procedure involved obtaining corresponding data for other states and the nation on total sales and employment. The average output per employee figure was applied to Idaho FIRE employment figures for 1963 and the resulting gross output estimate recorded in the Idaho Provisional Gross Flows Table.

To distribute output to demand sources, 1 percent of the FIRE gross output was assigned to every industry group in the processing sector except to Agriculture, Construction, and Trade (including an intraindustry transfer); each of these groups received larger percentage allocations based on estimates. Only 39 percent of gross output from FIRE was distributed in the processing sector, but 59 percent were shown as being sold to consumption (primarily because of the volume of real estate, banking and insurance services going to the ultimate consumer). The distribution of inputs to Industry Group No. 14 was structured so that the majority of them (88 percent) were depicted as value created in the payments sector; small amounts were shown as purchases from the processing sector (Idaho firms) primarily from Printing and Publishing, Utilities and Communication, Trade and Other Services. In most cases, inputs were estimates based on weighted averages derived from well researched patterns of economic behavior in other states.

[14]For a brief explanation of this tendency see Harmston, F. K. and R. E. Lund, *Application of an Input-Output Framework to a Community Economic System.* (Columbia: University of Missouri Press, 1967), pp. 50-51.
[15]Data obtained from Idaho Department of Employment.
[16]Data obtained from *Idaho Image* (Boise: Department of Commerce and Development), selected issues.

Personal Services (Industry Group No. 15)

This grouping includes three SIC lines (70, 72 and 76) which reflect the performance of services provided primarily to households or consumers: (1) hotels and other lodging places. (2) laundries, cleaning plants, barbers, beauty shops, photo studios, shoe shops, and funeral directories, and (3) miscellaneous services such as watch, furniture, and electrical repair shops. The breakdown in Table 3-15 describes the types of firms characterizing this industry group in Idaho.

TABLE 3-15. PERSONAL SERVICE FIRMS IN IDAHO, 1963

Type of Firm	Number of Establishments
Motels	406
Trailer Parks	102
Laundry Firms	260
Dry Cleaners	130
Beauty Shops	476
Barber Shops	411
Radio-TV Repair	175
Welding Repair	66
Furniture Repair	65

Source: 1963 *Census of Business* (Selected Services)

It is particularly significant that payroll, sales, and establishments in Industry Group No. 15 have roughly doubled during the 1948-1963 period. Table 3-16 indicates that sales increased 16 percent between 1954 and 1963. Furthermore, the fact that both employment and payroll have been rising during the past decade suggests that these lines of business are contributing to economic activity in Idaho. In 1963, there were 2,946 establishments providing Personal Services (as defined in this study). Many of these units were small proprietorships and can be truly classified as local service firms. For this reason, most of the gross output of this industry was assigned as Consumption to the final demand

TABLE 3-16. MEASURES OF ECONOMIC ACTIVITY, PERSONAL SERVICES*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Sales	Number of Establishments
1948	5,710	$ 7,503	$23,178	1,483
1954	5,179	8,660	29,481	1,518
1958	7,739	12,254	47,513	2,796
1963	7,785	13,700	55,435	2,946

*SIC Nos. 70,72,76; Idaho Input-Output Sector No. 15
Sources: (1) U.S. Census of Business (1958)
(2) U.S. Census of Business (1963)

sector of the gross flows table. Three entries were assigned in the processing sector: to Agriculture, Trade, and an intraindustry transfer. No distribution of output was made to the Investment column, but a nominal amount was estimated and allocated to Government. Since no data were available on amounts sold to out-of-state purchasers, the following estimates were established: all sales of the seasonal hotel line and half the receipts of motels and sporting camps (as reported in the *Census of Retail Trade)* were assigned to the Export column. Finally, inputs were estimated for Industry Group No. 15 as originating only from Printing and Publishing, Trade, and other non-goods businesses primarily because service firms purchase few inputs for further processing.

Other Services (Industry Group No. 16)

This group essentially includes business and related services. Since only two service categories were used, and since Industry Group No. 15 concentrated on personal-type services, Other Services necessarily includes all other firms in this area. Specifically, as can be noted in the footnote of Table 3-17, eleven different SIC classifications are included in this industry group. Some represent-

TABLE 3-17. MEASURES OF ECONOMIC ACTIVITY OTHER SERVICES*, IDAHO, SELECTED YEARS, 1948-63.

(dollars in thousands)

Year	Average Employment	Payroll	Sales	Number of Establishments
1948	3,389	$ 3,821	$20,666	1,142
1954	4,059	5,588	30,727	1,441
1958	3,987	6,969	34,225	1,153
1963	5,741	19,591	67,730	1,512

*SIC Nos. 73,75,78,79,80,81,82,84,86,87,88; Idaho Input-Output Sector No. 16
Sources: (1) U.S. *Census of Business* (1958)
(2) U.S. *Census of Business* (1963)

ative types of firms are (1) miscellaneous business services, (2) automobile repair establishments, (3) motion picture and other recreational services, (4) medical and health services, (5) legal services, (6) educational services, (7) nonprofit organizations, (8) domestic services (9) engineering, architectural, scientific, accounting services, and (10) other services not elsewhere classified. As can be noted from the composition of this listing, Idaho has most of these kinds of firms operating in many communities.

Gross output for this group was obtained from corresponding SIC sales data in the 1963 Census of Business as were other aggregates (as shown in Table 3-17). Here it can be noted that both employment and payroll rose substantially between 1948 and 1963, particularly since 1958. For this industry group, all output was shown as distributed inside the processing sector except to Agriculture (primarily because so many business-type services are represented by this grouping). Allocations were based on the average percentage deliveries of corresponding services to their sources of demand as noted in national and state interindustry transactions tables. Inputs to Other Services were structured according to the United States input-output table for 1958. The majority of inputs were shown as value created, i.e., the purchases of factors of production.

Treatment of Industry Groups

Some of the data presented in Table 3-1 through Table 3-17 were entered into the processing sector of the Idaho Provisional Gross Flows Table, particularly statistics on total shipments and sales. Figures on value added and capital creation were used in several places as entries in the payments and final demand sectors. Although the items of information presented in these tables were by no means sufficient to *complete* the gross flows table, sources listed in Chapter Two also provided many cell figures. In evaluating the nature of the processing sector, it should be recognized that (1) only Idaho businesses organized for profit are included, (2) goods sold only for the purpose of processing or for resale are shown, and (3) many kinds of specific transactions among Idaho companies are represented. As a result, the values of goods and their corresponding transactions in the processing sector do not depict the type of *ultimate* transactions with which the ordinary citizen becomes involved. Many of these sales are represented by entries in the payments and final demand sectors, as discussed below.

THE PAYMENTS SECTOR

As noted in Chapter Two, a payments sector traces (1) purchases outside the economy being studied and (2) sales of factors of production to the business firms constituting various industry groups. In the Idaho interindustry study the payments sector includes two entries each of which are read all the way across the gross flows table rather than just to the end of the processing sector. The two measures, "value created" and "imports" are separated from the processing sector because their entries in cells represent economic activity which does not directly emanate from the Idaho business economy. Entries in the payments sector can be treated both as inputs (i.e., purchases *by* industry groups) and outputs (sales by suppliers in the payments sector *to* Idaho industry groups). It is important to note that while the same entries appear in both columns and rows in the processing sector (e.g., Agriculture is listed on the left-hand side as well as at the top of an input-output table), entries in the payments sector are shown

only on the left-hand side of the gross flows table. Technically speaking, inputs in the payments sector are not defined by traditional interindustry studies. Whether or not such a cross-classification exists is not so important as recording the value of payments sector transactions in appropriate cells in the input-output table. In the Idaho provisional study, the payments sector was approximated from both secondary data and estimates.

Value Created

This entry in the payments sector is designed to account for reimbursing factors of production for their contribution to output. Specifically, value created in this study includes (1) compensation of employees, (2) rental payments, (3) capital consumption allowances, (4) taxes, and (5) business income. Although some information is available on items such as (1) federal, state, and local taxes, (2) wages of covered employment, and (3) depreciation expenses, complete data for each of the 16 industry groups were not available in a consistent, mutually exclusive form. For this reason all payments to resources were aggregated into the single value created row rather than showing separate entries for each factor of production. In order to record data which was reasonably consistent with other sources used in this study, value added[17] figures for half of the industry groups were taken from the 1963 Census of Business. Several of the figures were constructed from actual tax, wage, depreciation, and profit data for separate industries; remaining value created entries were rough estimates based on employment comparisons in similar lines in other states. As a result, more than three-fourths of the value created entries were derived from data which were available in secondary sources.

Imports

All inputs purchased by Idaho industry groups do not originate inside the state. In fact, business firms buy both factors of production and many other items from sellers outside the state. For example, a food store in Coeur d'Alene may purchase most of its canned vegetables from a grocery wholesaler in Spokane. The value of such a transaction should be entered as in import in the Trade column of an input-output transactions table. In the Idaho interindustry table, imports are recorded for each of the 16 industry groups and for three of the four entries in the final demand sector. Although the value of imports for each industry group and appropriate component of final demand is generally not available from secondary data, estimates were constructed by a variety of means. One approach was to use a modified-residual method in those industry groups for which input entries were nearly complete. Another method was to estimate imports on the basis of experience in other states where industry groups and structure were

[17]Technically, value added by manufacture is derived by subtracting the total cost of materials (including materials, supplies, fuel, electric energy, cost of resales, and miscellaneous receipts) from the value of shipments (including resales) and other receipts and adjusting the resulting amount by the net change in finished products and work-in-process inventories between the beginning and end of the year.

similar to Idaho. A third technique was to examine tables of direct requirements for the nation and selected states as a means of assessing input-output relationships (technical coefficients of production) for various industry groups. The structure of the Idaho economy was then examined to determine those inputs which definitely could or could not be supplied by Idaho firms. If inputs necessary to accomplish a certain type of production were not available in Idaho, it was concluded that they must have been imported. Often, this latter method was used to check residuals and estimates derived from the previous two methods. Although the import row consists primarily of estimates, it hopefully depicts the general pattern of purchases outside the state which characterize all kinds of buyers inside the Idaho economy.

THE FINAL DEMAND SECTOR

The concept of final demand was first introduced in Chapter Two. This specific grouping (or sector) records the distribution of output *for purposes other than* the processing for resale by individual industry groups. Final demand thereby reflects the ultimate use of items or the sale of them to economic units *outside* the Idaho economy. In most input-output studies, no inputs are defined for the final demand sector because each entry is not considered as being a purchaser for resale; hence an input-output relationship (or "technical coefficient of production") is not derived for components of final demand. Although a final demand sector can be subdivided into many separate entries, the Idaho provisional interindustry study depicted only four of them: Investment, Consumption, Government, and Exports.

Investment

Investment refers to gross private fixed-capital formation. This entry in the final demand sector represents sales by firms in the processing sector to consumers or businesses for replacing or adding to the stock of capital. Many sellers do not sell their output for investment purposes because certain outputs are not so used. For example, very little output of Agriculture, Food and Kindred Products, and Services is designed for capital creation. On the other hand, the output of construction firms is used largely for capital formation. Also, some of the sales of durable goods manufacturers as well as Trade may be used for investment. In evaluating this sector, the pattern of sales of output to Investment observed in other states and in the United States guided the analysis where original data were lacking. The structure of particular types of manufacturing and trade establishments present in Idaho was useful in completing the Investment column. For example, in Idaho there are 218 wholesale establishments in SIC 508 (machinery, equipment, and supplies) with total sales of nearly $50 million. Some of this output is sold to farmers and some is sold to manufacturers, primarily in the form of machine and equipment. Such sales represent capital formation and were thereby recorded in the appropriate cell under Investment. By tracing the Investment

column it can be noted that the majority of capital creation associated with Idaho's 1963 gross output came from only six instate industry groups, primarily because these were considered as capital-creating lines of business. Actual figures shown in corresponding cells were the result, in most cases, of allocating the output of various industry groups according to their respective sources of demand. Some entries were estimated on the basis of structure exhibited in the United States economy and other states. Only 27 percent of investment arose from sources outside the state. This figure was estimated from various sources and entered in the intersection of the Import row and Investment column.

Consumption

This component of final demand reflects purchases of goods and services by households and individuals for their own personal use. The data entered in various cells of the Consumption column represent the gross value of items bought directly from corresponding industry groups. Purchases by consumers were approached quite cautiously in the Idaho provisional study because many transactions occur through Trade and service establishments rather than from individual manufacturers. As a result, consumption is not shown for Mining, Construction,[18] Chemicals, Fabricated Metals, and Machinery-except-electrical. Remaining entries, representing sales both *from* the processing and payments sectors, were derived from secondary sources of information as well as from estimates. Some data were available from agricultural statistics, Transportation, Utilities and Communication, and Personal Services; other entries were estimated according to per capita relationships in other interindustry studies. Two remaining entries, Imports and Value Created, were also estimated on a per capita basis.

Government

Government, as a component of final demand, includes activities of federal, state, and local units. Entries in this column reflect sales by businesses to various agencies at all three levels. Here, inputs are expenditures by these governments for goods and services; payments are also included (primarily federal) to individuals and groups in Idaho for wages, benefits, and insurance payments. In the Idaho project, sales to the Federal government were not treated as exports, a practice prevalent in some interindustry studies. Since Government is shown in the autonomous final demand sector, it was reasoned that a concept of "exports to federal government" was a superfluous category for this study.

Not all industry groups sell to government. Those that do, sell in different amounts for various reasons. Some of the entries in the Government column which correspond to selected industry groups were taken from secondary data. Specifically, data on federal expenditures in Idaho, statistics on *State and Local Finances*, and annual reports from state agencies in Boise provided information for deriving provisional entries for Government. In addition, some of the entries resulted from allocations of the gross output by several industry groups to their sources of demand. A few entries were estimated by using other state interindustry tables as a basis for comparison. Finally, several sources reporting tax collections by various governments as well as taxes paid by various groups provided a guideline for checking the basic pattern and magnitude of certain entries.

[18]Even though a construction firm may build a house for a consumer, national income accounting theory defines residential construction as an investment item and its value is not consumption but rather capital creation. Therefore, the value of construction sales to consumers is recorded in the Investment cell within the Construction row.

Exports

Exports refer to the value of goods and services produced in Idaho by processing industry groups which are sold beyond the state's borders or to tourists. In essence, this column simply represents sales to out-of-state buyers. No inputs are defined for this sector, but the value of imports can be reconciled with the value of exports to measure "net exports." Several export entries were derived from calculations made by specialists in representative lines while some entries arose from secondary sources of information. Mining industry exports, as analyzed above, provided a realistic figure on the value of gross output of Industry Group No. 2 sold outside Idaho. Finally, some export figures were estimated and a few were treated as a residual after other requirements had been accommodated in the Provisional Gross Flows Table.

Chapter Four

CONSTRUCTION AND ANALYSIS OF IDAHO INTERINDUSTRY RELATIONS

This chapter contains the three basic input-output tables constructed for the Idaho economy for 1963 along with some brief comments inferred from them. An interindustry study can be used to identify many different kinds of relationships. This chapter describes only a few because a limited number of analyses were accomplished in this study. The first table shows gross flows (or "transactions") from which other tables were derived. Whereas these relationships for 1963 are both provisional and static, it is recognized that an economy such as Idaho can grow over time and that its internal structure may change. Nevertheless, as a first approximation, the analyses presented in this chapter develop preliminary insight into the structure of Idaho's economy.

THE IDAHO PROVISIONAL GROSS FLOWS TABLE

Chapter Three described the components of the basic input-output relations and explained the ways provisional data and estimates were entered into their respective cells in the table of transactions. Based on this approach, the Idaho Provisional Gross Flows Table was constructed for 1963 (shown as Table 4-1 in a fold-out sheet inside the back cover). Here, according to traditional input-output procedures, the activity of each industry as a seller is shown in a row, while purchases of an industry are listed in a column. Each row depicts delivery of the output of a particular industry group to itself, to other industries, and to final demand; each column outlines the purchases of each industry, both from businesses inside the state and from imports, as well as that industry's own value added. Since Idaho's economy was divided into 16 industry groups, a 16 x 16 processing sector matrix with 256 cells represents all transactions among Idaho businesses as outlined in the upper left-hand section of Table 4-1. As indicated in the previous chapter, the basic structure of this gross flows table reflects the four traditional Keynesian aggregates in the final demand sector, namely Investment, Consumption, Government and Exports; the payments sector consists of only two entries, Imports and Value Created.

Aggregate Business Activity

From Table 4-1 the reader can trace the estimated gross flows associated with economic activity in Idaho as well as the interindustry transactions among instate producers during 1963. *Total gross output* was estimated to be slightly more than $5.1 billion (recorded in the lower right-hand cell of Table 4-1). Leading Idaho producing groups were Agriculture ($453.9 million) and Food and Kindred Products ($370 million), thereby showing

Idaho's heavy dependence on farming and the processing of agricultural output. Wholesale and retail trade accounted for $313 million in sales (valued at trade margins) and thereby indicates that commercial sales firms in Idaho are predominant in terms of facilitating the state's economy. It is significant that in other state input-output studies, trade also shows up as one of the largest industry groups, primarily because a large part of trade output stems from sales of retail stores which cater to the local consumer.

Other producing groups contributing significantly to Idaho's economic activity were Lumber, Wood Products, and Furniture ($206 million) and Chemicals and Allied Products ($190 million).[1] It is interesting to note that three manufacturing industry groups combined (Fabricated Metal Products, Machinery-except-electrical, and Manufacturing-not-elsewhere-classified) contributed an estimated $194 million to Idaho's gross output in 1963. In fact, an analysis of *Census of Manufacturers* data indicates that value added for these three industry groups increased from $2.1 million to $75 million between 1948 and 1963; this change represents a growth by more than 35 times! Although Idaho's economy is still largely tied to agricultural sources of income, it is becoming more manufacturing oriented. Finally, the gross output of Finance-Insurance-Real Estate ($194 million), Transportation ($161 million), and Construction ($139 million) ought not to be ignored. Although these industry groups are not basic pillars upon which the Idaho economy ultimately rests, both their individual and combined activities suggest that much income and employment are tied to these sectors.

Interdependencies Among Idaho Industry Groups

An analysis of rows and columns in the processing sector traces the nature of the economic interrelationships among the 16 Idaho industries examined in this study. In Table 4-1, the value of Idaho interindustry transfer (i.e., the amounts that Idaho producers sold to one another) was estimated to be slightly more than $683 million in 1963. (These figures can be noted in the Intermediate Demand column of Table 4-1). Thus, approximately one-fourth of the output by Idaho firms was purchased by the state's business sector. Leading producers and sellers *to* Idaho businesses were Agriculture ($184 million) and Food and Kindred Products ($59 million); their sales amounted to slightly more than one-fourth of the value of all goods and services produced *inside Idaho* during 1963.

Examination of sources of intermediate demand for specific lines reveals that Agriculture, Utilities and Communication, Fi-

[1]Mining is often considered a major industry in Idaho but appears as a relatively minor contributor to Idaho's gross output (only $82.8 million). However, phosphate production, which is sometimes included in the "mining industry," constitutes the major source of output of Chemicals and Allied Products (Industry Group 7.) Phosphate employment and output are reported by the U.S. Census of Business and the Idaho Department of Employment under SIC 28 and thereby are included in Chemicals and Allied Products in this study.

nance-Insurance-Real Estate, and Other Services *each* sells more than 40 percent of the individual gross output inside Idaho. Viewing the breadth of instate markets for Idaho products (i.e., the extent to which Idaho firms rely on each other for their *sales)* the Provisional Gross Flows Table shows that each industry group in the goods-producing portion of the processing sector (i.e., industry groups 1 through 10) sells significant amounts of output to only 4 or 5 other industry groups. This tendency suggests that these lines are more final-demand oriented and thereby associated with Idaho's economic base than primarily facilitating other Idaho firms, although it is recognized that firms supporting basic activities are also important to a regional economy. On the other hand, most firms in the services portion sell their outputs mainly to businesses in Idaho. Other Services sells its entire output inside the state, while Transportation delivers over half of its output to Idaho firms. Non-goods producers are obviously less dependent on industrial markets outside the state than are firms in the goods sector of Idaho's economy.

Another important aspect of interdependency is the extent to which each Idaho industry depends upon the other for its inputs. According to the estimated relationships shown in Table 4-1, all Idaho industries combined purchased approximately 57 percent of those inputs they use for further processing from instate producers. Eight industries purchased more than 60 percent of their inputs from Idaho businesses rather than importing them from firms outside the states; these include, Agriculture, Construction, Food and Kindred Products, Printing and Publishing, Machinery-except-electrical, Finance-Insurance-Real Estate, Personal Services, and Other Services. However, the dispersion of purchases among Idaho firms is not very great; only four Idaho industry groups (Construction, Agriculture, Trade, Food and Kindred Products) purchased from nine or more of the other 16 Idaho producers; the other twelve lines bought from seven or less industry groups in the Idaho producing sector. This tendency suggests that many Idaho businesses are not interdependent. In other words, there is a lack of self-sufficiency within the state. Finally, in considering the pattern of instate purchases for Idaho firms represented in the processing sector, it is interesting to note that (1) manufacturing firms are not very closely tied to the Idaho economy in terms of buying *physical inputs* (except labor), but (2) most Idaho industry groups purchase most of their service-type inputs in Idaho. This tendency further supports the contention that the structural interdependencies in Idaho are not very strong. There may be room for more facilitating suppliers in Idaho to support manufacturing activities. Indeed, these growth potentials are too important to be ignored.

Gross Idaho Domestic Income and Product

The Idaho Provisional Gross Flows Table can be used to derive a measure of business activity in the state similar to Gross National Product (GNP), the aggregate value of goods and services produced in the United States which is computed by the Office of

Business Economics in Washington, D.C. Gross Idaho Domestic Product (GIDP) can be useful as a basic measure of Idaho's contribution to the national economy.

Whereas personal income statistics have been available for Idaho and other states for some time, no detailed measurement of Gross Idaho Domestic Product (the value of all goods and services produced in the state) has been attempted. This study provides a tentative measure of that aggregate for the first time. Viewing Gross Idaho Domestic Product (GIDP) via the expenditures approach (i.e., looking at the flows of money spent for goods and services by all Idahoans) that aggregate was $1.6 billion in 1963, according to the estimates made for this study. The components of GIDP are presented in Table 4-2, where it can be noted that the four Keynesian aggregates cited in Chapter Two and Chapter Three are recorded as estimates.

TABLE 4-2
ESTIMATED GROSS IDAHO DOMESTIC PRODUCT, 1963

(dollars in millions)

Component of GIDP		Amount	Percent
Estimated Idaho Personal Consumption:		$ 867.0	53
Estimated Idaho Gross Investment:		179.6	11
Estimated Government Purchases:		340.7	21
Estimated Net Exports:			
Estimated Exports	$1,214.3		
Estimated Imports	959.3	255.0	15
Estimated Gross Idaho Domestic Product		$1,642.3	100

Inspection of Table 4-2 shows that personal consumption expenditures by Idahoans, estimated to be $867.0 million in 1963, accounted for 53 percent of the GIDP. Table 4-1, the Provisional Gross Flows Table, indicates that 48 percent of this amount, or $417 million, reflects purchases from Idaho sellers, while 40 percent ($350 million) represents imports by Idaho consumers. Referring again to Table 4-1, consumer expenditures were most significant among firms in Trade, the Finance-Insurance-Real Estate group, and in Utilities and Communication. As one would expect, Agriculture and Transportation also sold noteworthy amounts of final output to consumers. In this regard, Idaho is quite similar to other states: The New Mexico interindustry study[a] indicates 47 percent of Gross New Mexico Domestic Product was consumed, while in Washington[b] consumption was 67 percent of Gross Washington Product. Thus, the Idaho figure (53 percent) appears to be a reasonable estimate based on the provisional input-output relationships derived for this study.

Investment in Idaho for 1963 was estimated at $179.6 million. This value represents spending for capital items by private

[a] "A Preview of the Input-Output Study," *New Mexico Business*, Bureau of Business Research, University of New Mexico, October, 1965
[b] Bourque, Philip J., *(et. al.), The Washington Economy: An Input-Output Study*, Graduate School of Business Administration, University of Washington, 1967.

firms, including residential and business construction and equipment. In this study the entire output of the construction group, less an estimated *intraindustry* transaction, was assigned to the investment category in final demand, thereby reflecting the major contribution to gross capital formation in the private sector. It should be noted that the value of capital creation by government is not shown in the Investment entry in Table 4-2.

Local, state, and federal government expenditures (aggregated into a single final demand entry) indicated that an estimated $340.7 million were spent in Idaho in 1963. These expenditures reflect capital purchases (such as dams, building, bridges, and roads) as well as current consumption items (including office supplies, food, and gasoline). Although the major suppliers of investment-type goods can be noted in Table 4-1, the *purchasers* of capital items are not shown. Some insight into this activity can be found through examining Tables 3-3 through 3-11 in Chapter Three which contain data on capital creation reported in the 1963 *Census of Business*. From these figures, the food processing, wood products, chemicals, and light manufacturing industries were significant investors during 1963. In addition, several millions of dollars were spent by households and commercial firms for the construction of dwellings and establishments during that year.

According to the estimated transactions, Idaho was a modest *net exporter* with a favorable balance of $255 million in 1963. Exports were largest in Agriculture ($215 million); Food and Kindred Products ($296 million); Lumber, Wood Products, and Furniture ($140 million); Chemicals and Allied Products ($173 million); and Manufacturing-not-elsewhere-classified ($121 million). *Net exports* in each of these lines were also larger than in other lines. Since Agriculture, and Food and Kindred Products, contributed more than $338.4 million in net exports, the conclusion that Idaho's economic base is associated with agricultural sources of income is reaffirmed. Phosphate production, timber, and miscellaneous manufacturing also supported Idaho's economy through exports.

GIDP By Originating Industry

The Gross Idaho Domestic Product can also be viewed as being the sum of the value created by all industry groups in the state (contained in Table 4-3). This presentation shows how much of the total GIDP of $1.64 billion was created by intrastate industries. A value-created figure includes (1) compensation to employees, (2) rent, (3) net interest, (4) capital consumption expenditures, (5) business taxes, and (6) business income. In essence, Table 4-3 indicates the *gross* income (before depreciation and taxes) earned by the economic resources employed in each of the 16 Idaho industry groups. Total value created in Idaho, which is necessarily the same as GIDP, was $1.64 billion in 1963. Approximately $1.37 billion, or nearly 84 percent of GIDP, were created *directly* by Idaho firms.

TABLE 4-3. ESTIMATED GROSS IDAHO DOMESTIC PRODUCT BY INDUSTRY ORIGINATING, 1963

VALUE CREATED BY PROCESSING INDUSTRIES

Idaho Industry Group Number	Description of Industry Group	GIDP (millions)	Percent of Total
1	Agriculture	$210	12.81
13	Trade	192	11.71
14	Finance-Insurance-Real Estate	172	10.49
4	Food and Kindred Products	111	6.77
10	Manufacturing, n.e.c.	105	6.40
11	Transportation	105	6.40
5	Lumber, Wood, & Furniture	89	5.43
12	Utilities and Communication	80	4.88
7	Chemicals and Allied Products	75	4.57
3	Construction	71	4.33
16	Other Services	46	2.80
2	Mining	45	2.74
15	Personal Services	39	2.38
6	Printing and Publishing	16	.98
8	Fabricated Metal Products	6	.03
9	Machinery-except-electrical	5	.03
	SUBTOTAL	1,367	83
	VALUE CREATED IN FINAL DEMAND		
	GOVERNMENT	174	11
	CONSUMPTION (HOUSEHOLDS)	99	6
	GROSS IDAHO DOMESTIC PRODUCT (ESTIMATED)	$1,640	100

Among the 16 Idaho industry groups described in the processing sector, value created was greatest in Agriculture ($210 million), followed by Food and Kindred Products ($111 million), Trade ($192 million), and the Finance-Insurance-Real Estate group ($171.6 million). Idaho is quite agriculturally oriented (approximately one-fourth of the population engaged in farming and related activities) so it is not surprising that value created is largest here. However, wholesale-retail trade and service also ranked near the top. These commercial activities are highly localized businesses which facilitate or service an economy and provide much income and employment as a result of their operations. Other important contributors to Idaho value created were Manufacturing-not-elsewhere-classified and Transportation, both with $105 million. Although Idaho's dependence on agriculture-related sources of income is again apparent from this analysis, other industry groups are also important in terms of the entire economic picture in the state.

Inspection of Table 4-3, suggests that several Idaho industry groups play a minor role in the state's economy. Specifically, two manufacturing lines combined (Fabricated Metal Products and Machinery-except-electrical) were responsible for contributing only $11 million in value created. Although this amount seems insignificant, these industry groups provide employment for nearly 1,000 persons according to tables 3-9 and 3-10.

DIRECT REQUIREMENTS

In any modern complex economy most business activity can

ultimately be traced back to the production of goods for consumption purposes. An industry group may only satisfy some component of final demand after its output has been extensively handled as intermediate demand by other processors. However, in a broad sense, businesses normally do not produce goods and services for their own benefit *per se* because as profit-seeking entities, their operations are geared both directly and indirectly toward *consumer* satisfaction. This tendency is even true for businesses which sell to other businesses. In the words of Marshall, "the ultimate regulator of all demand is therefore consumers' demand"[4]; the structure of an economy is consequently revealed by the interrelatedness of firms in the processing sector and their connections with components of final demand.

Direct requirements, as explained in Chapter Two, indicate the input-output relationships which characterize each industry group considered in an interindustry study. The estimated economic relationships shown in the Idaho Provisional Gross Flows Table, given the assumptions and data limitations, were recorded as *dollar transactions* among industry groups, factors of production, and ultimate buyers. These monetary values can be stated as "input coefficients" or the cents (percent) of direct purchases per dollar of output. To calculate these input coefficients, the gross output figure of each industry group is divided into every cell entry in the column corresponding to that same industry group. The resulting ratios depict the estimated cents worth of input which will be purchased from Idaho industries in response to each dollar increase in demand from outside sources (assuming that constant and stable paterns of production are in existence as output is increased with *present* plant and equipment). These computations were accomplished for each of the 16 Idaho industry groups and are recorded in Table 4-4, the table of direct requirements. In essence, this table shows the extent to which Idaho producers would have to react to changes in final demand.

According to the calculations (as shown in Table 4-4) those industry groups most sensitive to changes in final demand are: Transportation, Utilities and Communications, Trade, Finance-Insurance-Real Estate and Other Services. No matter which industry experiences an increase in final demand, chances are that these five industry groups will be affected *immediately*, primarily because most other firms wish to buy their outputs. To illustrate, an increase of one dollar in spending by consumers for electrical energy will directly (immediately) require Other Services to furnish 2½ cents worth of inputs to Utilities and Communication.[5] Similar relationships for all Idaho industry groups can be noted by tracing various transactions in Table 4-4.

[4]Marshall, Alfred, *Principles of Economics*, 8th ed. (New York: Macmillan, 1920), p. 92.

[5]To trace this relationship consider the next-to-the-last figure in Column 12 of Table 4-4 where the ratio .0249 can be noted. Since direct requirements means "cents worth of input for every dollar's worth of output," .0249 cents (or, 2½ cents) defines the relationship in the cell being examined.

TABLE 4-4 Estimated Direct Requirements (per dollar of final demand), Idaho, 1963

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Agriculture	.0999	.0000	.0000	.3695	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0054	.0000	.0000	.0000
2. Mining	.0002	.0019	.0381	.0000	.0000	.0000	.0017	.0013	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
3. Construction	.0000	.0000	.0010	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
4. Food	.0308	.0000	.0000	.0364	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0998	.0000	.0000	.0000
5. Lumber	.0000	.0000	.0741	.0000	.2000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0133	.0000	.0000	.0000
6. Printing	.0000	.0000	.0000	.0008	.0000	.1000	.0000	.0000	.0000	.0000	.0000	.0000	.0051	.0164	.0288	.0236
7. Chem.	.0128	.0000	.0000	.0000	.0000	.0000	.0413	.0000	.0000	.0000	.0000	.0000	.0101	.0000	.0000	.0000
8. Fab. Met.	.0000	.0000	.0146	.0000	.0000	.0000	.0000	.0500	.0232	.0160	.0000	.0000	.0000	.0000	.0000	.0000
9. Machin.	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0199	.0000	.0000	.0000	.0006	.0000	.0000	.0000
10. Mfg.	.0000	.0000	.1079	.0000	.0000	.0000	.0000	.0000	.0000	.0199	.0000	.0000	.0045	.0000	.0000	.0000
11. Transp.	.0357	.0440	.0300	.0291	.0400	.0156	.0300	.0191	.0850	.0299	.0149	.0000	.0017	.0000	.0000	.0000
12. Ut. & Com.	.0079	.0600	.0050	.0072	.0100	.0200	.0223	.0100	.0999	.0199	.0100	.1728	.0098	.0100	.0298	.0499
13. Trade	.0595	.0806	.0235	.0172	.0236	.0242	.0095	.0221	.0220	.0236	.0235	.0000	.0069	.0023	.0023	.0235
14. F. I. R. E.	.0801	.0234	.0342	.0052	.0094	.0606	.0102	.1426	.1655	.0114	.0120	.0189	.0169	.0400	.0349	.0286
15. Pers. Ser.	.0045	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0006	.0000	.0214	.0195
16. Other Ser.	.0000	.0262	.0400	.0218	.0150	.1750	.0600	.0150	.0199	.0199	.0453	.0249	.0106	.0350	.0695	.0611
MULTIPLIER	.3314	.2471	.3684	.4872	.2980	.3954	.1750	.2601	.4354	.1406	.1057	.2166	.1853	1037	.1867	.2062

Courtesy of Graduate School of Business Administration, University of Washington

An analysis of data on Table 4-4 suggests that several Idaho industry groups are not very sensitive to changes in final demand. According to the estimated relationships shown in the table of direct requirements, industries which would not be greatly affected by additional original demands for their outputs are Mining, Construction, Food and Kindred Products, Machinery-except-electrical, Fabricated Metal Products, Lumber, Printing and Publishing, and Personal Services. These conclusions are reasonable because the respective direct requirements column for each of the previously named industry groups contains many blank cells (which indicate that *all* firms do not buy and sell from one another). Wherever *no* direct requirements exist, an increase in final demand on the part of those industries involved means that certain kinds of inputs are not needed to produce that output. Since firms in these industry groups are not primary suppliers to other Idaho firms, their outputs are not used for further processing (intermediate demand) which would eventually result in final demand goods.

Finally, it should be noted that the direct dependency of each industry group upon each of the four final demand categories were not calculated for this study. These relationships would involve computing direct and total requirements of each industry group on the basis of the value of Consumption, Investment, Government, and Exports for each row in the processing sector. Since the Idaho input-output study is a provisional one, such an extended analysis was deemed inappropriate.

TOTAL REQUIREMENTS

Direct requirements discussed above relate to the *immediate effects* that some Idaho producers would experience from an increase in final demand. Thus, if raw agricultural exports should increase, farmers would presumably purchase more inputs within a relatively short period of time in order to supply this additional output. However, other businesses in the various industry groups would also have to increase their production as a means of supplying the agricultural industry which experiences the *initial increase* in demand. Consequently, additional pervasive impacts would necessarily spread to some firms in several other lines. These secondary and resulting effects were calculated for the state from the Idaho Provisional Gross Flows Table for 1963 and are presented as *total requirements* (direct plus indirect) in Table 4-5.[6]

[6]It should be noted that the table of total requirements meets the Hawkins-Simon condition, i.e., there are no negative entries in that matrix. See Hawkins, David, and H. A. Simon, "Some Conditions of Macroeconomic Stability," *Econometrica*, July-October, 1949. The direct requirements table calculated from the Provisional Gross Flows Table, was subtracted from the basic identity to produce the Leontief Matrix and subsequently inverted to obtain total (direct plus indirect) requirements. This procedure involved constructing a program via the power series and obtaining the transformations on an IBM 1620.

TABLE 4-5 Estimated Total Requirements (per dollar of final demand), Idaho, 1963

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Agr.	1.1293	.0041	.0017	.4341	.0015	.0016	.0006	.0012	.0012	.0012	.0012	.0000	.0499	.0001	.0002	.0018
2. Mining	.0002	1.0019	.0382	.0001	.0000	.0000	.0017	.0013	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
3. Constr.	.0000	.0000	1.0010	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
4. Food	.0434	.0088	.0036	1.0565	.0033	.0034	.0013	.0026	.0026	.0026	.0027	.0026	.0000	.1065	.0004	.0005	.0027
5. Lumber	.0011	.0013	.0932	.0007	1.2505	.0005	.0002	.0004	.0004	.0004	.0004	.0004	.0000	.0168	.0000	.0000	.0004
6. Printing	.0026	.0019	.0024	.0029	.0011	1.1184	.0022	.0037	.0044	.0011	.0017	.0013	.0068	.0203	.0358	.0296
7. Chem.	.0158	.0009	.0003	.0062	.0003	.0003	1.0433	.0002	.0002	.0002	.0002	.0000	.0113	.0000	.0000	.0002
8. Fabr. Met.	.0000	.0000	.0173	.0000	.0000	.0000	.0000	1.0526	.0249	.0172	.0000	.0000	.0000	.0000	.0000	.0000
9. Machin.	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	1.0203	.0000	.0000	.0000	.0006	.0000	.0000	.0000
10. Mfg.	.0003	.0003	.1103	.0002	.0001	.0001	.0000	.0001	.0001	1.0205	.0001	.0000	.0046	.0000	.0000	.0001
11. Transp.	.0430	.0566	.0403	.0474	.0510	.0179	.0320	.0207	.0095	.0316	1.0153	.0000	.0080	.0003	.0006	.0006
12. Ut. & Com.	.0147	.0771	.0176	.0172	.0178	.0417	.0333	.0169	.1248	.0274	.0159	1.2113	.0159	.0158	.0435	.0672
13. Trade	.0703	.0840	.0346	.0465	.0317	.0331	.0127	.0252	.0248	.0262	.0254	.0008	1.0133	.0040	.0054	.0264
14. Fire	.0974	.0298	.0448	.0450	.0147	.0789	.0147	.1586	.1841	.0171	.0153	.0250	.0245	1.0446	.0431	.0366
15. Pers. Ser.	.0054	.0007	.0009	.0025	.0004	.0038	.0012	.0004	.0006	.0004	.0009	.0006	.0012	.0007	1.0234	.0192
16. Other Ser.	.0098	.0355	.0529	.0307	.0241	.2141	.0704	.0253	.0340	.0255	.0508	.0334	.0182	.0432	.0854	1.0756
MULTIPLIER	1.4338	1.3029	1.4591	1.6900	1.3965	1.5138	1.2136	1.3092	1.4355	1.1715	1.1298	1.2724	1.2776	1.1294	1.2379	1.2599

The table of total requirements shows the accumulated demands placed on Idaho processors if the state economy is to produce an additional dollar's worth of final demand. This table thereby indicates that each Idaho industry group is related, at least indirectly, to every other industry group in the state. Although the figures in each cell are shown in decimal form, they signify the cents worth of total output a particular industry group will *ultimately* be required to produce when the output of some other industry group increases by an additional dollar. For example, the second figure in column 3 of Table 4-5 is .0382 and reflects the tendency for Mining to increase its output by nearly 4c for every dollar increase in final demand for Construction. It should be noted that the term "ultimately" refers to the cumulative increase in output which will transpire in the future, but not necessarily immediately. The time-period concept of requirements distinguishes "direct" from "total" requirements.

The values for total requirements are greatest and most widespread in those lines which buy significant portions of their inputs from Idaho firms. Specifically, total requirements have more state-wide impact and breadth in Agriculture, Food and Kindred Products, Printing and Publishing, and Machinery-except-electrical. In essence, total requirements reflect that Idaho's leading basic industries (farming and food processing) are characterized by their connection to the entire Idaho economy. An increase in final demand in any form in these to industry groups, for example, generates increased output in other industries in the state. The contention that farming and food processing are leading basic industries is thereby reaffirmed because of the total impact on the rest of the state's economy brought about by initial changes in their output.

IMPACT ANALYSIS: MULTIPLIER EFFECTS

In addition to charting the structure of inputs immediately and over time, economists are also interested in measuring the effects generated by changes in final demand. Tables of direct and total requirements, which indicate the amounts each industry group will have to buy from all other industry groups when the output of one increases, measure impact effects on the basis of the ratio shown in each cell. However, instead of tracing the effects of a change in final demand on an economy from the standpoint of *inputs to* a particular industry group, *impact analysis* traces the effects of final demand changes on an entire economy. This portion of the Idaho input-output study treats the impact of additional demand on all industry groups in the state. By using a recent measure of national economic policy as an example, the nature of "impact" and the "multiplier" can be explained.

At the national level in 1963-64, there was great concern about the effects which the so-called "Kennedy-Johnson Tax Cut" would have on the economy. At that time economic growth and employment rates were lower than the nation's potential. Consequently, the Congress enacted a substantial tax cut as a means of injecting new life into a sluggish economy. Both the federal personal and corporate income tax rates were lowered. Coupled with this maneuver a lucrative "investment credit" to relieve further the tax burden was brought into effect. By leaving households with more money to spend, the Congress hoped that Consumption (a component of final demand) would be stimulated; by leaving businesses with more money to spend and encouraging them to spend it on plant and equipment, it was hoped that Investment (another component of final demand) would also increase. The combined effects of these programs were therefore to bolster final demand at the national level. Many businessmen, economists, and legislators looked for successive rounds of both kinds of spending and re-spending to lead to additional employment and a faster rate of economic growth. In more technical language, it was hoped that the impact of these tax-cut measures on the economy would cause a "multiplier effect," thereby increasing the volume of final economic activity by a multiple of its original magnitude. Although cause-and-effect relationships are often difficult to establish precisely in economics, it is interesting to note that, shortly after the tax cut, income, output, and employment all rose substantially. An appraisal of "impact" and corresponding "multiplier effects" can be traced for the Idaho economy through a unique analysis of tables of direct and total requirements, as outlined below.

As a method which traces the effect of a change occurring in one industry to all other industry groups in the state, *impact analysis* is a useful technique in charting the course of economic growth in a region. Impact analysis capitalizes on the use of "multipliers" to chart such relationships. The *simple multiplier*, reflecting Idaho interindustry impact, for each industry group is the sum of that line's direct requirements and can be noted in the bottom entry of each column of Table 4-4. Hence, the simple multiplier for Agriculture is .3314 and for Food and Kindred Products is .4872. The total *income multiplier* measures the impact of accumulated transactions (direct plus indirect) and is presented as the bottom entry for each column in Table 4-5. For example, the total income multiplier for Transportation is 1.1298. In order to separate indirect from total effects, each cell at the bottom of Table 4-4 would have to be subtracted from its corresponding cell in Table 4-5. Simple and total multipliers for each of the 16 industry groups in Idaho are shown in Table 4-6.

TABLE 4-6. ESTIMATED IDAHO INCOME MULTIPLIERS, 16 INDUSTRY GROUPS, 1963

Industry Group	Simple Multiplier	Total Multiplier
Agriculture	.3314	1.4333
Mining	.2471	1.3029
Construction	.3684	1.4591
Food and Kindred Products	.4872	1.6900
Lumber, Wood, & Furniture	.2980	1.3965
Printing and Publishing	.3954	1.5138
Chemicals and Allied Products	.1750	1.2136

Fabricated Metal Products	.2601	1.3092
Machinery-except-electrical	.4354	1.4355
Manufacturing, n.e.c.	.1400	1.1715
Transportation	.1057	1.1298
Utilities and Communications	.2166	1.2724
Trade	.1853	1.2776
Finance, Insurance, Real Estate	.1037	1.1294
Personal Services	.1867	1.2379
Other Services	.2062	1.2599

Among other Idaho producers, aggregate total requirements (multiplier effects) are greatest in those industry groups which generate income mainly by direct means, notably in Food and Kindred Products, Agriculture, Printing and Publishing, Construction, and Machinery. Here, increases in output due to supplying additional final demand reverberate through the Idaho economy because establishments must purchase inputs from other businesses in order to increase their own output. It is significant that many of these purchases will be made from Idaho firms. In each of these 5 lines, total requirements are more than 1.4 times the initial demand (i.e., for every $100 increase in final demand at least *another* $40 worth of output is generated), on the basis of Table 4-5. An increase in final demand for processed potatoes of $1,000,000, for example, has the potential of ultimately generating nearly $1,700,000 worth of output in Idaho, according to these provisional input-output relationships. Moreover, this initial purchase would increase sales of 3 Idaho industry groups by at least $43,000 each; in the case of Transportation, sales would ultimately increase by approximately $47,000. As a result, the impact of the initial increase would be felt in many parts of Idaho rather than just in one industry group.

To continue, an initial dollar increase in final demand for agricultural products will ultimately generate a total of $1.42 in agricultural output. On the other hand, total requirements are less than 1.2 in Manufacturing, Transportation, and Finance-Insurance-Real Estate. In these lines, increases in final demand do not have much impact in generating income and output for the Idaho economy since the "satellite" industry relationships are weak within the state.

The multipliers shown at the bottom of Table 4-5 and in the right-hand column of Table 4-6 for each industry group in the Idaho input-output study can be used to project the aggregate effects of increases in final demand. Since the multipliers are in decimal forms, signifying "cent's worth of ultimate output for every dollar's worth increase in final demand output," any reader can easily figure the estimated impact. For example, suppose a businessman or legislator knew that an *additional* $5 million were to be allocated in Idaho on new construction during the oncoming year. To calculate what this increased expenditure could mean to the Idaho economy over time (in terms of generating additional income after all the spending and re-spending of the $5 million took place), simply multiply the total multiplier for Construction (1.4591) by the impending increase in expenditures ($5 million).

The result, $7,245,500, suggests that the new construction will ultimately generate over $7 million worth of income in the state. A similar approach can be taken to calculate the "impact" of initial expenditures by using the "multiplier" for each industry group. Obviously, the future economic growth of the state bears a close relationship to these interindustry impacts, and economic planning must be cognizant of the leakage represented by imports and processing of exports. Nevertheless, this type of analysis is useful in estimating how an entire economy can be affected by initial increase in spending.

STRUCTURE OF NET EXPORTS

Another important aspect of the structure of Idaho's economy is the extent to which the state is dependent upon outside regions for its outputs, both physical and monetary. Indeed, the concept of an "economic base" is directly related to the degree of this dependence. An analysis of economic base involves determining whether goods produced within the state are sold (exported) to sources of demand outside the state. Identification of inputs which are purchased from firms beyond the state's borders (imported) is also associated with the economic base. In regional economic terminology, those industry groups which lead in exporting a portion of an economy's output are integral to the state's "economic base." More precisely, important growth industries are said to be those industry groups which lead to exporting more than they import. Thus, if an industry group is characterized by significant net export (exports less imports), that industry is said to be a major segment of a state's economic base.

In order to determine which lines of business activity form the bases of Idaho's economic structure, the pattern of net exports was calculated for each industry group in the processing sector of the Idaho Provisional Gross Flows Table and are shown in Table 4-7. According to the data, nearly every industry group is involved in exporting and importing activities. An examination of the second column in Table 4-7 indicates that leading *gross* exporters were Food and Kindred Products ($296 million), Agriculture ($215 million), Chemicals and Allied Products ($173 million), and Lumber, Wood, and Furniture ($140 million). These industry groups each represent raw materials and related processing forms of economic activity. Furthermore, another raw materials line (Mining) contributed $77 million in gross exports. Thus, these five lines contributed $946 of $1,216 million or approximately 77 percent of Idaho's gross exports in 1963 according to the provisional input-output study. It is also significant that notable amounts of exports are transacted by Manufacturing-not-elsewhere-classified ($121 million) as well as by Transportation ($88 million). While it is true that a large portion of these combined gross exports can be claimed to arise from manufacturing operations of a sort, their complexion is not closely related to industrial-machine type manufacturing.

The pattern of interregional trade is not much different from the above analysis when *net* exports (exports less imports) are calculated, as shown in column four of Table 4-7. Once again agriculturally related sources of income (farming and food processing) form a major part of Idaho's economic base, according to this criterion. Chemicals, wood and miscellaneous manufacturing also contribute an important share to basic sources of income and employment in Idaho. On balance, these five industry groups (1, 4, 5, 7, and 10) constitute nearly 85 percent of all *net* exports for firms included in the Idaho processing sector.

Finally, four industry groups each import more than they export. Specifically, Construction, Machinery-except-electrical, Finance-Insurance-Real Estate, and Other Services appear as negative entries in column four of Table 4-7. The output of three of these industry groups essentially represents the sale of various kinds of services which are normally not sold outside the state in significant amounts, although firms in these lines do import certain inputs not available inside Idaho (e.g., very heavy construction of goods). The remaining line, Machinery-except-electrical, exports a small amount, but because Idaho is not a highly industrialized state in terms of fabricated parts and other similar supplies, firms in this industry group must buy those inputs from outside the state. On balance, however, Idaho *is* a *net* exporter and nearly all industry groups contribute to this form of economic activity.

TABLE 4-7. ESTIMATED STRUCTURE OF NET EXPORTS, 16 INDUSTRY GROUPS, IDAHO, 1963

(dollars in millions)

Industry Group	Gross Exports	Gross Imports	Net Exports (Exp.-Imp.)
1. Agriculture	$ 215.0	$ 93.3	$121.7
2. Mining	76.9	17.4	59.5
3. Construction	———	16.6	—16.6
4. Food & Kindred Products	296.3	78.4	217.9
5. Lumber, Wood, Furniture	140.3	55.2	85.1
6. Printing & Publishing	5.9	3.2	2.7
7. Chemicals & Allied Products	173.2	81.5	91.7
8. Fabricated Metal Products	4.4	3.8	.6
9. Machinery-except-electrical	1.8	2.5	—.7
10. Manufacturing, n.e.c.	121.0	40.0	81.0
11. Transportation	87.8	38.9	48.9
12. Utilities & Communication	6.8	———	6.8
13. Trade	65.4	62.5	2.9
14. FIRE	———	2.3	—2.3
15. Personal Services	20.7	5.6	15.1
16. Other Services	———	7.9	—7.9
TOTALS	$1,215.5	$509.1	$706.4

Chapter Five

CONCLUDING REMARKS

According to the title page this study allegedly deals with Idaho's *economic structure.* Since the term "economic structure" refers to the internal arrangement of the components of the economy it is appropriate to outline these general features of Idaho. The primary objective of this study was to estimate the interindustry transactions by Idaho business firms and to trace their relationships to ultimate sources of demand both inside and outside the state. Concurrently, an attempt was made to analyze these relationships and draw tentative conclusions from them. This final chapter summarizes some of the main findings of the study, then explores several problems associated with the analysis.

REVIEW OF PROVISIONAL RELATIONSHIPS

What can be said broadly about the structure of Idaho's economy? What is its economic base? What is the composition of business activity associated with that foundation? What are the interconnections within that structure and their relations to the outside world? This section attempts to answer these basic questions.

Aggregate Relationships

Tables 3-1 and 3-2 can be used to posit some interesting relations about Idaho. In 1963, total gross output in Idaho was estimated to be $5.16 billion and Gross Idaho Domestic Product (GIDP) was calculated at $1.64 billion. Idaho households consumed roughly $867 million worth of goods and services of which $418 million (48 percent) were purchased from Idaho business firms, according to the provisional data. During 1963, total investment (capital creation) in Idaho approximated $180 million while the combined purchases of federal, state, and local government units amounted to nearly $341 million. Although gross exports were estimated to be close to $1,214 million, the value of estimated imports ($959 million) portrays Idaho as a *net exporter* of approximately $255 million for that year. Sales and purchases of Idaho businesses to and from each other amounted to an estimated $683 million while the total value created by all Idaho businesses was nearly $1.87 billion. The combined final demands stimulating the Idaho economy amounted to approximately $1.9 billion of which $1.2 billion arose from sources outside the state thereby signifying that Idaho is quite dependent on its ties with the rest of the nation, a tendency directly related to the concept of economic base.

Economic Base

Table 5-1 contains a summary of several analyses developed from the Idaho Provisional Gross Flows Table as well as from

tables showing direct and total requirements. These relationships pertain to nine major industry groups which were associated with significant economic activity in the state. Estimated interindustry and final demand transactions suggest Idaho's economy is strongly related to agricultural sources of income, mainly from farming and food processing. Generalizing even further, Idaho's economic base rests largely on raw materials and related processing sources of income and output. In this regard, farming, mining, and lumbering (representing raw materials) and food, wood products, and chemicals (representing raw-materials processing) combined constitute a large percentage of the gross output and value created in Idaho. In addition, net exports and multipliers are generally larger in these industry groups than for most other lines of business. In fact, the values of the multipliers (as noted in Table 5-1) are also large enough to suggest that increases in final output among these five lines have significant growth-generating potentials for Idaho. Not only are immediate reactions to changes in final demand significant in terms of simple multipliers, but the total income multipliers are also relatively large in these lines. Output and multiplier measures in other industry groups were also found to be significant, notably in Transportation, Trade, and Utilities-Communication; however, these industries are tied more to economic activity *in* Idaho rather than to out-of-state sources of final demand. In essence, the structure of Idaho's economy rests primarily upon a foundation of raw materials production and related processing because in these lines, rather than in industrial manufacturing or services, output, employment, and income are originally generated through supplying out-of-state sources of final demand. In this way, the wherewithal for supporting secondary and facilitating businesses in Idaho is made possible.

TABLE 5-1. SUMMARY OF SELECTED MEASURES OF ESTIMATED ECONOMIC ACTIVITY AMONG MAJOR IDAHO PRODUCERS, 1963

Idaho Industry Group	Gross Output	Value Created	Sales to Idaho Firms	Net Exports	Simple Multiplier	Total Multiplier
Agriculture (1)	$453.9	$210.1	$183.8	$121.7	.33	1.43
Food Processing (4)	370.0	111.1	58.7	217.9	.49	1.69
Trade (13)	313.0	105.0	63.5	2.9	.19	1.27
Lumber and Wood Products (5)	206.0	89.4	55.7	85.1	.30	1.40
Finance-Insurance-Real Estate (14)	194.0	171.6	77.8	—2.3	.10	1.13
Chemical (7)	190.0	75.2	16.8	91.7	.18	1.21
Miscellaneous Manufacturing (10)	169.2	105.3	19.8	81.0	.14	1.17
Utilities and Communications (12)	102.3	80.1	52.9	6.8	.22	1.27
Mining (2)	82.8	44.9	5.9	59.5	.25	1.30

Idaho's Economic Infrastructure

Tables in Chapter Three contain some important relationships on which industry groups are related to Idaho sources of demand as well as those dependent on the state's basic industries

for their business activity. Several industry groups export relatively small amounts to final demand, notable Printing and Publishing, Machinery-except-electrical, Fabricated Metal Products, Construction, Finance-Insurance-Real Estate, and Other Services. In each of these six lines, sales to Idaho firms (either for intermediate demand or capital creation) are much greater than sales for export purposes. Since both processing and investment sources of demand are Idaho-oriented, it follows that firms selling for these purposes may be tied to firms that export.

Another aspect of the nature of Idaho's economic infrastructure is the extent to which certain lines primarily service support basic industries. This relationship can be noted from Table 3-3 (Direct Requirements) which indicates that some industry groups sell most of their output to several lines represented in the processing sector. For example, Transportation, Other Services, Finance-Insurance-Real Estate, Utilities and Communication, and Trade each supply between 12 and 15 other industry groups with their own inputs. As such, these 5 industry groups facilitate Idaho firms rather than servicing out-of-state sources of demand directly. Tracing this relationship even further, it can be noted that a large part of the outputs of these five industry groups constitute the majority of inputs used by the 6 industry groups identified as basic industries in the section directly above. While it is obvious that wholesale and retail establishments, public utilities, communications media, transportation facilities, and the various business services are essentially supporting rather than primary lines, it is important to realize that economic activity among these business firms is closely *related to* the operations of basic industries.

Some Interesting Comparisons

The credibility of aggregate state measures devised from the Idaho Provisional Gross Flows Table can be appraised by comparing them with similar economic measures at the national level. For example, Gross Idaho Domestic Product (GIDP), the value of all goods and services in Idaho, was estimated to be $1.64 billion in 1963 while Gross National Product (GNP), the value of goods and services produced nationally, was reported at $583.9 billion during that same year. Thus, Idaho produced approximately .281 percent of the GNP in 1963 according to the provisional figures. It is interesting to note that in 1964 Idaho had nearly .289 percent of the nation's participation income[1] and approximately .290 percent of United States population.[2] Since these 3 percentages are quite close, the comparison suggests that the Idaho study has generated reasonable estimates. Furthermore, similarities between the composition of GIDP and corresponding data for other states (discussed in Chapter Three) also indicate that the estimates developed in this study are plausible.

[1]U. S. Department of Commerce, Office of Business Economics, *Survey of Current Business*, August, 1958, and July, 1965.
[2]Department of Commerce, Bureau of the Census; *Current Population Reports*, Series P-25, Nos. 304, 336, and 348.

SOME PROBLEMS OF INPUT-OUTPUT ANALYSIS

Procedures for accomplishing the Idaho interindustry study were presented in Chapter Two. The project was a provisional one, and many sources of secondary data and other information were used. The author experienced many minor difficulties which were resolved on a day-to-day basis; other basic problems were accepted as inevitable occurrences in economic research. Whereas the input-output method is characterized by several theoretical limitations,[8] completing the Idaho study gave rise to some empirical problems of research and procedure which ought not to pass unmentioned. The following nine points do not cover all difficulties which might be encountered in an interindustry study, but they do include some conceptual and practical problems which must be recognized and accommodated. They are presented here as neither shortcomings nor limitations, but rather as a means of communication so that readers might develop additional understanding of input-output research and its limitations.

First of all, *a procedural problem* exists which involves preliminary organization of the study itself. The researcher must decide how many sectors and industry groups should be included in an input-output study of a region. The actual numbers depend upon the amount of detail deemed necessary and the extent to which certain industry groups are worthy of examination. In Idaho two manufacturing lines with serious growth potential, according to some observers, are potato processing and trailer construction. Yet, these lines were not isolated in the Idaho study because two-digit Standard Industrial Classification data was used as a guideline for establishing the 16 industry groups in the processing sector; the level of these categories are too broad to focus on specific products. Another aspect of procedure is the development and execution of appropriate planning devices as a means of organizing the workload and scheduling deadlines. Researchers who are familiar with recently developed statistical planning techniques will find them to be excellent organization tools. An interindustry study is so complicated an undertaking that careful planning must be implemented from the beginning of the project.

Second, *a temporal problem* is usually present because it takes time to accomplish a useful input-output study. If the research is conducted in stages much of the information may become outdated if the lapse of time between data gathering and publication is lengthy. Over relatively long periods of time, demand and production functions can change; thus, if the project is prolonged much of the analysis does not truly reflect current conditions. However, searching out relevant data is a time-consuming task. It is often difficult to be efficient, yet effective in handling this aspect of interindustry analysis.

[8]An excellent account of these theoretical problems can be noted by comments of Friedman, Milton, and Phillip Ritz as reported in *Input-Output Analysis: An Appraisal Studies in Income and Wealth:* Vol. 18, (Princeton: Princeton University Press, 1955), pp. 169-182.

Third, *a financial problem* besets interindustry projects because sufficient funds are needed to accomplish a thorough and valid research of such economic relationships. The cliche that "a poor study is better than none" may not be entirely true for input-output projects since incorrect conclusions often lead to poor decision making. Perhaps no interindustry study is better than an invalid one. However, as a means of gaining insight into the nature of a state's economic structure a tentative set of relationships may be sufficient. As for funding, input-output analysis is so all-pervasive in terms of its uses that many interest groups, such as businesses, institutions, and government agencies, benefit from its completion and may be potential sources of support. Yet, gaining financial backing can be as time-consuming a task as accomplishing the study itself.

Fourth, *a problem of cooperation* also exists in terms of obtaining information from both primary and secondary sources. It is no understatement that a selling job must be accomplished to gain community support if a researcher is to secure good information for an input-output study. In this regard, one must necessarily explain the nature and value of this technique to businessmen and others. Here, it is important to meet with community and business leaders both individually and in group sessions. By pointing out some of the uses of input-output for forecasting, market-share analysis, and industrial development a better understanding of the project can be established so that cooperation from interested groups can be enlisted.

Fifth, *a credibility problem* is present when conducting interindustry studies because it is often difficult to validate information from respondents who furnish data. This difficulty does not arise due to dishonesty but rather from a lack of communication on the part of the interviewer or misunderstanding on the part of persons being interviewed. In this study of Idaho's economy, wherein secondary information sources were used, the credibility problem was minimized. However, researchers attempting to continue this project via primary data sources may encounter such difficulties. A careful appraisal of data and information is needed to compensate for the credibility problem.

Sixth, there is also *a problem of comparability* when using various information sources for completing an interindustry study. Since the present project was accomplished with a relatively small amount of funds, it was necessary to be as resourceful as possible in accumulating secondary data. Bits and scraps of information from a multitude of sources were pieced together to build the Idaho Provisional Gross Flows Table. However, these data were not originally collected for the same purposes nor according to similar classifications and units. As such, they may be both conceptually and realistically non-comparable. While it is hazardous to aggregate them as a means of drawing conclusions, it is important to note that the use of different types of already-published data can be cross-checked via several methods. In the Idaho Pro-

visional input-output study, many estimates were compared with similar results from other state studies. As a result, minor adjustments were made in the data wherever deviations appeared unreasonable.

Seventh, *a problem of independence* often characterizes research on economic structure. The job of the economist is not just to accomplish research *per se,* but to be creative and innovative in adapting research techniques while studying a problem. In this way, as barriers to knowledge are pushed back, worthwhile spillover effects can also occur: A research problem is not only explored but a different way of analyzing other problems evolves. In regional economics it is often difficult for each study to be a replica of other projects because states and communities differ according to resources, type of economic activity, and composition of population. In a nation where unique conditions persist, no two regions are exactly alike; therefore, data, procedures, and techniques for analysis will necessarily be different. Yet, as each researchers tries to solve his unique problems, a related problem of coordinating rather than copying efforts evolves.

Eighth, *an integration problem* arises while attempting to assimilate studies of various regions into each other. Different levels of government or certain businesses may wish to combine two or more interindustry studies. Suppose a manufacturer in Coeur d'Alene plans to expand sales into Washington and wishes to correlate the Idaho and Washington input-output tables. Unfortunately, the Washington study has 27 industry groups in the processing sector while the Idaho project used only 16 such entries. Thus, it would be difficult to integrate the two studies. Additionally, it is often hazardous to compare one state with another, or even with the nation, if different categories are used in the final demand and/or payments sectors. Since there is some autonomy in developing and conducting regional input-output research, coordinating one study with another becomes a frustrating experience.

Finally, *a problem* encountered is one *of involvement.* Conducting a worthwhile input-output study is not properly a part-time activity; it is a full-time job for more than just one person. For a region or area, such as the Pacific Northwest or the State of Idaho, a team effort is more appropriate than merely attacking the project with inadequate manpower. Since many tedious man-hours are in store for interindustry researchers, the scope of the program must be outlined well in advance and the extent of time involved in conducting one must not be underestimated. While it is often difficult to involve enough researchers in appropriate subject-matter areas, most successful studies have been accomplished through a task-force approach.

FURTHER STUDY ENCOURAGED

Many economic relationships can be developed from input-output analysis, although this study has included only a few of them. Estimates derived from the interindustry study can be useful to gain basic insight into the nature of Idaho's economy. Additional inquiry will benefit from methodological problems encountered in this study. The apparent weak interdependencies among Idaho industries indicate that growth-sensitive lines of business may exist; additional research and analysis may suggest appropriate economic policy measures to stimulate more self-sufficiency for Idaho's economy. With further interest and support, a detailed interindustry study based on primary data may yield relationships precise enough to be used by Idaho businessmen, state and local government officials, and others interested in the structure of Idaho's economy.

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TABLE 4-1. IDAHO PROVISIONAL GROSS FLOWS TABLE, THOUSANDS OF DOLLARS, 1963

BUYING INDUSTRIES

SELLING INDUSTRIES *(Read down)*	1. Agriculture	2. Mining	3. Construction	4. Food & Kindred Products	5. Lumber, Wood & Furniture	6. Printing & Publishing	7. Chemicals & Allied Products	8. Fabricated Metal Products	9. Machinery (except elec.)	10. MFG (n.e.c.)	11. Transp.	12. Utilities & Comm.	13. Trade	14. Finance, Insurance—Real Estate	15. Pers. Services	16. Other Services	Intermediate Demand	Investment	Consumption	Government	Exports	Final Demand	Gross Output		
1. Agriculture	45388			136731									1710					183829		22694	32369	214990	270053	453882	1.
2. Mining	100	162	5300	9			326	18					7					5922			1000	75878	76878	82800	2.
3. Construction			140															140	88860		50000		138860	139000	3.
4. Food & Kindred Products	14000			13500									31250					58750		5000	10000	296250	311250	370000	4.
5. Lumber, Wood & Furniture			10300		41200								4167					55667		8000	2000	140333	150333	206000	5.
6. Printing and Publishing				320		3200							1600	3200	1600	1600		11520	6058	8000	500	5922	20480	32000	6.
7. Chemicals & Allied Products	5812						7865						3167					16844				173157	173156	190000	7.
8. Fabricated Metal Products			2040					680	272	2720								5712	3097		400	4391	7888	13600	8.
9. Machinery (except elec.)									234				195					429	9531			1760	11291	11720	9.
10. Manufacturing (n.e.c.)			15000							3382			1409					15791	11455	16916		120999	149370	169161	10.
11. Transportation	16243	4554	4170	10800	8240	500	5700	260	100	5070	2400		533					51570		14150	500	87780	102430	161000	11.
12. Utilities and Communications	3500	4968	695	2700	2060	640	4240	136	1171	3382	1610	17682	3095	1940	1652	3386		52857		24988	17683	6755	49426	102283	12.
13. Trade	27051	6674	3271	6371	4865	775	1808	301	258	4004	3788		2184	456	129	1593		63528	10627	173000	500	65390	249517	313045	13.
14. Finance, Insurance-Real Estate	36365	1940	4760	1940	1940	1940	1940	1940	1940	1940	1940	1940	5320	7760	1940	1940		77485		115515	1000		116515	194000	14.
15. Personal Services	2054												196		1187	1187		4624		29608	500	20703	50811	55435	15.
16. Other Services		2170	5560	8100	3090	5600	11400	204	234	3383	7305	2555	3341	6790	3857	4141		67730						67730	16.
Sub-Total	150513	20468	51236	180471	61395	12655	33279	3539	4209	23881	17043	22177	58174	20146	10365	13847		683398	129628	417871	116452	1214307	1878258	2561656	
Imports	93306	17430	16553	78443	55181	3226	81528	3843	2461	40020	38940		62520	2280	5645	7916		509292	50000	350000	50000		450000	959292	
Value Created	210063	44902	71211	111086	89424	16119	75193	6218	5050	105260	105017	80106	192351	171574	39425	45967		1368966		99137	174228		273365	1642331	
Sub-Total	303369	62332	87764	189529	144605	19345	156721	10061	7511	145280	143957	80106	254871	173854	45070	53883		1878258	50000	449137	224228		723365	2601623	
Final Total	453882	82800	139000	370000	206000	32000	190000	13600	11720	169161	161000	102283	313045	194000	55435	67730		2561656	179628	867008	340680	1214307	2601623	5163279	

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